Capacity constraints in developing countries: A need for more e-learning space? The case of Nigeria

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More often than not, economic growth and social development demands educational expansion. However, capacity building for higher education in developing countries is being thwarted by seemingly long-lived constraints of brain drain, political unrest, access, finance, quality, governance, efficiency, human capital and so on. It is becoming apparent that higher education reform cannot take place without paying attention to Information and Communications Technologies (ICTs) in support of teaching, research, and lifelong learning. This paper reviewed potential constraints affecting the capacity of the Nigerian higher education system to accommodate more students. Given the several opportunities and promises of ICTs in addressing some of these challenges; it suggested the strategic use of ICT in Nigerian higher education to increase its capacity.

Keywords: Capacity constraints, ICT, developing countries, Nigeria, e-learning

Introduction

> The strength of Africa's Universities and research institutions is a key condition for its development, and their weakness is an index of, as well as a contributor to its poverty (Sawyerr, 2004a).

Education in general, and higher education in particular, is seen as crucial to a nation's competitiveness in the knowledge economy (Saint et al., 2003). As Sharma et al., (2009) suggested that a nations route to becoming a successful knowledge economy is its ability to also become a learning society. Higher education, as argued by Daniel (1996) is in crisis in much of the world today. The nature of the crisis is apparent in the various strictures levied against it by the community it serves. Czerniewicz & Brown (2009) argued that globally, higher education has been required to become responsive to many more social interests than was previously the case and to engage with the imperatives being voiced by many different groups ranging from unions and associations to industry, business and regional authorities. Daniel (1996, p. 11) highlighted five of the major criticisms and argued that they vary in content and force from one country to another.

- Higher education (universities) systems are not accommodating the volume of variety of student demand;
- Higher Education is too costly and does not deliver graduates with skills employers value;
- Teaching methods are too inflexible to answer the needs of a diversifying student body;
- The quality of higher education is not assured;
- The sense of the university as an academic community is being eroded.

Green (1994) likewise contended that there are a number of growing concerns for higher education, some of which includes

- rapid expansion of student numbers against a backcloth of public expenditure worries
- the general quest for better public services
- increasing competition within the educational 'market' for resources and students
- the tension between efficiency and quality

While some issues within these lists may appear archaic in the current context of higher education, most of them are still unchanged and critical in the current environment, especially in developing economies (Czerniewicz & Brown, 2009; Gulati, 2008; Perraton, 2007a). In the words of Lishan Adam (2003, p. 196), issues such as "…increase in the number of students entering colleges, matched by decline in the number of qualified teachers, the mounting demand for accountability, and apprehensions about the social and economic roles of higher education," are compelling academic institutions to seek strategies for sustainable development (World Bank, 2007). Quoting Rye (2009), "The 'massification' of higher education is an ongoing worldwide process whereby many developing countries, which until recently had limited and often elitist academic systems are now facing the pressures of expansion."

More often than not, economic growth and social development demands educational expansion (Perraton, 2007a). Czerniewicz & Brown (2009) puts it like this, "the rapid worldwide social and economic transformation that is captured in the notion of globalization has had an impact on higher education institution, with increased pressure to produce more graduates with high-level knowledge skills." However, capacity building for higher education in developing countries is being thwarted by seemingly long-lived problems of equity, access, finance, quality, governance, efficiency, human capital (Perraton, 2007a; Saint, et al., 2003). It has been contended by various scholars however that new technologies, as well as the new use of old ones are useful in addressing some of these challenges (Adam, 2003; Daniel, 1996; Rye, 2009). Adam (2003, p. 196) agreed thus, "it is becoming apparent that higher education reform cannot take place without paying attention to ICTs…in support of teaching, research, and lifelong learning." This paper presents a review of some constraints affecting the capacity of Nigerian universities and the potential of the e-learning space in addressing them.

Background

Nigeria's higher education system currently has 95 universities - 27 Federal universities, 34 State universities and 34 Private owned universities (NUC, 2009) - and about 160 other tertiary institutions - Colleges of Education, Polytechnics, Monotechnics (UNESCO, 2009). Every year, about a million students apply to enrol into these universities and barely 10% of them are enrolled (JAMB, 2009). In other words, the demand for university education in Nigeria is higher than what the university capacity can accommodate. Over the years, universities' admission rates have been on the rise; however, it has not kept up with the increasing demand (Ojo & Olakulehin, 2006).

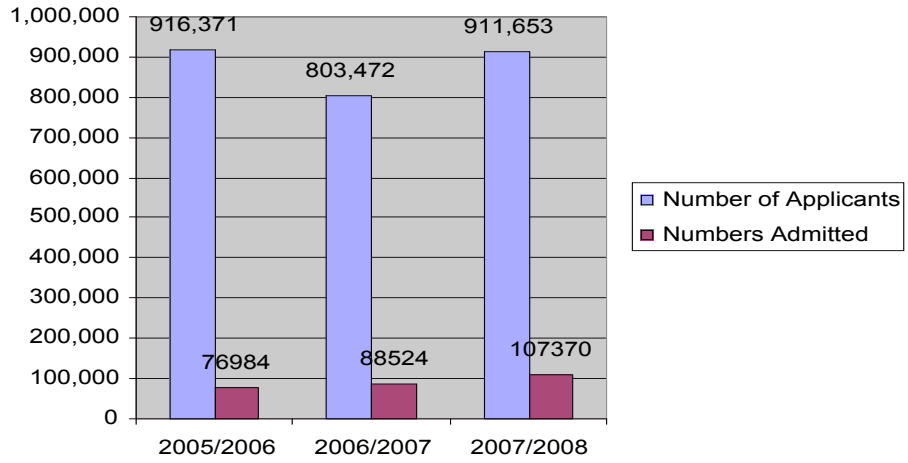

Figure 1: Number of applicants and students admitted annually into Nigerian universities
(http://jamb.edu.ng/)

Figure 1 reveals the wide gulf between the demand for admission places (number of applicants) and the actual number of students admitted annually. The percentages of admission for 2005/2006, 2006/2007 and 2007/2008 are 8.4%, 11.1% and 11.8% respectively. Across these years, the highest point of admission into the universities has only been 11.8%, while the average rate of admission is only 10.3% of the total number of applicant.

