International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2007, Vol. 3, Issue 1, pp. 64-84.

Policy networks and the transformation of secondary education through ICTs in Africa: The prospects and challenges of the NEPAD e-schools initiative

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ABSTRACT

Using the policy network theoretical framework, this paper examines the prospects and challenges of the New Partnership for Africa's Development (NEPAD) e-schools initiative. Based on qualitative research approach, this study aims to critically evaluate the prospects and challenges facing the e-schools collaborative initiatives under the auspices of the NEPAD. Secondary education system is the most strategic education sector and unfortunately the least developed and the least available in Africa. With the vision of changing teaching and learning paradigms in Africa, the e-schools initiative aims to tackle the problems of secondary education in the region through the application of information and communication technologies (ICTs). However, a successful exploitation of the potential of ICTs for the enhancement of secondary education depends more on pedagogical and inter-organizational strategies than ICT issues. While secondary education is the domain of interest, e-school projects are premised on collaborative partnerships, alliances and consortia of corporate and governmental bodies. The projects have many prospects and challenges that must be resolved to ensure its sustainability. It is argued that a responsive ICT in education policy in each country is key to the success of e-school projects across Africa. At the organizational level, the study argues that sustained technology intervention is based more on the resolve of the partner members, especially the political will of African governments. Besides, the e-school initiative stands to gain from the experience of developing countries that have successfully integrated ICTs in education through collaborative strategies.

Keywords: *Information and communication technologies; e-school; secondary education; policy network; collaborative partnerships; Africa*

INTRODUCTION

Improved secondary education is fundamental to the creation of effective human capital in any country. In an effort to eradicate poverty and ensure sustainable socio-economic development in Africa, the newly formed New Partnership for Africa's Development (NEPAD) recognizes that a key issue is the development of human resources in the region. The crisis facing human resource development in Africa is clearly manifested in the secondary education sub-sector in forms of limited access and poor quality. The World Bank (2005) describes secondary education as the crucial link between primary schooling, tertiary education, and the labor market. As the World Bank (2005) notes, the task confronting education policymakers in Africa is to transform secondary education institutions and current schooling practices to align them with the fast growing demands of globalization and the technology-driven world. Thus, the main focus of the education policy process in Africa is to address the twin challenges of increasing access to, and improving quality and relevance of secondary education for all young people in the region. This underscores the imperative to transform teaching and leaning in primary and secondary schools in African countries. This is what the NEPAD e-school projects wants to accomplish with a new paradigm of educational curriculum delivery. This new and integrated strategy for socio-economic development in Africa paves a new way for the improvement in quality and expansion of access

to public education in the region. The NEPAD e-school projects aims to equip secondary schools (and later primary schools) in Africa with information and communication technologies (ICTs) to enable educational transformation to meet the demands of the 21st Century. In the long-run, modern communication technologies are expected to be widely deployed for teaching and learning in primary and secondary schools across Africa. This broad-based technology-enhanced education will be implemented through a collaborative partnership system in African countries.

The pilot phase of this e-learning initiative is currently being implemented in selected African countries. The NEPAD e-Schools Project is under the auspices of the NEPAD e-Africa Commission, the NEPAD ICT task team responsible for developing the NEPAD ICT program and implementing related projects. The e-schools initiative is on a multi-collaborative partnership strategy between the NEPAD, major ICT companies and ministries/departments of education in different participating African countries. The objective of this study is to examine the prospects and challenges of effectively implementing a large scale technological intervention in education within the context of developing countries in Africa. Due to high costs and shrinking educational resources in Africa and the increasing demand for secondary education in the regions, technology intervention has become one of the most feasible choices for education transformation. Following this background, this study examines the question: to what extent can the NEPAD e-school initiative use the policy network approach to bridge gaps in secondary education in Africa through the application of ICTs? To address this question, I will employ the policy network theoretical framework for analysis which is fully described below.

