

Challenges Facing Infrastructural Development and Quality Education In Nigeria

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Abstract: Infrastructure is the basic structures and facility inform of building, transportation, water, energy sources, and administration system necessary for a country or organization like schools to function efficiently. It is the basis for quality education. The depravity and inadequacy of the structures and facilities modeled strong challenges to an effective and functional education system in Nigeria. This paper examines the challenges facing the educational system in Nigeria in terms of infrastructures, facilities, and development of these factors and proffers some remedies such as government rising to the challenges facing Nigerian educational systems such as the construction of a classroom, library, ICT center and stabilizing the power supply and host of others. This paper also tries to explore together the meaning of the term educational technology and the challenges of educational technology for quality education delivery in Nigeria. Attempts shall also be made at suggesting a way forward. It's the opinion of this paper that improvement on the standard of education will help reduce the level of world economic crisis. Also, it was found that there is no significant difference in infrastructural development between the state and federal universities. Thus, it is recommended that government increases funding towards the development of the infrastructure.

Keywords: Challenges, Infrastructure, Development. Quality Education, Nigeria.

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I. INTRODUCTION

Education has long been recognized as a panacea for nations' ills. This is especially true of higher education. A good higher education system is required for the overall prosperity of a nation. However, in Nigeria, tremendous growth in the higher education sector has made the administration of higher education institutions complex. As the pinnacle of the educational pyramid, the country's universities have critical capacity-building roles to play. Greater attention is being focused on quality assurance as a critical factor in ensuring educational relevance. [1] Posits that the objectives or goals of establishing a university differ from one society to another. Generally, it is a basic assumption that universities are, by definition and long-established tradition, meant to be places where all learning activities are governed by creative skepticism, constant questioning, disputations, and argumentation. The National Policy on Education (2004) relates the relevance of higher education to:

- Contributing to national development through training high-level manpower;
- Developing and inculcating proper values for the survival of the individual and society;
- Developing the intellectual capability of individuals to understand and appreciate their local and external environments;
- Acquiring both physical and intellectual skills which will enable individuals to be self-reliant and useful members of the society;
- Promoting scholarship and community service;
- Fostering national unity; and
- Promoting national and international understanding and interaction.

Overshooting the carrying capacity of most Nigerian universities is foiling the realization of these objectives. [2] quality education based on its human and material resources. Therefore, infrastructure is among the important operational inputs into any instructional program. It constitutes elements that are necessary for teaching and learning and is vital in the development of qualitative university education. [3] Noted four important factors in an attempt to balance the qualitative and quantitative growth of the education system in Nigeria. These range

from the quality and number of infrastructure (in the forms of buildings, machinery, and equipment) through the usage to the maintenance of the infrastructure. [4][4] Pointed out that the stress put on the universities in terms of demand and the limited expansion in physical facilities and academic staff to cater to this demand has taken a great toll on the quality of programs in the institutions. [5] Thus submitted that the quality of output (graduates) is a function of infrastructure that determines the students' learning environment and their motivation to learn. Therefore, if the quality is to be ensured in the nation's universities, the infrastructural base of the system needs to be improved upon.

Availability of infrastructural facilities both in terms of quantity and quality is necessary for effective and functional education. [6] Puts it that in some secondary schools, one can get 80 to 90 students in a small classroom. The overcrowded nature of classrooms today poses a great danger to teaching and learning and invariably poses a serious threat to the quality of education. When we talk about facilities what readily comes to our mind are; classrooms, desks and chairs, laboratories, libraries, workshops, playgrounds, chalk, and other consumables. In many of our secondary schools, even the structure is not available not to talk of other things. Where they exist, the buildings are dilapidated and in most cases, grossly inadequate for the population of the students. In some cases also, funding arrangements are more of paper or budgeting estimation whose implementation is never concluded. The laboratories are ill-equipped, the laboratory space that used to take 28 students, in the 80s now takes over a hundred students, equipment and materials for practical are no longer available. All these facts are evident in the research findings of Etuk (2003), and Agbana (2005). However, with these problems in the background, teaching and learning for quality education in secondary schools cannot be possible.