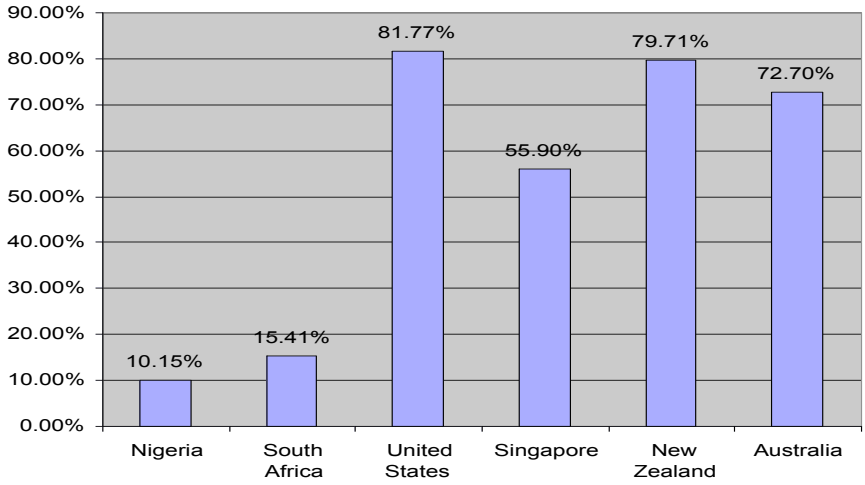

Figure 2: Percentage gross tertiary enrolment, 2006
(http://info.worldbank.org/etools/kam2/KAM_page1.asp)

The significance of Figure 1 is well articulated in the World Bank's Gross Tertiary Enrolment (GTE) statistics (figure 2) comparing 6 countries, namely; Nigeria, South Africa, Australia, United States, Singapore and New Zealand. Nigeria and South Africa have the lowest enrolment rates amongst the countries compared with 10.15% and 15.41% respectively, while the United States, Singapore, Australia and New Zealand enrol above average and well over in the case of Australia, United States and New Zealand. This trend is daunting at a time of heightened global appreciation of the significance of Information and Communications Technologies (ICT) in higher education.

Literature review

The challenge of limited capacity in Africa

Over the years, enrolment rate of students into universities in Africa has experienced growth. However, while the rate of enrolment has been on the rise, it has not kept pace with the increasing demand (Saint, et al., 2003). Retrospective review of literature reveals that the pressure to boost access and enrolment in response to the challenge of limited capacity in Africa's Higher Education systems reveals two main factors (Perraton, 2007a; Sawyerr, 2004a, 2004b; Teferra & Altbach, 2004):

Historic factor: the need to fill up the substantial limited demand stemming from situations of the colonial and immediate postcolonial period, when opportunity for local university education was curbed in almost all African countries (Sawyerr, 2004a; Teferra & Altbach, 2004).

The second factor is the high rate of population growth and the consequent youthfulness of the population in nearly all African economies (Bajinath, Awad, Lolwana, & Olakulehin, 2008; Moja, 2000; Sawyerr, 2004a). The following sections briefly explore these factors in both the African and Nigerian context.

History factor

> The impact of the colonial past and of the continuing impact of the former colonial powers remains crucial in any analysis of African higher education (Teferra & Altbach, 2004, p.24).

Before independence in many African countries, colonial authorities feared widespread access to higher education (Sawyerr, 2004b; Teferra & Altbach, 2004). Consequently, they only educated a limited number of African nationals to assist in administering the colonies. Teferra & Altbach (2004) reported that some colonial powers, notably the Belgians, outlawed higher education in their colonies. Others, for instance the Spanish and the Portuguese, kept enrolments to a minute population. The French preferred to send small numbers of students from its colonies to study in France (ibid). Consequently, during the time of independence, the size of the academic system was very small (Sawyerr, 2004b). A World Bank (1991) study revealed that less than one-quarter of all skilled civil service positions were held by Africans; barely any of the trade and industry all over the continent was native-owned; and only three percent of high school-age students received a secondary education (Teferra & Altbach, 2004).

Africa, like most of the world is dominated by academic institutions shaped by colonialism and managed following the European model (western model of academic organization) (Sawyerr, 2004a). "As is the case of the developing world, higher education in Africa is an artifact of colonial policies" (Teferra & Altbach, 2004, p. 23). As a matter of fact, European colonizers, such as Belgium, Britain, France, Germany, the Netherlands, Italy, Portugal, and Spain shaped and are still shaping Africa's route of development (Teferra & Altbach, 2004). The consequence of this history moreover, as argued by Akintola et al (2002), is still evident today as students are now being enrolled into institutions originally designed for smaller number of students. While demand for places has been on the increase, other resources have not kept pace (Teferra & Altbach, 2004).

State of enrolment in Nigeria

> In virtually all African countries, demand for access to higher education is growing, straining the resources of higher education institutions (Teferra & Altbach, 2004; p.25)

Sawyerr (2004b) attributed one of the causes of limited access to "the high rate of population growth and the consequent youthfulness of the population in virtually all African countries." Large groups of school-age children seeking entry into secondary schools have pressed the substantial expansion of both primary and secondary education, leading to continuous increase in the pool of secondary school graduates (ibid). With a population of approximately 148 million, Nigeria accounts for almost 20% of the population of Sub-Saharan Africa as well as 47% of West Africa's population (World Bank, 2008). Nigeria also boasts of the largest university system in Sub-Saharan Africa in terms of number of institutions (Saint, et al., 2003).