RESEARCH METHOD

This research uses qualitative methodology. Qualitative studies involve multiple data collection strategies for purposes of deriving rich descriptions within as natural a setting as possible (Merriam, 1998; Patton, 1990). Unlike the quantitative approach, qualitative research method promises to provide in-depth information and description about the basic dynamics of collaborative partnership in the NEPAD e-schools initiative in Africa. Data for the article was collected from primary and secondary sources using a triangulation of methods. The field research for the study was conducted in the summer of 2005. Interviews were conducted with key informants at the NEPAD e-Africa commission in Pretoria, South Africa. A large set of information used in the study comes from internet materials, particularly those produced by civic groups responding to issues of ICT in education in the developing countries.

CHALLENGES FACING SECONDARY EDUCATION IN AFRICA

The NEPAD e-schools project is motivated in part by the sordid state of the secondary education system in Africa, and by the conviction that the potential of modern ICTs can be utilized to meet educational challenges in the region. One may ask, to what extent is the introduction of ICTs necessary for the transformation of secondary education in Africa for national development? Is an initiative like the NEPAD e-school project vendor-driven or a mere effort to ensure that African schools conform to the global trend of applying modern ICTs in education? In essence, are ICTs a luxury or a necessity for secondary education in Africa? These are genuine questions that can be answered by looking into the current state of post-primary education Africa using the policy network theoretical framework for analysis.

Secondary education is of strategic importance to Africa's development and capacity building, particularly because students of secondary school age and young people in general make up more than 60 percent of the population of Africa (Bregman, & Stallmeister, 2002; Lewin, 2004;

Akoojee & McGrath, 2005). Unfortunately, many African countries are unable to meet the increasing demand for secondary education due to their inability to build on the successes of the universal primary education system. African countries are expected to double or triple the number of primary school graduates in the next couple of years. This massive turn-around is due to the success of the universal primary education system under the Education for All (EFA) programs. For instance, in the 2004 school year, the number of primary school graduates in Uganda was expected to increase from 400,000 to over 1million; in Tanzania, this figure increased from 540,000 to 1.2 million; while the expected growth in Malawi grew from 200,000 to 500,000 (Bregman, & Stallmeister, 2002;Lewin, 2004). Unfortunately, existing secondary schools in Africa do not have the capacity to absorb the increase in aggregate primary school graduation.

For decades, the sub-sector of secondary education has been neglected in Africa both by the governments and donor agencies. This view is in line with Colin Power's statement: "We in UNESCO have put much emphasis into basic and higher education, and have neglected the young people in the middle" (Chavez *et al*, 1996, cited in UNESCO, 1999). This neglect of the secondary education sub-sector in Africa is further confirmed by Nsubuga's (2003) view that, "whereas primary education has been targeted during the past decades and higher education always had strong interest groups behind it …Secondary [education] has been conspicuously relegated to the behind scene" (p. 1). The apparent neglect of this sub-sector has resulted in limited access, especially for young women and rural communities, poor quality of curriculum and lack of qualified teachers and essentials infrastructure. This has created inequity in access to secondary education. Out of an estimated 86 million children of secondary school age in sub-Saharan Africa (SSA), only 23 million are in enrolled in schools (ibid). Lewin (2004) reports that the secondary Gross Enrolment Rate (GER2)[1] is below 20 percent in fifteen countries in SSA and below 50 percent in thirty-seven others countries in the region. In general, SSA has an average GER2 of about 26 percent but when other variables such as over-aged students and repetition are factored in, the net GER2 in Africa may be below 20 percent (*ibid)*. African countries have the lowest GER2 value when compared with other developing countries around the world[2]. The widening gap in secondary education development between SSA and the rest of the world cannot be reversed simply by exploring new finance and planning strategies, the mode of delivering secondary education needs to be reexamined in order to expand access.

Historically, secondary education is more accessible to urban areas than to rural communities in Africa (Boaduo, 2005). Additionally, there are some significant gender disparities in the distribution of secondary education in Africa. Socio-cultural, religious, and economic factors have contributed to this disparity that has placed young women at a serious disadvantage (Bregman & Bryner, 2003). In African countries, more boys (28 percent) benefit from secondary education than girls (22 percent) (The World Bank, 2005), yet secondary education plays a vital role in the political and socio-economic development of Africa. As Psachraopoulos (1986) notes, knowledge and human capital are vital aspects of growth and development. With high social and economic return on investment, education in general and secondary education in particular brings about productivity improvements that drive economic growth (Hanushek and Kim, 1995). This is because the social and economic returns to investment in secondary education outweigh the cost. Among other things, such returns include reduction of endemic poverty, increased democratic culture, social inclusion, health awareness and gender equality (Bregman & Bryner, 2003; Lewin, 2004). These are empirical evidences to demonstrate the direct correlation between secondary schooling and socio-economic development of Africa.

