Review

Restructuring education, training and human-resource development in the Nigerian construction industry

N. Aniekwu* and C. A. Ozochi

Civil Engineering Department, University of Benin, Benin City, Edo State, Nigeria.
E-mail: anny_aniekwu@yahoo.com.uk, ananiekwu@uniben.edu.

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Investments in manpower development in the construction industry of most developing nations have been the failure of numerous National plans and development strategies adopted by countries and international lending institutions. As a consequence most of these nations are experiencing serious human resources constraints in their construction industry. Clearly the perception and position of government on education has a very long term effect on training of manpower for the industry. The paper looks at knowledge acquisition, the constraints and the possibilities of creating new human-resource capacity for the industry. By stabilizing the construction environment and re-orienting existing training and training institution in terms of government skills-development strategy, these proposals will help create new careers for those working in the industry.

Key words: Construction, education, human-resource capacity, skills-development strategy.

INTRODUCTION

Construction involves more risks than most other industries. Construction sites are often located in remote places, materials have to be transported to site from long distances, labourers has to be housed and fed and many unknown and unpredictable events have to be managed, weather, ground conditions, break downs, price changes, delay by owners just to mention a few. Also the production responsibilities are divided among many participants (designers, owners, contractors, sub-contractors, material suppliers, equipment dealers, funding institutions, etc.) each performing different functions and belonging to different organization with different objectives, policies and practices. Construction therefore involves a substantial expertise in the management of risks, materials, equipment, money and time, and the coordination of the activities of disparate participants who may not be directly responsible for the final product and over whom there is limited opportunity for control. In most developing countries like Nigeria the adverse business environment under which the contractor must operate further complicates these responsibilities. Construction therefore, requires the possession of a broad range of management talents and skills and the capacity for a continuum approach to problem solving.

These skills can be acquired only through experience, while the knowledge comes from learning in a real or stimulated environment. The highest level of learning by a construction professional is to be trained as an engineer or similar profession and to perform either as a consultant or a contractor. This training acquaints the benefactors with the theoretical and practical principles of engineering operations and problem solving. At the lower end of the spectrum are artisans and craftsmen of all kind. From a global perspective, economic and social developments are increasingly driven by the advancement and application of knowledge. Education in general and higher education in particular, are fundamental to the construction of a knowledge economy and society in all nations (World Bank, 1999). Yet the potential of higher education systems in developing countries to fulfill this responsibility is frequently thwarted by long-standing problems of finance, efficiency, equity, quality and governance. Now, these old challenges have been augmented by new challenges linked to the growing role of knowledge in economic development, rapid changes in telecommunications technology, and the globalization of trade and labor markets.
EDUCATION AND THE ACQUISITION OF DEVELOPMENT SENSITIVE KNOWLEDGE

For individuals and for countries, education is the key to creating, adapting and spreading knowledge. Basic education increases people’s capacity to learn and to interpret information. But higher education increases the technical training needed to build a labour force that can keep up with a constant stream of technological advances, which compress product cycles and speed the depreciation of human capital, such as the construction industry. And outside the classroom, peoples’ working and living environments are the setting for still more learning, well beyond the ages associated with formal education. Recognizing these benefits, many countries have made great strides in expanding enrollment at all levels of education, and a good number have made primary and even secondary education universal (World Bank, 1999).

Basic education with the proper content is very critical for enhancing people’s capabilities to harness knowledge while investments in higher education offer the appropriate labour force for enhancing technical knowledge base. Besides teaching new and better skills, tertiary education and technical training produce people who can monitor technological trends, assess their relevance to the country’s prospects and help formulate an appropriate national technological strategy.

New knowledge in the form of scientific discoveries and inventions requires abundant financial resources, sophisticated human capabilities, as well as business acumen to stay ahead of competitors (which is a factor generally beyond the reach of developing countries). Being a technological “follower” did not hurt the East Asian economics, which began their spectacular rise by being very good at adapting foreign technology. But even a follower country needs a labour force with a relatively high level of technical education, especially when technologies are changing rapidly. There is some evidence from studies that, the type of tertiary education provided, matters for economic growth. The proportion of students majoring in mathematics, science and engineering has being found to be positively correlated with subsequent growth rates, suggesting higher returns to education investments in these fields. The content of education thus appears important for countries seeking to develop new technologies suitable for local conditions (Aniekwu and Ogbeide, 2002).