Saint et al. (2003, p. 271) reported a statistics by National Universities Commission (2002) that between 1977/88 and 1997/98, when system enrolment surged 12% annually, staffing grew at just 3% a year. During this decade, total academic staff (headcount) increased from 9,612 to 13,515, and total student enrolment (headcount) doubled from 130,731 to 267,730. By the year 2000, system enrolment had reached 325,299, academic staff totalled 13,760. Overall, the staff-student ratio fell to 1:24 (ibid). The enrolment rate in 2008 was higher and still low growth was recorded in the academic staff count (JAMB, 2009). While universities' admission rates have increased, it has not kept up with the increasing demand (Ojo & Olakulehin, 2006). Moja (2000) argued that Nigerian higher education institutions currently function at a higher capacity than they were initially set up for, yet the demand for access persists. Moreover, the government, over the years have responded through some initiatives, some of which include (Saint, et al., 2003):

- Increasing the number of Federal Universities
- Expanding enrolment numbers for institutions
- Introducing an admissions quota system to address regional and class imbalances
- Approving the establishment of private universities and;
- The establishment of the National Open University of Nigeria (NOUN).

However, despite all these initiatives, the challenge still persists as the population size continues to increase and consequently, the demand for university education (Bajinath, et al., 2008; Olakulehin, 2008)

Dimensions of capacity constraints

> Enrolment rates in higher education in Sub-Saharan Africa are by far the lowest in the world. Although the gross enrolment ratio has increased in the past 40 years – it was just 1 per cent in 1965 – it still stands at only 5 per cent (Bloom, Canning, & Chan, 2006).

Moja (2000) suggested that there is an urgent need for capacity building in the various commissions charged with responsibility for governing and managing different aspects of education in Nigeria. Nigerian higher education faces chronic problems such as increasing number of students, brain drain, frequent labour strife, extreme corruption, weak policy choices, poor technology, campus closures, severe under funding, declining education quality, all of which call for education reforms in the country (Adam, 2003).

However, governments and developed agencies in Africa seeking to address the challenges of increasing access and widening participation are hindered by the huge costs of establishing, equipping and sustaining new higher education facilities in the recent educational reform (Bajinath, et al., 2008).

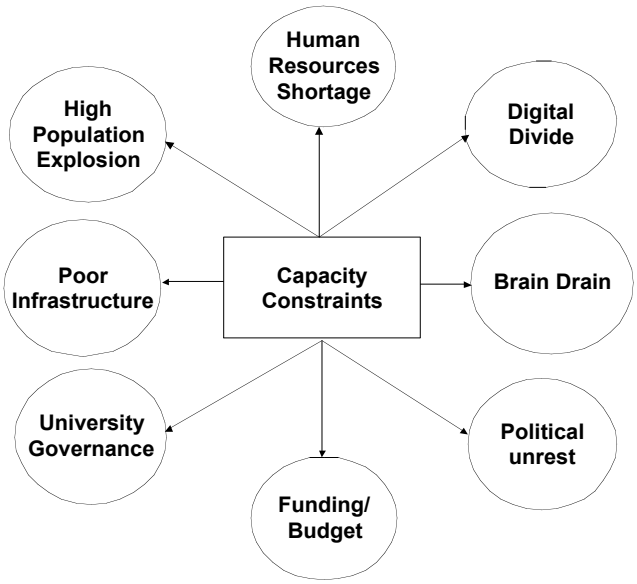

Figure 3: Dimensions of capacity constraints in Nigerian universities

As it is one of the aims of this research to look into constraints affecting capacity within the higher education system, and different dimensions of constraints affecting the capacity of higher education in Africa. These constraints however, do vary from country to country as well as from one institution to another. Nevertheless, some of them have been identified and are discussed below.

Inadequate human resources

The development of human resource capacity for the delivery of an effective education is of grave importance (Moja, 2000). UNESCO (2006) however reported the shortage of teachers in all the key disciplines in Nigerian universities, with the exception of arts. The only areas where the staff-student ratios are approximately as expected are in veterinary medicine and social sciences. The deficiency of teachers in administration, education, agriculture, medicine, engineering, science and pharmacy is significant. Ogunsola & Aboyade (2005) emphasized that developing countries must be active in developing infrastructural, institutional and human capital capacities to effectively tackle the challenge of limited capacity. In the context of ICT utilization in schools, Aduke (2008) stressed that limited or non-availability of ICT trained teaching staffs militate against capacity building in Nigerian universities. Consequently, ICTs have not been fully integrated into their curricula. Ogunsola & Aboyade (2005) noted that most Nigerian universities, even those with relatively good ICT infrastructure are still at the low level of ICT integration into teaching, learning, research, library, information and managerial services due to inadequate human resources.

Several Nigerian universities struggle to recruit or even retain academic staffs. The case of Obafemi Awolowo University (OAU) in Nigeria was reported, where there was academic staff increase from 962 to 973 (1%) between 1988 and 1998; however, student enrolment grew by 56% within the same period (Saint, et al., 2003). The reason for the low level of human resource in education can be attributed to the following (Osinubi, 2003; Saint, et al., 2003): relatively low level of academic salaries; declining financial attractive power of university employment compared to other opportunities; political recruitment of highly skilled academic; brain drain.

Brain drain

> One of the most serious challenges facing many African countries is the departure of their best scholars and scientists away from the Universities (Teferra & Altbach, 2004, p.41).

The flow away from domestic academe takes a form of internal mobility (locally) and regional and overseas migration (Teferra & Altbach, 2004). Teferra & Altbach (2004) argued that internal mobility of academics can be best described as the flow of high-level expertise from universities to better-paying public firms and private institutions/firms that may or may not be able to utilize their expertise and talent effectively. Consequently, causing more harm to institutional capacity, quality of teaching, learning and research.