The above problems are commonly associated with educational failures and setbacks, which make the realization of the EFA (Education for ALL) goals in Africa a daunting challenge. Considering the high private and social return to investment in secondary education (Psacharopoulos and Patrinos, 2002), innovative policy interventions are urgently needed to improve the quality of secondary education and meet the increasing demand for secondary

education in many African communities. Without disregarding the basic needs of secondary education in Africa, such as building more classrooms, there is growing evidence that ICTs may be the only feasible and economically sound means of expanding access to and improving the quality of secondary education, both in Africa and the rest of SSA (Isaacs, 2002). The NEPAD e-school initiative is designed to accomplish this goal through public-private partnership approach.

THE RATIONALE FOR ICT IN SECONDARY EDUCATION IN AFRICA

There is a general consensus that modern information and communication technologies are transforming various aspects of human activity, particularly the arts of teaching and learning. While various terms have been coined for this technology-enhanced education, such as information society, e-learning, and e-school, many countries have acknowledged the fact that investment in ICTs is an investment in human capital development. Such investments are essential in order to meet the demands for new meanings of "school" and "learning," within the larger process of education reform.

Considering the level of poverty in SSA, it is ideal to ask whether it is reasonable to invest huge amount of money in ICTs for the educational development, instead of using such resources to meet other needs of the secondary education system in the region. Such resources, one may argue, can be used to construct more classrooms, provide updated textbooks for students, or better still used to provide electricity and good access roads to secondary schools in rural and remote communities in Africa. In response to the above concern, this study agrees with Luis Osin (1998) that ICTs in education and basic needs in the developing countries are not contradictory or conflicting interests. As he further argued, "The only way to reach a long-term solution for the economic problems of the population is to raise the educational level, particularly for the low socio-economic groups" (Osin, ibid, p.2). In addition, the objectives of ICT in education cannot be realized without basic infrastructures and educational resources. Suffice it to say that the objective of integrating ICT in secondary education cannot be pursued in isolation rather it should be seen as an integral part of the overall strategy for knowledge creation and the improvement of educational system in Africa.

The rationale for integrating ICTs in education was substantiated in a report issued by the Organization for Economic Co-operation and Development (Organization for Economic Co-operation and Development [OECD], 2001) on the impact of ICT in schools. In addition, the report identified other rationale for integrating ICT in education and these include:

- Economic rationale which has a focus on the perceived needs of the economy and the requirements to meet the skill and learning needs of the information economy;
- Social rationale which focuses on facility with ICT becoming a prerequisite for participation in society and employment, so that ICT competence is seen as an essential life skill and a basis for maintaining employability throughout life;
- Pedagogical rationale which concentrates on the role of ICT in teaching and learning and the ways in which ICT can increase the breadth and richness of learning, foster motivation for learning, and support the development of higher-order thinking skills (OECD, 2001)

Generally, the expected advantages of integrating ICTs in secondary education in Africa are: Effective curriculum delivery by teachers as facilitators; Improved learning by raising curiosity; Technological Literacy among students; expanding educational access to remote communities that were formerly deprived of education due to distance, culture, economic needs or gender disparities; and to prepare students for the world of work.