Clearly, the massive investment in tertiary education enabled the East Asian countries to sustain their new industries, sustain their strategy of technology adoption and provided the basis for their later growth. Universities need to ensure that curricular will be more attuned to the perceived demand of students and adapt faster to changing technologies. Academics should consult in the industry for relevance and synergy of research and practice. And because experience provides opportunities for discovery, it increases the general stock of knowledge. Similarly, learning can lower the unit cost of production as workers discover better ways to use new technology, to organize production, or to monitor product quality. The observation that wages and productivity rise with experience in the initial stages of many jobs is consistent with such on the job learning. Education in many developing countries remains of poor and mediocre quality, particularly when it comes to the basic skills on which countries will depend to meet the needs of tomorrow’s labour market. These observations are as relevant in the construction industry as any other in the contemporary times, but more so, because of the dynamic and itinerant nature of construction.

BASIC TRAINING IN NIGERIA

For education, Nigeria spends an estimated 2.4% of its GNP while Sub-Saharan Africa as a whole spends 5.1% (Osime, 2007; William et al., 2004; Hinchliffe, 1987; Unesco, 2000). In Nigeria, primary education enrolls 81% of the relevant age group and graduates 69% of these. Therefore just over half of all children complete primary school. School drop-out rates have been rising and educational standards have reportedly declined (Onweh, 1997). Secondary education enrollments grew at roughly 10% yearly during the 1990s, but access remains constrained (less than half of secondary school age children attend school) and significant regional disparities in access are evident. Technical education is substantially neglected by policymakers and oriented to the teaching of traditional hand skills that are often divorced from labor market requirements. Higher education enrolls a very modest 4% of the relevant age cohort. This level compares poorly with economic competitors such as South Africa (17%), India (7%), Indonesia (11%) and Brazil (12%) (World Bank, 2006).

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

1. The need for basic subsistence as a pre-requisite to any kind of training is paramount and instinctive to man. In 1985, Nigeria’s poverty line was such that the rural, urban and national levels were respectively 49, 31.7 and 43%. Seven years later, although there was an improvement of 13 and 7% respectively in the rural and national levels, the urban level’s improvement was marginal at 1.2%.

2. By international assessment as 1997, Nigeria was considered really poor as over 70% of her population lived on less than $1 per day and over 90% lived on less than $2.0 per day consequently, a substantial percentage
of the educable population drop out just to focus on subsistence.

3. There is a chronic lack of facilities to offer adequate education to all deserving and qualified Nigerians and consequently another substantial percentage of the qualified population drop out due to lack of appropriate institutions to accommodate their educational needs.

3. Funding of the educational system in Nigeria has been identified as one of the most pervasive and the greatest challenge to education and the training of all categories of professionals in the country. Experts agree that the most serious problem facing the Nigeria educational system is the manner in which the sector is funded, organized, planned and administered. The United Nation's Education and Scientific Committee (UNESCO) approved standard budgetary allocation to education is 26% of the national budget in order to engender proper development in that sector and in appreciation of the key role of that sector in economic development. And for the past 15 years, no government in Nigeria has been able to meet this minimum standard and indeed, since 1999 and the advent of democratic rule in Nigeria, the budgetary allocation to education has not risen beyond 10%. While many countries have met or are striving to attain the UNESCO approved minimum budget allocation, Nigeria has continued to accord low priority to education and indeed the allocation of only 1.8% in the current year. (Hartnett, 2000).

Figure 1 indicates the low level of interest the government has on education. Not only is the training of construction workers of little interest in the government in Nigeria but so is any other kind of training. The low investment privately accorded to education implies that the basic ground upon which individuals, forms or institutions could stand to undertake the discrete training of construction workers is very weak and the existing educational factor cannot be maintained. The long term implication of this situation is extremely disturbing because a time will come when the populations who have been so denied their opportunity of meaningful training will be directly responsible for the continued functioning of not only the construction industry but the country in general. This will obviously amount to a regression.