In Nigeria likewise, many universities have been deprived of indispensable and experienced human resources due to opportunities provided locally (private institutions, politics etc) as well as overseas. Ndulu (2004, p. 60) reported that over 21,000 Nigerian PhD and Medical doctors are working in the United States. The consequence of such migration is that it reduces the capacity of institutions to admit more students as the staff-student ratio keeps dwindling continuously.

Staff student ratio

Saint et al. (2003, p. 271) reported a statistics by NUC (2002) thus; between 1978/88 and 1997/98, when system enrolment surged 12% annually, staffing grew at just 3% a year. During this decade, total academic staff (headcount) increased from 9,612 to 13,515, and total student enrolment (headcount) doubled from 130,731 to 267,730. By the year 2000, system enrolment had reached 325,299, academic staff totalled 13,760. Overall, the staff-student ratio fell to 1:24 (ibid). Recent enrolment figures in 2008 reveal an increase in enrolment; however, low growth is still recorded in the academic staff count (JAMB, 2009). This institutional or system inadequacies definitely affects students' enrolment as the system can not take more than its capacity; hence, the continuous challenge of access into Nigerian universities.

Finances/budget

> Economic factors ranging from the lack of capacity to pay for costly infrastructure to sustaining computer networks introduced through donor funding weighed on the universities as their budgets continued to get slashed (Adam 2003).

African Higher Institutions face tough economic factors which includes the lack of ability to pay for costly infrastructure, sustaining computer networks introduced through donor support; all of which is weighed on the universities as their budgets continued to get slashed (Adam, 2003). In Nigeria, the education sector is almost solely funded by the government (Akintola, et al., 2002). Saint et al. (2003) however argued that current expansion of higher education in Nigeria has surpassed the government's capacity to act as its major funder. The budget allocation to the education sector in Nigeria has been in decline over the years. Less than 10% of the national budget is usually allocated to education in Nigeria as against 26% recommended by UNESCO (Akintola, et al., 2002).

Table 1: Federal Government annual budget allocation & education allocation

Year	Federal Government Annual Budget (Billion Naira)	Total Allocation to Education (Billion Naira)	Education Allocation as Percentage
1996	121.20	15.40	10.81
1997	188.10	16.80	11.53
1998	246.30	23.70	9.61
1999	249.00	27.80	11.13
2000	-	56.60	8.70
2001	-	62.47	7.00
2002	-	69.03	5.90

(Aigbokhan, Imahe, & Ailemen, 2005; UNESCO, 2006)
Naira is the Nigerian currency. As at the 26th September 2009, 1 NZD is equal to 91.0769 Naira (source: http://www.xe.com/)
Data from 2000 to 2002 in table 1 were adopted directly from the source. The source lacked data for the federal government annual budget however; the percentage education allocation was present.

Table 1 reveals that the education budget increased from 15.40 billion naira in 1996 to 69.03 billion naira in 2002. However, the increase is not parallel to the percentage of the total budget. This reveals that Nigeria has not been consistent in the budgetary allocation to education over the years. (Aigbokhan, et al., 2005) suggested that perhaps education expenditure was not considered as a matter of policy target in the overall budgeting; otherwise it would have maintained an increasing proportion of the yearly budget. Saint et al. (2003) contended that government funding of higher education in Nigeria has been guided neither by criteria linked to strategic national priorities, nor by a concern to attract talent into careers linked to public good. Consequently, while the shortfalls in funding continued, enrolments in the higher education system out-stripped the government's ability proportionately to sustain its financial support (ibid). "Simply put, the system lacks the financial resources to maintain educational quality at a time of significant enrolment expansion" Saint et al. (2003, p. 272)

Infrastructure

Sawyerr (2004a) identified a few basic infrastructures of a University system, which includes, buildings (laboratories, libraries, classrooms, hostels etc), equipments, an effective system of information storage, retrieval, and utilization and appropriate management systems. However, in the case of many African countries (Nigeria inclusive) lack of some basic resources were reported such as limited number of textbooks and desks or writing spaces, libraries without journals, and laboratories without equipments (Gulati, 2008).

Moreover, ICT infrastructure is of low degree in most African countries. Despite the growing body of evidence suggesting that investing in ICTs is cost effective, the total cost of ownership (maintenance, upgrading, skills development, etc) of ICTs has remained high for African universities (Adam, 2003). ICTs costs often include that of computers and peripherals, video equipment, specialized tools like digital microscopes, electrical wiring, internet access, lighting, air-conditioning, space, network equipment, software, manuals, books, videos, audio-tapes, and other supplies (ibid). However, the presence of these supplies is depressingly low in African countries. The following sections under this sub-heading explore two major types of infrastructure: one is a basic infrastructure and the other is in line with current educational reform.

Electricity

Nigeria also faces electricity constraints. As Adomi (2005) highlighted "the electricity situation in Nigeria also hampers the development of the internet." The body in control of power generation and supply in Nigeria - Power Holding Company of Nigeria (PHCN) – does not supply stable electricity and there are often frequent power outages (ibid). Internet Service Providers (ISP), cyber cafés and telecommunication companies have to make stand-by electricity through various generating plants which makes their services costly for the users as the costs are passed on to them (ibid).

The consequence of this is the cost of putting in place infrastructures and practice that are pertinent to standards in current educational reform. Furthermore, it does not allow for flexibility in the way classes are run. Like in most developed countries where classes are run at various times of the day, classes in Nigeria are only run during the day due to inadequacies of the electrical system (Akintola, et al., 2002). Also, classes run in the day time can only cater for a smaller population as frequent power outages will not allow the effective use of public address systems capable of reaching a larger population of students in a classroom.