Despite the recognized roles of Information and Communication Technologies (ICTs) in improving the quality and quantity of education, ICTs remain a low policy or financial priority in most educational systems in Africa. Obviously, most countries in the region lack the local capacity and financial wherewithal essential for a sustainable integration of ICTs in education. Understandably, African countries face numerous competing development priorities ranging from budgetary constraints, management challenges, and shortage of teachers and other educational resources, to the dreadful impacts of HIV/AIDS on education. These are issues that vie for the attention of local policy makers. While all countries in the region acknowledge the strategic role of ICTs in development, only a couple of countries in Africa have established a comprehensive policy for the integration of ICT in education. Where such policies exist, they tend to remain vague and make little reference to implementation (James, 2001). As Tina James (ibid) aptly opined, ICT in education policy needs to establish itself within the set of competing priorities. However, given the urgency of educational needs in the region, particularly at the secondary school level, the establishment of such policy domain is overdue. It is against this background that one sees the NEPAD e-school initiated as an innovative approach.

Countries in Africa share few domains driven by harmonized policy initiatives and standards. Such few regional policies are under the sponsorship of regional bodies and groupings like the South African Development Cooperation (SADC) and the Economic Community of West African States (ECOWAS). These regional organizations, modeled along the European Union (EU), have contributed more in recent history to the areas of regional peace-keeping, peace-enforcement and reconciliation/reconstruction of member countries destabilized by civil wars. Hence, the decision to implement a harmonized ICT in education policy through the NEPAD e-school initiative is an unprecedented accomplishment of collective governance, which this study sees as policy network from a regional perspective. The need for the integration of ICT in secondary education in Africa is underscored by two main factors, namely: expanding secondary education access to marginalized communities; and to improve the quality and value of secondary education in Africa.

The NEPAD – A Background

The New Partnership for Africa's Development (NEPAD) is the newest experiment in regional cooperation and economic development of the African Union (AU). The strategic framework document that formed NEPAD was the product of a mandate given to the five initiating Heads of State (Algeria, Egypt, Nigeria, Senegal, and South Africa) by the African Union to develop an integrated socio-economic development framework for Africa. The 37th Summit of the AU in July 2001 formally adopted the strategic framework document (New Partnership for Africa's Development [NEPAD], 2005). With focus on education, health, regional infrastructure, agriculture, market access and preservation of the environment, NEPAD operates within the larger framework of the African Union. The framework has been described as a holistic, comprehensive integrated strategic approach for the socio-economic development of Africa. NEPAD is more or less a fresh collective commitment to move Africa forward. To a large extent, the NEPAD venture is driven by the implications of globalization for African countries. The NEPAD document provides the vision for Africa, a statement of the problems facing the continent and a program of action to resolve these problems in order to reach the goal. According to the document, the objective of NEPAD is "to consolidate democracy and sound economic management on the continent" (NEPAD, 2001. p.59). The NEPAD e-Schools project was publicly launched in Durban, South Africa during the Africa Summit of the World Economic Forum on June 12, 2003. The aim of the project is to impart ICT skills to young Africans in primary and secondary schools and utilize the potential of ICTs to improve, enrich and expand education in African countries (e-Africa Commission, 2006). As the architects of NEPAD argue, public-private partnership is "…a promising vehicle for attracting private investors, and focus public funding on

the pressing needs of the poor …" (NEPAD, 2001. p.23) such as improved literacy and high quality education. Hence, the activities of the NEPAD and its various commissions adopt the policy network strategy in pursuit of their development objectives in Africa.

NEPAD e-Schools Initiative as Policy Network

Policy network is a perspective which shows that the activities of the society, represented in formal policy process, are no longer centralized and dictated by the formal institutional arrangements of the state; instead, it is controlled and influenced by dispersed intelligence and activities of independent actors. The objective is to mobilize both public and private sector resources in order to produce methods and activities that can promote sustainable development in the society. Kenis and Volker (1991, p. 27) observe that "contemporary policy processes (i.e., problem identification and agenda setting; policy formulation; policy implementation; and Policy monitoring and evaluation) emerge from a complex actor constellation and resource interdependencies." It is important to stress that policymaking is not linear process. Therefore, policy network is seen as a linkage between broad social structures of the state and other elements of social coalitions in the state, such as the private sector and other civil society organizations.