II. LITERATURE REVIEW

Studies have reported that infrastructural resources required for the production of an effective education process are in short supply in Nigerian universities. Lecture halls, laboratories, students' hostels, library spaces are grossly inadequate. The available few are fast dilapidating. National Universities Commission (2004) in the communiqué of the presidential visitation panel that looked into the operations of federal universities between 1999 and 2003 reported that physical facilities at the universities were in deplorable condition. It is saddening to note that the equipment for research, teaching, and learning is either lacking or very inadequate and in a bad shape to permit the universities the freedom of embarking on the basic functions of academics. There are no facilities for effective practical learning for the students in most courses, especially in the universities of Technology, which require a lot of intensive training in terms of students' usage of their psychomotor skills and hi-tech equipment. When universities face the NUC accreditation exercise, it is shameful to observe that to scale through the hurdles of the exercise, some departments will have to borrow equipment from neighboring and sister institutions, present them and claim their ownership. With the remarkable increase in the number of universities and university enrolments, it becomes worrisome that the tremendous increase in placement may not correspond to the state of available physical infrastructure. By implication, Nigerian universities are under the siege of decay. To this end, this paper is considered relevant to find out the impact of the infrastructural conditions on quality assurance in Nigerian universities and to also see the workability of some innovative approaches in maintaining the available few infrastructure facilities.

2.1 INFRASTRUCTURE: AN OVERVIEW

Infrastructure according to Online Oxford English Dictionary, is defined as the basic physical and organizational structures needed for the operation of the society or an enterprise. This means that infrastructure is an essential ingredient for the smooth function of any economy and the development of any nation. According to structuralist/functionalist theorists, the progress or otherwise of a society depends largely on the functional structures of that society. What this means is that structures in the societies will largely determine the economic development [7]

A review of the literature shows that several ideas have been used to explain infrastructure. Among such concepts are the "school plant", "learning resources", "physical resources" and "educational resources", to mention but a few ([5][8] In specific terms, [8] described infrastructure as the operational inputs of every instructional program and constitutes elements that are necessary for teaching and learning. Such include buildings, laboratories, machinery, furniture, and electrical fixtures. These must be functional about other aspects of the community, such as health centers, libraries, and good roads, and must be large enough to allow for expansion as enrolments expand.

In the same vein, [9] opines that infrastructure represents the aesthetic picture of the school conveyed by the position of structures about one another. It also represents the empirical relevance of the totality of the school environment for the realization of the school business (teaching/learning). He asserted in specific terms that school plant is made up of landscape, trees, lawns, hedges, and accompanying paths, playgrounds, buildings, security facilities, and utilities. However, a well-equipped and well-maintained physical plant can

make learning a more pleasant experience and discourage early drop-outs. It can as well attract better quality teachers. In summary, therefore, infrastructure can be viewed as the totality of all that goes into education such as classrooms, lecture theatres, laboratories, libraries, electricity, water, health center, sports and recreation centers, ICT, machines, and furniture put there-in, to facilitate teaching-learning.

2.2 INFRASTRUCTURE AND QUALITY OF UNIVERSITY EDUCATION IN NIGERIA

Qualitative university education constitutes the pivot on which the development of any nation is based. Therefore, proper and correct acquisition of knowledge by the citizens of any nation is fundamental to its growth and development. The need for infrastructural support was highlighted by [10] and [5] who said, high-quality university education and training requirements that appropriate infrastructure be provided by the institution. All students deserve safe, technology-ready facilities designed for learning and adequate decent facilities, structured around their learning needs. More importantly, completion rate and satisfaction with the university programs are closely related to the infrastructure that can be provided. School buildings that can adequately provide a good learning environment are essential for students' success. The bridge between good infrastructure and effective student learning is of great importance. Looking closely at a university system, there is no doubt that infrastructure plays a great role in the welfare of students and the result is learning motivation.