THE ACADEMIA-INDUSTRY DIVIDE

The great double irony facing technological development in Africa is that on one hand, Africa carries out relatively little research, and with over 8.5% of the world's population living in Africa, Africa still accounts for only about 0.9% of the world's scientific publications. (Saint et al, 2004).

Africa carries out only a tenth of the R&D it ought to be carrying out according to the world average. Yet on the other hand, even the little R&D output Africa produces is prematurely abandoned; little of it is ever developed into usable technologies. This led the UNESCO conference on University-Industry science partnership, in 1994, to conclude that Africa's developmental problems can only be addressed when there is collaboration between institutions that search for solution upstream, such as Universities and research institutes and those that seek solutions downstream such as industry and the rest of the productive sector. However, in Nigeria these sought of collaboration was statutorily forbidden by successive government in Nigeria from 1981 - 1999, and appropriate edicts where enacted to ban members of the academia from such collaborative efforts with the Industry. Thus the synergy that should be derived from the efforts of these two key sectors for technological development was effectively frustrated. The advice that Universities should adapt their curricula (and research institutions to their program), to the needs of industry and conversely, that industry should reciprocate by supporting this effort was of course not heeded, thus the training industry and society in general. We therefore had the situation where the country had need for innumerable number of professionals yet we had unemployed professionals.

INSTUTIONAL SETBACKS

The history of indigenous participation in professional consulting/contracting is less than 50 years old in Nigeria. Construction works where generally planned by public works department or the federal ministry of works. Early works where on roads, housing, structures while engineer- ing services were limited to plumbing and electrical wiring. These areas, including water supply and drainage became dominant in the 60s. With the oil boom of the 70s, housing became a dominant sector of the economy where in, structural engineering services, building services including water supply and drainage, electrical engineering services, air-conditioning, fire services, lift and escalators services became relevant in our industry. Until recently, indigenous participation has not included much works in areas of oil/gas/energy, power, industry, production, telecommunication environment valuation or project management-opportunities. In these areas, indigenous participation was restricted and foreigners were found under different guises, either as contractors or turnkey project (Uujahman, 2001).

This over concentration of professionals in areas of architecture and basic engineering with hardly mechanical and electrical engineers, in core engineering ministries – industry, telecommunication, oil and gas, power, production, aviation, transport, defense, etc, did not only fail to bring the different discipline of engineering to the ministry of works, but inhibited the necessary and relevant growth of engineering and technology in core areas of development. Mechanical engineers trained in hard core machines and equipment design, ended up doing plumbing works, offering superficial system design rather than venturing into equipment design, manufacture and fabrication. Many people grew up with the notion that
a mechanical engineer must only know how to repair his car once he leaves the University, simply because the name mechanical engineer sounds like a motor mechanic. So the poverty in our capacity to construct, manufacture, machine and fabricate is to a large extent dependent on the structure of the ministry that harbored engineers with very limited or no challenges, who instead depended on foreign professionals for work outside the scope of the ministry of works.

Today many engineering consulting firms are still tied around civil/structure, electrical and mechanical engineering services. The organizational structure that served us in the last 30 years are still in place, with tee squares, calculators and draughts-men. We must recognize the force of technological logic in the face of which one must bend or be swept from the sands of progress into darkness and backwardness. The consultants of this millennium must aspire to be relevant to society in terms of knowledge, innovation, service delivery and command of tools. We must be able to address non-technical issues including environment and sustainability if we want to be taken seriously and be relevant. These are all concepts that are new and relevant to our society and would require not just the re-training of the existing work force but will require a re-structuring of the industry in general to take advantage of these new trends. Whereas previously, independence and specialization were key issues embraced by organization and leading to the axiom that “bigger is better”, modern forward thinking organizations focus on collaborations, networking, strategic alliances, linking up and partnering. Rather than expanding to be able to handle an assignment, we join forces with particular expertise or capacity thereby spreading risks, retaining our lean structures and still reaching our objectives. Bigger is not better, Better is better.