The strength of the policy network theory is the fact that almost all of its definitions involve a number of similar components, which serve as the points of theoretical and conceptual consensus upon which this study builds. These components are: multiple actors or agencies; multiple sectors (at times); multiple levels (at times) and, a recognition that everybody is participating for their own reasons. As Lawrence O'Toole aptly puts it, "[t]he image of the 'policy implementation network' can be used to convey the idea of a highly differentiated and complex array of public and private organizations that are involved in the translation of the policy intentions … into appropriate measures or actions for the realization of these objectives at the 'level of the consumer' (1988, p.139)." Policy network is therefore composed of the linkages between interdependent organizational actors.

In the past, African countries have had a series of externally driven and unsuccessful technological interventions in education. [3] The NEPAD e-school initiative marks the first time that African governments, the private sector, foundations, development agencies and civil society organizations have come together for a common ICT project in education, developed and driven by Africans and for Africa (Chasia, 2004). Thus, the NEPAD e-school initiative represents a policy network model, which involves a multi-actor, multi-sector and semi-closed system operating on interwoven activities of entities aimed at maximizing influence and resources for the common goal of secondary education transformation in Africa. The ten-year NEPAD flagship e-schools initiative involves establishment of an Africa-wide satellite network that will connect schools to the internet, as well as to points within each country from which, educational content will be fed to the schools on a continuous basis (NEPAD Dialog, 2004). Additionally, in order to utilize ICT educational development it is crucial to train teachers and students, develop content and curriculum, and facilitate community involvement and participation in the implementation process.

The formulation and implementation structure of the NEPAD e-school project in Africa is a policy network in action. Though it requires national execution with continental coordination, the e-school initiative conveys the idea of a highly differentiated and complex array of public and private organizations, including the civil society that are involved in the translation of the policy intentions for the realization of secondary education objectives in rural and urban Africa. All the actors in the e-school implementation structures operate in both markets and hierarchies. This is a multi-actor model of ICT in education policy process where no single organization or agency commands all the needed resources. None of these actors, both at national and continental levels, have the power to autonomously determine the strategies of all the other actors or unilaterally determine

the outcome of the e-school initiative. Thus, the e-school policy processes are not the implementation of *ex ante* formulated goals, rather they are more or less processes of interaction in which actors exchange information on ICTs, preferences and means of implementation, and trade-off goals and resources essential for the accomplishment of the e-school objectives in Africa. In this model, while African governments are no longer envisioned as holding superior, hegemonic positions, they are, nonetheless, viewed as being on, at least equal footing with other stakeholders in secondary education in Africa.

The NEPAD e-Schools System

The NEPAD e-schools initiative is a collective response to the challenges of secondary education in Africa by leveraging the potential of ICTs. Generally, the development and application of ICT infrastructure to educational development is considered essential to the achievement of long-term sustainable socio-economic development on the African continent. Kinyanjui (2003, p.5) defined an e-school as "a school connected to the ICT network and with a minimum set of ICT tools and teaching capabilities necessary to impart ICT skills and improve the provision of education in Africa." The objectives of the NEPAD e-schools initiative are to:

- Provide ICT skills to young Africans in primary and secondary schools to enable them function effectively in the emerging information society and knowledge economy;
- Make African students health literate;
- Provide teachers with ICT skills in order to enhance teaching and learning;
- Provide school managers in Africa with ICTs skills to facilitate efficient management and administration in schools; and
- Establish "health points" in each school in order to provide health information to students, parents, healthcare workers and the broader community (The NEPAD e-School Initiative, 2005).

The Health Point aspect of the e-school system is not necessarily part of the on-going demonstration projects hence it is given less attention in this paper. This technological intervention in education was announced on June 12 2003 at the Africa Summit of the World Economic Forum in Durban, South Africa (The NEPAD Dialog, 2004). The NEPAD's e-schools policy implementation is under the aegis of the e-Africa Commission. This is the department responsible for driving NEPAD's ICT Programs. The implementation structure of the e-school project has two broad levels: the core tasks of supervising the installation and operation of the hardware and software in the schools, deploying teachers and curriculum delivery will be managed at the national level; while the tasks of formulation, co-ordination, monitoring and evaluation of the project will be performed as a continental collaboration through the NEPAD e-Africa Commission (NEPAD, 2004).