ICT and bandwidth constraints

Most developing countries face capacity constraints, largely a result of thin-bandwidth and frequent power outages (Oyeyinka & Adeya, 2004). Bandwidth is the scarcest ICT resource in African universities and this is mainly due to vetoes on academic institutions' accessing international circuits and high licensing fees for connecting to advanced circuits for obtaining authorization (Adam, 2003). Adam further reported Jensen's (2002) survey showing that almost 60% of African countries have bandwidth that is less than that of a typical institution in the developed world and added that only six countries in Africa have a reasonable outgoing bandwidth. Nigeria is not an exception in this subject. Adomi (2005) likewise stressed that in developing countries like Nigeria, internet bandwidth is very expensive. Adomi (2005) argued that African universities outside South Africa are paying about 100 times more than equivalent prices in North America and Europe. Below are some of the findings of the report:

- Makerere University (Uganda) pays about $22,000/month for 1.5_Mbps/768_kbps;
- Eduardo-Mondlane University (Mozambique) pays $10,000/month for 1_Mbps/384_kbps;
- University of Ghana pays $10,000/month for 1_Mbps/512_kbps.

Furthermore, a close look at the Networked Readiness Index - the measurement of a nation or community readiness to participate in and benefit from ICT developments – reveals Nigeria ranked 88th out of 122 countries scoring 3.23 in the Global Information Technology Report (Weforum, 2007), Nigeria was ranked 94th. Denmark topped the list followed by Sweden, Singapore, Finland and Switzerland. Nigeria was also ranked 94th amongst 127 countries in 2008 scoring 3.32 (Weforum, 2008); and 90th amongst 134 countries in 2009 scoring 3.45 (Weforum, 2009). While this elicits improvement in Nigeria's preparedness to participate in and benefit from advancements of ICTs, the country is still poorly ranked; hence, more work is still to be done for it to attain better ranking in the future. The government has to

tackle this aggressively if the higher education system must benefit from the promises and opportunities presented by ICTs.

Governance

> Responsive university systems have been moving towards more business-like forms of management and governance. Accountability, quality assurance and performance monitoring become more important, and management has become a permanent quest - Saint et al. (2003, p.275).

According to Teferra and Altbach (2004), a typical Nigerian University's chain of administrative power starts with the Vice-Chancellor, then moves to Dean/Directors, and then Department Heads. The dean and directors in most cases are appointed by the vice-chancellor, directly by government officials, or by boards or directors or trustees (ibid).

> African Universities suffer from poor, inefficient and highly bureaucratic management systems. Poorly trained and poorly qualified personnel; inefficient, ineffective, and out-of-date management and administrative infrastructures; and poorly remunerated staff are the norm (Teferra & Altbach, 2004, p.31).

In support of this, Saint et al. (2003) argued that Nigeria's management of the university system and individual institutions lack professional management techniques and also noted that strategic planning is still in its infancy in the state. Institutional communications with internal and external audiences are weak. Likewise, management innovation does not seem to be pursued with full awareness of its necessity (ibid). The NUC is the body that oversees the Nigerian university system. The commission is staffed almost entirely by long-serving public servants that appear to operate in relative isolation from international higher education bodies and likewise appear to lack adequate knowledge of how a modern university system should function (Saint, et al., 2003).

This implication of this is the inability of the institutions to function as modern universities capable of competing in a knowledge-intensive world. Old models and policies of university education are still the current practice in most of the universities; hence, no strategic initiative towards the challenges arising (Sawyerr, 2004a). That is why most of the engineering faculties, laboratories of science, and classrooms of Nigerian Universities still have the ageing/obsolete equipments in them (Akintola, et al., 2002). The consequence of this is the inability of the system to accommodate the continuous demand for enrolment. To this effect, Saint et al. (2003) suggested that the Nigerian University System needs professional management techniques, strategic vision and more proactive corporate management that deals innovatively with challenges.

Digital divide

ITU (2009) defined Digital divide as the gulf between those who benefit from digital technology and those who do not. In many countries in Africa, there exist rural-urban infrastructure disparities; in other words, while some urban areas can boast about some infrastructure such as electricity and telecommunications, rural areas remain unconnected and hence disadvantaged (Gulati, 2008). Federal Universities in Nigeria are more equipped than State ones because they are solely funded by the federal government whereas the state universities are funded by the state governments which receive allocations from the federal government (Aigbokhan, et al., 2005). In other words, a percentage of what the state government gets from the federal government is what is allocated to the state universities.

In support of this argument, from a survey of 171 Academic staffs of Nigerian Universities, Oyeyinka and Adeya (2004, p.850)

> …found very significant disparities in Internet, computer and email usage between federal and state universities. Federal universities tend to have relatively better facilities institutional access. The proportions of computer users, email and internet are far higher. For instance, non-users of computers in federal universities amount to only 6.2% compared to 75% in state universities. The main reason was non-availability of facilities. Institutional provision of computers is twice that of state universities.

The effect of this is that State universities are not able to build capacity with their limited funds in order to accommodate more students. While some state universities are as large in terms of land size as their

federal counterparts, they still cannot accommodate as much as federal universities would (Aigbokhan, et al., 2005; Osinubi, 2003).

Political instability/unrest

> The Civil War, the era of military rule and the general feeling of injustice and insecurity have been, literally, deeply demoralizing to society in general. The educational system is not immune to this (Osinubi, 2003, p.306).

The state of politics in Nigeria has only been stable in the last decade when it resumed democracy in 1999 (Osinubi, 2003). Political instability and its destructive impact on the educational system is not contributing to upholding high standards (ibid). The military rulers were reported to have either neglected or undervalued Higher Education while in power. Quoting Akintola et al, (2002); "By omission of commission, successful military governments in Nigeria have, in the last 17 years grossly corrupted, mismanaged, under-funded and neglected all the key institutions and infrastructure of good governance in Nigeria" (including higher education). The effect of this is that the current democratic government did not get the necessary foundation for educational policies when it came into power; hence, almost everything had to be restructured to what it is today (ibid).