**TRAINING OF CONSTRUCTION WORKERS**

**The Nigerian Situation**

The construction industry provides the infrastructure which is fundamental to the ongoing development of the country, its activities affects everyone’s lives in one way or the other. Right at the top of the list of government’s development priorities is the provision of infrastructures, designed to bring relief to people through job creation, linkages to markets, assets that promote economic business development in an integrated and coherent fashion. Jobs, expanding business opportunities and the potential for increased investment for small medium and emerging contractors and individuals are but some of the benefits that will flow from an expanded and motivated industry.

Declining investment and demand volatility has left the industry’s skills base depleted as experienced people leave the industry in times of depressed construction while unpredictable and poor career prospects discourage new entrants. Firms, faced with declining markets and tighter margins, have cut back on the education and training of staff. While the government seems totally oblivious of the importance of education in her scale of priorities, institutional mechanisms for supplying training to the industry have come under strain as the educational infrastructure is neglected, overstretched and not conformed with societal needs. Declining enrolment and falling contributions have left the existing training institutions facing increasing deficits while the majority of the industry’s workforce is still unable to access such training. Thus the restructuring of training must achieve the following:

1. Address the need for rapid skills formation to achieve the quantity and quality required to meet the nations development programme;
2. Create synergy with the changing realities of the industry;
3. Promote access to training and career progression by the workforce, and emerging enterprise;
4. Create an equitable and sustainable financing system for training and education, which recognizes the need for all participants to contribute;
5. Align professional training needs to be more closely harmonized with development priorities and the delivery approaches; and
6. Develop a focus on the specific requirements of public-sector delivery management.

Although most contractors in Nigeria are not trained as engineers, this training in a low technology environment like Nigeria is fraught with problems. The technological educational system in Nigeria is closely fashioned after the British system which is basically suited to a society with a high level of technological development and awareness as in Britain. Thus, it was noted that, while the theoretical education of engineers in Nigeria used to compare favorably with that of any University in the world, the opportunity for practical training is extremely inadequate (Oseni, 1987). The same is true for polytechnics and other technical schools in the country. This situation has deteriorated so badly that a typical
Nigerian graduate cannot be accepted for postgraduate work in most developed countries. Even the theoretical aspect of his training is now so deficient that he has never seen nor conducted experiments in key engineering principles. This as a consequence of the low level of priority accorded education by the government and the import dependent nature of Nigeria on foreign technologies and the tendency to acquire these technologies faster than the skills and knowledge required to operate them.

The education curriculum operated in Nigeria for example, requires students of engineering to undergo industrial training program for a substantial percentage of his total training period, as is standard in most schools of engineering, the world over. However, there are no places to send these students for their industrial training experience. Thus that part of the programme is loosely implemented. The technical aspect of engineering is more or less standard in the world over, with the engineering formulae, of universal application with defined constraints. However, the management of engineering services must be geared towards the environment in question. The educational curriculum for the training of construction professionals in Nigeria is very inadequate in this respect. Not only do the students not get enough training in management courses, but the little management training he gets, is standard and not directed at his business environment. Thus a young graduate is as handicapped, from this point of view as any foreigner in operation within the Nigerian business environment. Further more, the facilities for training all categories of technical workers are limited in the number they can produce within a given period. They are limited in terms of the facilities available for conducting this training both equipment-wise and staff-wise and in terms of physical facilities housing them. Thus although Nigeria has many universities with faculties of engineering, many technical colleges and polytechnics, there is still a serious shortage of manpower and skills.

Conceptually, educators could hardly differentiate between the terms vocational and technical education, while society had been led to believe that vocational education is for those who are incapable of pursuing academic programmes. Against this background, vocational and technical education has made slow progress from its earliest times to date. For the purpose of clarity, vocational education is that skill-based programme designed for sub-professional level education and based on a specific vocation. Technical education, on the other hand, facilitates the acquisition of practical and applied skills as well as basic scientific knowledge.