2.3 THE IMPACT OF POOR INFRASTRUCTURE ON EDUCATION AND THE GLOBAL ECONOMY

Poor infrastructure development has impacted negatively on the state of Nigeria's education standard in particular and by extension on the global economy. There is no doubt that quality education is a vital tool for civilization and development. Whenever and wherever education is poorly impacted and imbibed the effect is tremendously volatile because it contaminates other spheres of life in any economy. The saying that one does not give out what one does not have is applicable in this discussion. When a teacher is poorly trained, the reality is that he will poorly train others.

[11] Tried to X-ray the decadence and danger in education in Nigeria as he noted that: Yet another obvious area of decline in education in Nigeria today can be in quality and quantity of the teaching staff in our schools. Times there was when men and women attracted into the teaching profession were the creams of the crop. They were then the best both in character and in learning. Today it is no longer so, the truth of the matter is that there is more cheating than teaching going on in the schools today. Men who entered teaching practically as missionaries have been displaced from the system leaving the arena for traders in academic gap lecturers.

The truth is that part of the effects on the neglect of the education sector in Nigeria is that lecturers embark on different clandestine means of making money to augment or better their condition. The reasonable ones prepare quality and standard handouts and textbooks, while the bad ones resorted to the production of poor handouts and textbooks and sell them at exorbitant prices. In the words of Osisioma "lecturer" handouts are often commercial papers that are aimed more at generating revenue than at teaching. The textbooks are hurriedly assembled, often without the simple courtesy of acknowledging authors whose copywriter have been flagrantly violated". He never the less blames the government attitude and policy as contributory factors for the lapses in education standards.

2.4 INFRASTRUCTURE AND OTHER DIMENSIONS OF QUALITY

The quality of buildings may be related to other institutional quality issues, such as the presence of adequate instructional materials and textbooks, learning-teaching conditions for students and teachers, and the ability of teachers to undertake certain instructional approaches. Such factors as on-site availability of lavatories and a clean water supply, classroom maintenance, availability of space and furniture, all have an impact on meaningful learning. Quality assurance of the institutional facilities can only be guaranteed if basic conditions and guidelines are followed from the onset. This means that infrastructural development must make provision for adaptability or alteration probability, flexibility in user demands, accessibility to students, staff, and society, and due regard for an aesthetic and clean environment. [12] Developed a quality indicator checklist that shows what the physical environment and facilities in higher educational institutions must require both in qualitative and quantitative terms. These include the availability of infrastructural development programs (facility provision), adequacy of the facilities in terms of currency and relevance to purpose; students friendliness and centeredness of the facilities (attractive to students and suitable for their needs); regular maintenance and renewal of the dilapidated ones; the infrastructural development must be of international standard (globally acceptable) to attract foreign students, staff and recognition; and must be environmentally safe and of high sanitary standard.

III. THE CHALLENGES

3.1 Challenges of Energy Sources

There exists a strong relationship between the quality of education and the power sector of any country as it is impossible to build a nation educationally without an efficient supply of power/ energy sources. As an essential component for developing society, energy plays an essential role in communication, education, and other sectors.

Nigeria is blessed with abundant energy resources. Nigeria has the 11th largest deposit of crude oil in the world as of 2007 (Wikipedia, 2010) and has the largest deposit of liquefied natural gas (LNG). Nigeria also has two major rivers running through the country, wind and abundant sunshine. Despite these resources, the country faces a serious electricity shortage. [13] States that Nigeria produces 2, 500 megawatts of electricity a day out of a total maximum daily production capacity of 3,000 megawatts. In December 2009, [14]reported that the nation's power generation to the grid peaked at 3, 600 MW.

This was the highest output in three years according to the minister of power Dr. Olarewaju Babalola during his media briefing in Lagos. However, all the potential generating capacity falls short of the 6,000 megawatts promised to be achieved by President Yar'Adua. These, therefore, pose a strong challenge to the school development, functionality of the laboratory equipment in the schools, and so affect the quality of education negatively in our secondary schools.

3.2 Challenges of ICT Centre

Information and communication technology (ICT) consists of facilities and features that are capable of changing and enhancing teaching-learning and society in Nigeria. They have the potential to enhance access, quality, and effectiveness of education in particular and development in general. [15]Believe that information and communication technology is one of the major contemporary factors shaping and producing rapid changes in the quality of education in society. ICT facilities have fundamentally changed the way students learn and communicate.