This section has shown some of the constraints limiting access into Nigerian Universities under various sub-headings. The issue of inadequate human resources where academic are attracted by local of overseas opportunities, hence, leaving universities desolate. Likewise, Nigeria lacks basic infrastructure such as good buildings, laboratories, equipments, electricity; all these affects the capacity of universities in accommodating students relative to the demand placed on them. Most Nigerian Universities are still run on old systems of governance that does not seem to fit into current reforms in education, hence, causing lack and lags in strategies capable of building capacity within these institutions. In summary, the current state of human resources, infrastructure, university management/governance and policies are less encouraging and needs to be well addressed if Nigeria would survive or surmount the challenges these constraints pose on it higher education system. The next section examines the potential of open and distance education as a solution through existing literature.

A need for more e-learning 'space'?

> Looking beyond these immediate problems and charting a way forward… There is advantage to be had from the development of ICT. Distance education is a recognized means of coping with the rising demand for higher education while ensuring good quality and improving current standard. Distance education should be adopted in complement to the conventional educational system (Osinubi, 2003).

There is a growing body of research suggesting open and distance education as a strategy capable of reducing the challenge of capacity, equity and access to education (Bajinath, et al., 2008; Ojo & Olakulehin, 2006; Olakulehin, 2008; Perraton, 2007a). The reason for this, many claim is the opportunity it provides to "educate and train anyone, anytime, and from anywhere" (Govindasamy, 2002). Perraton (2007b) reports that 56 percent of higher education students were studying at two of Thailand's Open University in 1985; likewise, Turkey saw a rise in figure from 4 percent in 1980 to 26 percent in 1994.

Furthermore, various studies put together have discussed some benefits of Open and Distance Learning (ODL) which are worthy of note for the purpose of this question (Marsden, 1996; McFall & Freddolino, 2000; Ojo & Olakulehin, 2006; Olakulehin, 2008; Perraton, 2007a; White, 2005); these benefits include:

- Increased Accessibility: ODL breaks the barriers of times and space; hence making it possible to enrol a large number of learners without restrictions. As explained by Schrum & Ohler (2005) distance education "significantly challenges the standard onsite educational culture pedagogically, organisationally, technologically and financially."
- Flexibility of learning activities: Instructions delivered are independent of time, location, pace and space; hence learners can still face other commitments and learn at their own pace.
- Economies of scale: the increase in enrolment rates in a distance education system lowers the unit cost per learner.
- Cost effectiveness: permits the achievement of individual educational objectives at affordable costs, without affecting the normal schedule of learners.
- Suitable for Marginalized and under represented groups: such as full time house wives, women in certain cultures, physically challenged persons, farmers, fishermen, and rural and remote dwellers.

Open and distance learning in Nigeria

Ajadi et al., (2008) argued that ODL is needed in Nigeria for three main reasons: firstly, majority of the population lives below the poverty level; thus, they are unable to access urban based institutions and consequently remain deprived of higher education; secondly, people who joined the workforce without completing their education due to family commitments and other issues are unable to combine work and study despite interests due to the limited capacity of the contemporary institutions; lastly, in some parts of Nigeria, majority of the female population are deprived of higher education due to early marriage or religious beliefs. Moreover, ODL is not a new phenomenon in Nigeria as it dates back to early independence. Currently, the National Open University of Nigeria (NOUN) is the leading icon of ODL in Nigeria. It is also the largest university in the state in terms of student population and offers over 50 programmes and 750 courses.

NOUN's objectives for the Nigerian populace include (see Ajadi, et al., 2008; NOUN, 2006):

- To provide wider access to education generally but specifically university education
- To ensure equity and equality of opportunities in education
- To enhance education for all and life-long learning
- To provide the entrenchment of global learning culture
- To provide instructional resources through the intensive use of ICTs
- To provide flexible, but qualitative education
- To reduce cost, inconveniences, hassles of and access to education and its delivery
- To enhance more access to education.

The university operates its administrative headquarters in Lagos with 28 study centres spread across the six geo-political zones in the country (NOUN, 2006). The study centres are main contact places for students' learning activities (Ajadi, et al., 2008). The number of registered learners in the university is higher than the enrolment of any conventional university in Nigeria. Enrolment at the university is estimated at 43,254 (see Ajadi, et al., 2008). Given the rapid expansion of the university and the growth of ICTs in the country, NOUN has commenced plans on the introduction of more e-learning initiatives with the support of international bodies such as, Commonwealth of Learning (COL), African Virtual University (AVU), African Council for Distance Education (ACDE) and the International Council for Distance Education (ICDE) (Ajadi, et al., 2008).

Barriers to e-learning space in Nigerian universities

Adam (2003) argued that ICTs, in some circles of education, are regarded as a solution for the problem of having to do more with less, providing access to increasingly diverse demography of students and faculty and improving both quality and quantity of educational content. Nafukho (2007) also argued that current developments in technology have an extraordinary potential for transforming education to meet the growing need for customized, on-demand learning. However, these promises and developments of ICTs often encounter barriers, some that challenge their adoption and integration. Some of the challenges include:

- Inequality of access to technology: the challenge of digital divide exists among the student of NOUN; thus, some of them are unable to afford computers due to the relative cost to the average income of workers in the country (Ajadi, et al., 2008; Arikpo et al., 2009).

- Internet connectivity: the cost of accessing the internet in Nigeria is still on the high side. Hence, some students find it a challenge to afford. Aduke (2008) suggested that the government should make Internet connectivity a priority for higher education be able to leverage on the promises and opportunities ICTs present.

- Energy related problems: irregular and frequent interrupted power supply in Nigeria is a perennial problem affecting almost every aspect of the economy, including education. Ajadi et al., (2008) argued that its been a major set back for technological advancement in the country. Most rural areas in Nigeria are not even connected to the national grid. The consequence of this is that students residing in such areas may find it difficult to use ICT effectively.