The major difference between the two terms is that, whereas vocational education is designed for a particular vocation, technical education does not target any particular vocation but gives general technical knowledge. Thus, while every vocational education programme is technical in nature, not all technical education programmes are vocational. This subtle relationship accounts for the interchangeable use of both terms in academic literature.

In Nigeria for example, vocational education programmes are offered at the technical colleges, while the polytechnics offer vocational and some technical education courses at the ordinary national diploma level (Otuka, 1993). The training for low – middle level manpower is facing very serious challenges and indeed it has become very difficult to get appropriate manpower in this class of labour. While middle manpower training Institutions are few in Nigeria, they mainly serve as a qualifying step for University education.

Hence in a survey conducted by the author, in about 68% of the companies investigated, 25% of their staff have less than Higher National Diploma (H.N.D) or above. Although there was no direct questions to ascertain, how the construction contractor perceived the need for training, questions were asked as to the level of training, the workforce received both before and during employment. The results indicates that only about 7.3% of those tested give more than 75% of their workers on-the-job training, while 23% train between 50 - 75% of their workers on the job. 35% train between 25 - 49%, while 26% of all those tested train less than 25% of their workers on the job. 8% do not give any form of training whatsoever while on the job. On the basis of skilled workers who receive vocational training only 0.9% of those tested gave more than 75% of their skilled workers vocational training while only about 10% train between 50 - 75% of their skilled staff. 25% of those tested gave 25 - 49% of their skilled workers vocational training while 44% gave less than 25% of their skilled workers. 20% of those tested do not give any training to their skilled workers. On the average 64% of all those tested either do not give any form of vocational training to their skilled workers or give less than 25% of their workers (Appendices 1, 2 and 3).

The results given herein indicates that although the majority of workers in the construction industry do not receive adequate training, the need for training of construction workers is either not fully appreciated or is not considered important enough to receive the kind of attention it deserves. This perception may well account for the low level of priority accorded education in the government of Nigeria. The facilities for conducting training are grossly inadequate even if the need is appreciated. For these and a host of other reasons most contractors do not have formal training in the area they operate. Most of them begin as trade apprentices and artisans and go on to become foremen and eventually gain enough confidence to venture into contracting. Their training is therefore gained from the experiences gained on the job. Some inherit a construction enterprise from the family or take up construction contracting after working within the construction industry as engineers, suppliers etc. Others become contractors when they find themselves in the positions to secure construction contract through contacts. In such cases often the contract is received before the company is setup. The contractor may not have any business or experience...
whichever in construction. Thus it is not unusual to find retired headmaster or policemen and the sort, as big time contractors. How long such contractors survive is based on too many factors. While some fail early, others give up while the risks become unacceptable while some advance to higher levels of growth.

There are many who did not receive formal training but are able to hire the required skills and have achieved remarkable successes. However given the complex nature of the construction industry, the need for skilled workers and the need for the contractor to continuously upgrade their knowledge and enhancing their ability to cope with problems is an absolute necessity of any contemporary construction industry.

**Middle manpower vacuum**

Nigeria has 35,000 primary schools with an enrolment of 12.9 million pupils, and 6,400 secondary institutions with an enrolment of 5.1 million. At the tertiary level it has 62 colleges of education (with 86,000 students), 47 polytechnic institutes (120,000), and 42 universities and inter-university centres (325,000) (Economic Commission for Africa, 2002). The country confronts two main problems in human resource development: Unemployment among the educated youth and the dwindling federal budgetary allocations to educational institutions. Despite the high volume of graduate output, the manpower needs persists alongside increasing unemployment, due to a mismatch between town and gown. There is no synergy between education and industry. An organized and industry-sensitive approach to education is urgently needed.