The ICT facilities that aid learning and teaching included computers, internets, projector digital camera, CDS, cell telephone, communication satellites, fiber optics, television, videos, cassette recorder, etc. some of them are cheap but on the whole, they are mostly costly. The major challenge is that of getting them available in our schools. In some secondary schools, one cannot get even the transistor radio, not to talk or PowerPoint presentation and the like. Without ICT facilities and building infrastructures to have them safely, information as well as effective teaching and learning cannot adequately get across to the growing number of students in our secondary schools. It also makes the learning of sciences difficult.

3.3 Challenges of Library

The decay of teaching and learning infrastructural facilities has greatly rendered the Nigerian educational system inactive. According to [16]the absence of teaching infrastructural facilities has made the teachers take to oral exposition which has forced the learner to adopt memorization as the method of teaching at the expense of understanding and possessing the required competence. The challenge passed by the lack of a library for information in our secondary schools is overwhelming. It is an indisputable fact that information is power and an important working tool for the advancement of humanity and society.

The overwhelming argument is that information is needed for man to be liberated from the shackles of ignorance, misconception, economic stagnation, social unrest, and political instability. It is beyond the burdens of controversy that no nation can strive and survive without relevant information to guide its development plans and objective. [17] Gave a good definition of information literacy as a set of skills and strategies which includes the abilities to recognize a need for information, to retrieve the required information, and to evaluate information. The challenge facing our secondary schools today is the dilapidated library buildings and the non-existence of libraries in many secondary schools.

3.4 Challenges of Administration System

The government schools were wholly funded by the government via a grant by either states or federal. As time went on it become necessary for the government, for obvious reasons, to acquire the voluntary agency schools and fund them completely. The control and supervision of such schools became the responsibility of the government.

Of recent, however, it has become obvious that government alone cannot fund education, continuous fees would only lead to more drop-out because of the present economic meltdown. Some state governments have complained that adequately funding education alone would require almost thrice the annual budgetary provision made to the entire state. However, based on these challenges associated with funding education, the area of cooperation in funding is for the government to encourage the individual to contribute to funding

education. Thus, lack of appropriate funding is a blow to the quality of education because all the necessary things needed will not be appropriately founded.

3.5 Challenges of Transportation

Generally, traveling in Nigeria is a challenge. This is due to a total infrastructural decay in the transport sector. Different geographical locations have historically suffered neglect in development terms. The roads and other basic infrastructure are generally poorly developed. Indeed, Nigerian roads are more or less a death trap. Poor transportation facilities pose the following challenges to secondary schools and the quality of education in Nigeria.

- i. Lateness to school and absenteeism
 - ii. drop- out from school by students of a poor background
 - iii. Discouragement of teachers posted to schools.
- i. Lateness and Absenteeism: in most secondary schools especially those in rural settings, the roads are in a deplorable state. Transporters are discouraged from plying such roads. Students in such locality have to go to school by trekking the distance. The corollary of that is coming to school late and hence resuming the academic work of the day very late. This leads to poor participation in class work resulting in a reduction in the quality of education received and consequently leads to poor performance in the academic work.
 - ii. Increasing the Cost of Schooling and Leading to Students Drop-Out: Due to the poor state of the roads, transporters consider the effect of the road on their vehicle and the time they spend. All these are transferred to the final consumer who is the passengers. The cost of transportation is therefore increased. The students find it difficult to fund going to school regularly due to the high transportation fare. Those from poor backgrounds are discouraged from going to school. All these defeat the goal for quality education in our secondary schools.
 - iii. Discouragement of Teachers: the deplorable condition of roads discourages the teachers from going to schools regularly. Those that are posted to the school in the rural areas find the school unattractive and thereby apply for transfer. The consequence is the brain- drain from the schools in the rural areas of qualified teachers by leaving them if at all with unqualified teachers sourced within the locality. The effect is a reduction in the quality of education received by the students leaving them unprepared to face the future academic challenges in contemporary society. No wonder Davis (1990) lamented that the transportation problem has reduced the quality of education in our country.