- Limited expertise: Ajadi et al., (2008) reported that there are few technical staff at NOUN to maintain the current system. Lack of, or inadequate trained personnel are a challenge to the use of ICT in most Nigerian higher institutions (Aduke, 2008).

Other challenges include and are not limited to: attitude of students, software and licence costs, institutional issues and ICT culture.

Enablers of e-learning space in Nigerian universities

While there are barriers to building capacity for e-learning in Nigeria, there are also enablers, some of which include:

- Student positive attitude and disposition to the use of ICT: In a survey of 300 undergraduate students from 10 different faculties across Nigerian universities in the western region, Awoleye et al., (2008) found the usage and adoption of ICTs to be 92%. This compared to Oyeyinka and Adeya's (2004) earlier findings of 69%, this reveals an upward surge of 23%. Thus, there appears to be a positive disposition to ICTs amongst Nigerian students. Consequently, a number of Nigerian universities are making frantic efforts towards improving their ICT infrastructure (Awoleye, et al., 2008).

- Internet diffusion: Awoleye et al., (2008) also found that the students surveyed spend an average of 3.5 hours per week on the internet. As compared to an earlier study by Jagboro (2006) which reported an average of 1 hour per week; this shows an improvement in the diffusion of the internet amongst Nigerian students. Awoleye et al., (2008) also found that a large percentage of the students surveyed confirmed that the internet has a positive impact on their academics.

- Strategic Alliance for ICT initiatives: Nafukho (2007) revealed a partnership referred to as 'bandwidth consortium' in Africa, with the aim of expanding internet bandwidth capacity at lower cost to academic institutions. The consortium consists of 11 African universities and two higher education organisations backed by four major United States foundations. Among the 11 universities, are 6 from Nigeria, 2 from Ghana, others are from Mozambique, Tanzania and Uganda. The higher education organisations are: Association of African Universities (AAU) and the Kenyan Education Network (KEN).

These we argue are enablers of the e-learning space in Nigerian universities. Others include gradual ICT-curriculum Integration and increasing government initiatives towards building capacity for ICTs.

Conclusion

This paper has demonstrated that overcrowding is a characteristic feature of universities in developing economies with particular focus on Nigeria. It also revealed two factors believed to be playing significant roles in the 'massification' of university of education – historical and population explosion. Give the opportunities and promises of ICTs in addressing this challenge; it reviewed potential constraints affecting the capacity of the Nigerian higher education system. It also draws upon relevant literature to review the current status, barriers and enablers of the e-learning space in Nigerian universities. Moreover, while ICTs presents notable opportunities; this study does not advocate for the adoption of a particular mode of e-learning in addressing the capacity constraints; however, we suggest that building capacity for the e-learning space can play a significant role if strategically implemented.

References

Adam, L. (2003). Information and Communication Technologies in Higher Education in Africa: Initiatives and Challenges. *Journal of Higher Education in Africa, 1*(1), 195-221.

Adomi, E. E. (2005). Internet Development and Connectivity in Nigeria. *Program: electronic library and information systems, 39*(3), 257-268.

Aduke, A. F. (2008). Usage and Challenges of Information and Technology (ICT) in Teaching and Learning in Nigerian Universities. *Asian Journal of Information Technology, 7*(7), 290-295.

Aigbokhan, B., Imahe, O. J., & Ailemen, M. I. (2005). Education expenditure and human capital development in Nigeria: Any Correlation so far? Retrieved May 26, 2009, from http://www.regional-studies-assoc.ac.uk/events/aalborg05/aigbokhan.pdf

Ajadi, T. O., Salawu, I. O., & Adeoye, F. A. (2008). E-learning and Distance Education in Nigeria. *The Turkish Online Journal of Educational Technology, 7*(4), Article 7.

Akintola, A. A., Aderounmu, G. A., & Owolarafe, O. K. (2002). Problems of Engineering Education and Training in Developing Countries: Nigeria as a case study. *European Journal of Engineering Education, 27*(4), 393-400.

Arikpo, I. I., Osofisan, A., & Usoro, A. (2009). Bridging the digital divide: the Nigerian journey so far. *International Journal of Global Business, 2*(1), 181-204.

Awoleye, M. O., Siyanbola, O. W., & Oladipo, F. O. (2008). Adoption assessment of Internet usage amongst undergraduates in Nigerian Universities - a case study approach. *Journal of Technology Management and Innovation, 3*(1), 84-89.

Bajinath, N., Awad, B. M., Lolwana, P., & Olakulehin, F. K. (2008). *Beyond Bricks, Mortar and University Towers: Rethinking Delivery Systems in African Higher Education*. Paper presented at the African Council on Distance Education Conference. Retrieved April 29, 2009, from http://www.nou.edu.ng/noun/acde2008/acde_en/papers.pdf/SUB-THEME-V%20PDF/Beyond%20Bricks%20Mortar%20and%20Ivory%20Towers-Rethinking%20Delivery%20Systems%20in%20African%20HE_Baijnath_Awad_Lolwana_Olakulehin.pdf

Bloom, D., Canning, D., & Chan, K. (2006). Higher Education and Economic Development in Africa Retrieved 30 July, 2009, from http://www.arp.harvard.edu/AfricaHigherEducation/Reports/BloomAndCanning.pdf

Czerniewicz, L., & Brown, C. (2009). A virtual wheel of fortune? Enablers and Constraints of ICTs in Higher Education in South Africa. In S. Marshall, W. Kinuthia & W. Taylor (Eds.), *Bridging the Knowledge Divide* (pp. 57-76). Charlotte, NC: Information Age Publishing.

Daniel, J. S. (1996). *Mega-Universities and Knowledge Media*. London: Kogan Page.

Govindasamy, T. (2002). Successful implementation of e-Learning Pedagogical considerations. *Internet and Higher Education, 4*(1), 287-299.