The present system of vocational training is inadequate to meet the skill requirements of rapid growth. The training of middle manpower in the construction industry is either through vocational training or apprenticeship. A broad based effort is needed to reform the system. The existing vocational education system will need to be restructured and additional resources provided to improve its output. Industry should be involved to a much greater extent in the management of V. T. E. and for this purpose, selected Vocational Training projects chosen for joint management with industry should be converted into autonomous bodies receiving government funds with a management structure in which industry representatives can be formally inducted on the governing boards and the institutions also given sufficient autonomy to become effectively board managed.

The Apprenticeship System is the traditional and more predominant method of training artisans and tradesmen, in which the apprentice works and understudies a master for a period of time. During this period of tutelage, the apprentice may even live with the master and serve and understudy all his ways. The "Apprentice" will normally enter into an apprenticeship agreement to serve and understudy the master for a specified period of time, at the end of which he will be ceremoniously released with some specified benefits, that is, a kit of all relevant tools of his trade or a stocked shop, or a given amount of money intended to start him off with an independent life. However, while this system has worked effectively for a long time, it is not adequate in its informal form, to supply the volume of skilled labour required by the industry. It has also become evident that apprentices tend to truncate their training as soon as they perceive that they have learnt something they can earn with, especially if they have enough independent means to procure their own tools. An Apprentice Act ensures skill development training in specified industries or fields, and also to ensure high quality work standards on publicly funded projects by requiring that employees hold the appropriate expertise. It is our proposal that all enterprises, irrespective of size and status, small industries and micro enterprises should be brought under the purview of an "Apprenticeship Act". It is necessary to review the present policy whereby training in Government institutions has traditionally been provided free. It may be desirable to allow Vocational Training Institutes to charge fees, at least for the more specialized courses. A case can also be made for considering a small levy on companies to be contributed to a skill development fund, which could be used to fund vocational training. The coverage of the levy, its amount and guidelines for the use of the fund would have to be worked out. To make industry perceive the benefits of the fund, a portion of the collection in each State of the Federation should be used to fund vocational and industrial training in the State. Professional associations should also have a voice in deciding allocations.

Teaching pre-vocational subjects in the primary and junior secondary schools should be encouraged and taken more seriously to raise the interest of students for these vocational programmes. All stakeholders, especially those within the private sector, should provide more funds for the purchase of instructional facilities. The Educational Tax Fund should consider vocational education a priority area for funding. There should be less emphasis on certificates/ examinations in implementing the curricula content of the various programmes. Acquisition of practical skills should be stressed on the final outcome.

**CONCLUSION**

The need for an educated population in contemporary times is not just a matter of chance but acute necessity. The interest of government in education must be resuscitated in other to provide a basic framework upon which other contributors to education can invest. Economic activities in all fields of endeavor have demonstrated the potentials of the local workforce, if screened properly and trained. Vocational education must be strengthened and the organized private sector should be involved in their
administration and funding. The problem of lack of demand for vocational training relative to higher-level education could be mitigated if graduates of vocational and special training institutions are eligible for entry into polytechnics or even universities while pre-vocational subjects in the primary and junior secondary schools should be encouraged.

Adequate arrangements should be made by government if necessary with statutory backing, making it mandatory for every company of a defined minimum category to accept students on industrial training from various schools under stipulated conditions. This would help improve the students’ practical awareness including the business environment. It will also be very helpful if more vocational training centers can be established, well equipped to cater for the need of training and re-training middle level manpower in the construction industry and existing ones refurbished. There is a need for the coordinated interaction of government, the statutory professional bodies and the organized private and public sector to ensure the appropriate development of all built-environment professionals, as well as greater synergy in their training to meet public-sector objectives, industry needs and the all-round promotion of existing and new professions. It is also the author’s views that more active participation in the activities of the construction industry will offer indigenous contractors and professionals the opportunity to learn through experience given the deficiencies in our educational system.

REFERENCES


Appendix 1. Percentage of technical staff with “HND” and above.

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<th>States</th>
<th>Imo No</th>
<th>Kwara %</th>
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Appendix 2. Percentage of skilled workers that receive on-the-job training.

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Appendix 3. Percentage of skilled workers that have vocational training.

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<td>2.35</td>
<td>14</td>
<td>4.12</td>
</tr>
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