IV. THE EDUCATIONAL TECHNOLOGY

4.1 Definitions of Educational Technology

This paper examines various attempts made by scholars to define the term educational technology. These are:

1. Educational Technology refers to hardware and software, including television, radio, electronic classroom, instructional devices, still and motion picture projectors, computer-assisted or managed instructional equipment and materials, communications equipment for educational application, and other equipment and materials necessary to assist the process of learning (Grayson, 1982 cited in [19] This definition restricts the meaning of educational technology to instructional media, with emphasis on the gadgets used in learning. The concept of technology in education is seen in terms of physical products.
2. Educational Technology is a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication and employing a combination of human and non-human resources to bring about more effective instruction [18] This definition defines education technology in terms of the product and process of technology as a way of organizing materials and men.
3. Educational Technology is the development of a set of systematic techniques and accompanying practical knowledge for designing, testing, and operating schools as educational systems. It draws upon many disciplines, including those which design working space, like architecture, equipment like the physical sciences; social environments like sociology and anthropology; administrative procedures like the science of organizations and conditions for effective learning like psychology [20] this definition draws the attention of the various fields that contribute to educational technology.
4. Educational Technology is concerned with designing the system as a whole; identifying aims and objectives, planning the learning environment, exploring and structuring the subject matter, selecting appropriate teaching strategies and learning media, evaluating the effectiveness of the learning system, and using the insights gained from evaluation to improve that effectiveness for the future [19].

4.2 THE EDUCATIONAL TECHNOLOGY: THE CONCEPT

Various attempts have been made to define the term educational technology. The definitions have differed from one scholar to another. Davies (1978) cited by [18] identifies three concepts of educational

technology, which represent three different approaches to educational technology. These are educational technology like hardware, software, and a systematic approach.

4.2.1 Educational Technology as Hardware

This approach to educational technology characterized the early formative years of the field. It sees educational technology as the devices, equipment, machines, gadgets, tools, and instruments used to promote teaching and learning [18] This is also known as the tools technology approach. The hardware or product approach was greatly influenced by the physical sciences. It involved a direct application of the physical sciences to the problems of education. It entails the instrumentation, mechanization, or automation of education. The goal is to make teaching more efficient by mechanizing or industrializing it.

4.2.2 Educational Technology as Software

The software approach to educational technology emphasizes the careful design of the teaching-learning process using principles of behavioral sciences. It is closely associated with programmed learning and the movement of the behavioral objective. It is the behavioral science concept of educational technology. Emphasis is on applying learning principles to the direct and deliberate shaping or modifying of behavior. It is characterized by detailed task analysis, writing to precise objectives, selection of learning strategies, reinforcement of correct responses, and constant evaluation.

4.2.3 Educational Technology as Systems Approach

The systems approach is also known as the step-by-step plan, systems analysis, systematic approach, and systems technology. The systems approach is an attempt to remedy the inherent weakness of the approaches above. It sees educational technology as the systematic application of ideas, resources, people, materials, and equipment to the solution of the educational problem [18] it entails a holistic approach to problem-solving. The educational problem at hand or the entire educational system is analyzed within the context in which it is located, operated, or with which it interacts. It entails systematic thinking; having a holistic view of the educational system or educational problem at hand. It is concerned with the systematization of the educational process. It implies operating at different levels of complexity and dimensions.

4.3 Challenges of Educational Technology in Nigeria

Educational Technology is an educational innovation and is as old as education. Its practice is therefore faced with several challenges in Nigeria.

Firstly, there is the problem of ignorance and misconception of what educational technology is [18] Some see educational technology in terms of teaching aids and or the use of gadgets, tools, and devices like projectors, films, radio, television, computer, etc. The tendency of such a narrow view is the focus on only the tools aspect of education. In Nigeria, so much money was spent in importing tools for Introductory Technology, with much of the gadgets lying idle for several years due to so many factors. A correct conception of educational technology would have suggested more careful and holistic planning, implementation, and evaluation of the project.