Green, D. (1994). What is Quality in Higher Education? Concepts, Policy and Practice. In D. Green (Ed.), *What is Quality in Higher Education?* (pp. 1-20). Buckingham: The Society for Research into Higher Education & Open University Press.

Gulati, S. (2008). Technology-Enhanced Learning in Developing Nations: A Review. *International Review of Research in Open and Distance Learning, 9*(1), 1-16.

Jagboro, K. O. (2006). A study of internet usage in Nigerian universities: a case study of Obafemi Awolowo University, Ile-Ife, Nigeria. *First Monday, 8*(2-3). Retrieved from http://firstmonday.org/issues/issue8_2/jagboro/index.html

JAMB (2009). JAMB Statistics: Application and Admission (UME and PCE) Retrieved April 30, 2009, from http://www.jambng.com

Marsden, R. (1996). Time, Space and Distance Education. *Distance Education, 17*(2), 222-246.

McFall, J. A., & Freddolino, P. P. (2000). The Impact of Distance Education Programs on Community Agencies. *Research on Social Work Practice, 10*(4), 438-453.

Moja, T. (2000). Nigeria Education Sector Analysis: An Analytical Synthesis of Performance and Main Issues Retrieved May 15, 2009, from http://siteresources.worldbank.org/NIGERIAEXTN/Resources/ed_sec_analysis.pdf

Nafukho, F. M. (2007). The Place of E-learning in Africa's Institutions of Higher Learning. *Higher Education Policy, 20*, 19-43.

Ndulu, B. J. (2004). Human Captial Flight: Stratification, Globalization, and the Challenges to Tertiary Education in Africa. *Journal of Higher Education in Africa, 2*(1), 57-91.

NOUN (2006). Getting to Know Your University. In F. Peters (Ed.), *University Brochure* (Second ed., Vol. 1). Nigeria: National Open University of Nigeria.

NUC (2009). List of Nigerian Universities and Years Founded Retrieved April 30, 2009, from http://www.nuc.edu.ng/pages/universities.asp

Ogunsola, L. A., & Aboyade, W. A. (2005). Information and Communication Technology in Nigeria: Revolution or Evolution. *Journal of Social Sciences, 11*(1), 7-14.

Ojo, D. O., & Olakulehin, F. K. (2006). Attitudes and Perceptions of Students to Open and Distance Learning in Nigeria. *International Review of Research in Open and Distance Learning, 7*(1), 1-10.

Olakulehin, F. K. (2008). Open and Distance Education as a Strategy for Human Capital Development in Nigeria. *The Journal of Open and Distance Learning, 23*(2), 123-130.

Osinubi, T. S. (2003). System Performance and Sustainability of Higher Education in Nigeria. *Higher Education Policy, 16*, 301-311.

Oyeyinka, B. O., & Adeya, C. N. (2004). Dynamics of Adoption and Usage of ICTs in African Universities: A Study of Kenya and Nigeria. *Technovation, 24*, 841-851.

Perraton, H. (2007a). Higher Education: Beyond the Courtyard Wall *Open and Distance Learning in the Developing World* (Second ed., pp. 82-124). New York: Routledge.

Perraton, H. (2007b). *Open and Distance Learning in the Developing World* (2nd ed.). New york: Routledge.

Rye, S. A. (2009). Negotiating the Symbolic Power of Information and Communication Technologies (ICT): The Spread of Internet-Supported Distance Education. *Information Technology for Development, 15*(1), 17-31.

Saint, W., Hartnett, T., & Strassner, E. (2003). Higher Education in Nigeria: A Status Report. *Higher Education Policy, 16*, 259-281.

Sawyerr, A. (2004a). African Universities and the Challenge of Research Capacity Development. *Journal of Higher Education in Africa, 2*(1), 213-242.
Sawyerr, A. (2004b). Challenges Facing African Universities: Selected Issues. *African Studies Review, 47*(1), 1-59.
Schrum, L., & Ohler, J. (2005). Distance Education at UAS: A Case Study. *Journal of Distance Education, 20*(1), 60-83.
Sharma, R., Ekundayo, M. S., & Ng, E. (2009). Beyond the digital divide: policy analysis for knowledge societies. *Journal of Knowledge Management, 13*(5), 373-386.
Teferra, D., & Altbach, P. G. (2004). African Higher Education: Challenges for the 21st Century. *Higher Education, 47*, 21-50.
UNESCO (2006). International Bureau of Education: World Data on Education (6th Edition). Retrieved May 26, 2009, from http://www.ibe.unesco.org/Countries/WDE/2006/SUB-SAHARAN_AFRICA/Nigeria/Nigeria.pdf
UNESCO (2009). UNESCO portal on Higher Education Institutions: Nigeria Retrieved April 30, 2009, from http://portal.unesco.org/education/en/ev.php-URL_ID=51421&URL_DO=DO_TOPIC&URL_SECTION=201.html
Weforum (2007). The Network Readiness Index 2006-2007 Rankings Retrieved 27 October, 2009, from http://www.weforum.org/pdf/gitr/rankings2007.pdf
Weforum (2008). The Networked Readiness Index 2007–2008 rankings Retrieved 27 October, 2009, from http://www.weforum.org/pdf/gitr/2008/Rankings.pdf
Weforum (2009). The Network Readiness Index 2008-2009 Rankings Retrieved 27 October, 2009, from http://www.weforum.org/pdf/gitr/2009/Rankings.pdf
White, C. (2005). Contribution of Distance Education to the Development of Individual Learners. *Distance Education, 26*(2), 165-181.
World Bank (2007). Utilizing Knowledge for Development: Ten Priorities for Africa. *Knowledge for Africa's Development Conference, 2006*, from http://siteresources.worldbank.org/KFDLP/Resources/TenPriorities2.pdf
World Bank (2008). Nigeria at a glance Retrieved April 30, 2009, from http://devdata.worldbank.org/AAG/nga_aag.pdf

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