Another serious challenge of educational technology in Nigeria is what [18] calls “lack of institutional readiness for Educational Technology.” These are factors related to the adoption and diffusion of Educational Technology as an educational innovation. These factors are:

1. Lack of professionally or academically trained personnel in Educational Technology limits the practice of the field.
2. Poor funding and allocation for Educational Technology at the various levels of the educational system leads to an inadequate supply of facilities, equipment, and materials. No wonder, most of our Nigerian schools are ill-equipped, if at all.
3. Lack of space and instructional resources in Nigerian schools and colleges. Most classrooms, lecture halls, and auditoria are not designed or adapted to accommodate audio-visual devices.
4. Bureaucratic bottlenecks and rigid organizational structures oppose innovation and insist on maintaining the status quo.

Furthermore, Educational Technology Centers are non-existent in most schools and colleges, higher institutions. Other challenges could be:

1. Lack of power supply.
2. Lack of relevant educational media in majority of subject areas
3. The lack of professionalization of educational technology in Nigeria is a major challenge. – Maintenance problems exist. Also, there is a lack of spare parts.
4. Teaching load that leaves the teacher with little or no time to adapt and use educational technology tools and techniques.
5. The Nigerian educational system places much emphasis on examinations and certification thereby limiting the extent to which educational technology tools and techniques can be used in the instructional process (FRN, 1981).

V. CONCLUSION

Infrastructural factors such as classrooms, libraries, laboratories, instructional gadgets, and office space are significant in the quality assurance of university education. Unfortunately, lecture rooms and office places are grossly inadequate and not convenient for the proper positioning of modern electronic gadgets that will accommodate the current curriculum and the globally acceptable mode of teaching and learning. If there is anything that the learners expect of universities, it is high-quality teaching and learning characterized by factors such as quality teachers, quality learning materials, and adequate infrastructure. Having identified some of the infrastructural challenges that impede the achievement of quality education in our schools, it will be appropriate if the recommendation given below are implemented. It is hoped that the quality of education in Nigerian schools will improve in the 21st century.

Although educational technology is not a panacea to all educational problems, it is agreed that it has numerous benefits. However, many challenges are preventing these benefits from being realized. The challenge before practitioners, proprietors, governments, and other interested bodies is to identify these problems and solve them in a creative, systematic, and comprehensive manner so that the dreams for educational technology in Nigeria can be fully realized.

Educational Technology is a field that can bring about rapid improvement in the Nigerian educational system if well implemented. Having identified some of the challenges, this paper must suggest ways of overcoming these challenges. These are:

- Workshops, seminars, conferences, etc. should be organized regularly to correct the misconceptions about the meaning and importance of educational technology to our educational system.
- The workload of teachers should be at the optimal level that will give them time and room for creativity and effective practice of educational technology.
- Staff with sufficient academic or technical training in educational technology should be engaged. Training institutions like Universities of Technology, Polytechnics, and Colleges of Education, Technical will have to design and provide short and long-term academic programs for the training of educational technologists that will fill existing vacancies.

5.1 Way Forward

Based on the findings of this study, the following suggestions were given as a way forward to the identified infrastructural problems in the nation's education:

- Government should wake up to her responsibility of adequate funding of education and provision of infrastructure that will benefit students and staff alike in the educational institutions.
- The quality of university education must not be compromised by over-enrollment, over-crowdedness, and the multi-campus system.
- Development of a high level of maintenance practice on the available facilities should be institutionalized. However, there is a need for the implementation of a direct quality assurance program to ensure that maintenance standards are met.
- Basic infrastructure like electricity, pipe-borne water, and road network should be improved upon. The constant erratic power outages in the universities call for immediate attention. It is recommended that each faculty has an alternative source of power supply to ensure that faculty members are not delayed unnecessarily from carrying out their routine administrative and academic assignments. However, standards should be maintained in the provision so that "disturbing" power generators are not put in circulation.
- Promoting an institutional culture of quality and sincere self-analysis to guide the institution's administration, academic planners, and policy implementers.

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