A major aspect of the e-school system is the NEPAD e-school Satellite Network. This project is expected to provide a central and harmonized Internet connectivity for all schools in the NEPAD e-School system in Africa. In addition to connecting African schools to the Internet, the satellite network is expected to facilitate the distribution of educational contents in Africa. The satellite will be linked to major distribution content centers in each country from which educational contents will be distributed to schools (Malapile, 2006). This mechanism is expected to enrich the quality of secondary education contents in Africa, especially among those countries that are still using outdated and ineffective educational curriculum.

Delivery targets have been set to turn all African secondary schools into NEPAD e-schools within five years of the implementation start date and all African primary schools into NEPAD e-schools

within 10 years of the start date. It is estimated that the 600,000 schools in rural and urban Africa (about 10 percent secondary schools) will benefit from this collaborative and technological intervention in education (Kinyanjui, 2003). The project aims to establish a steady and sustainable process in which Africans graduate from secondary schools equipped with basic and vital skills that will enable them to function effectively in the emerging information society and to contribute meaningfully to the development of their immediate society. The implementation of this technological intervention in secondary education includes the following processes:

- Installation of ICT equipment, software and infrastructure in schools;
- The training of pre-service and in-service teachers to use this technology to impart ICT skills to the students, as well as facilitate preparation and delivery of course materials in all other subjects;
- The use of ICT to develop appropriate course materials and make them available to schools and teachers;
- The establishment of an African-wide satellite network that will connect schools to the internet, as well as to points within each country from which educational content will be fed to the schools on a continuous basis (NEPAD Dialog, 2004. p. 8).

According to the outline of the e-school agenda, within five years (by the end of 2008), each youth graduating from an African high school will be ICT-literate, and within ten years (by the end of 2013), each child graduating from an African primary school will be ICT-literate (NEPAD, 2004). By these dates, it is expected that each one of these schools in the respective category would have been converted into a NEPAD e-school. The image of a NEPAD e-school is one which is connected to the NEPAD e-schools network via satellite and equipped with the necessary ICT infrastructure (computers, TV sets, radio-sets, telephones and telephone lines, fax machines, digital cameras, VCR's, scanners, photocopiers, communication terminals etc). School management and administration will also benefit from this ICT-induced system of reform in education.

The e-schools initiative is a unique project geared towards using regional and sub-regional cooperation to realize economies of scale to reduce unit cost in the acquisition of ICT capabilities for secondary education improvement in Africa. As the World Bank (2001) points out, expanding educational access through educational technology can reduce unit cost through economies of scale that require large target audiences. This is rarely available within national boundaries of sub-Saharan African countries. The implication is that using ICTs to effectively change the landscape of educational provision and access in SSA is beyond the unilateral effort of national governments. This underscores the imperative of collaborative partnerships in this untested water of socio-economic development. This is one way of ensuring ownership and financial sustainability of such projects.

The e-School Pilot Projects

The implementation of ICT in education policy under NEPAD is organized in phases, starting with pilot or demonstration projects. The e-schools demonstration (e-schools demo) projects are critical initial steps for the implementation of the e-Schools Project. Phased implementation of the e-school initiative ensures that the implementation process is manageable and the development of best practices and lessons learned is gradual. It also provides opportunities for evaluations, so that the policy can be revised and fine-tuned through the feed-back process. In general, the demo projects aim to accrue empirical knowledge about the implementation of ICT in schools across Africa. The acquired body of knowledge from the demo will serve as a forerunner to a full scale and extended rollout of the broader e-schools initiative (NEPAD Dialog, 2004). Thus, the dynamic concept of the e-schools demo project involves the notion of a learning community in which the various stakeholders are both learners and contributors to the education reform process through

ICTs. This will provide a good basis for the successful implementation of ICT in education policy in the region. Through formative and summative evaluations of lessons from the e-school demo projects, the best practices and lessons learned can be integrated in the ICT in education policy in Africa.

The demo projects, which started in July 2005, are expected to establish a total of 96 secondary e-schools in 16 countries (six schools in each of the participating countries will initially benefit from the e-schools demo). The demo project is expected to directly impact approximately 150,000 African learners and teachers in the participating countries (NEPAD, 2004). The following 16 countries are participating in the demo project: Algeria, Burkina Faso, Cameroon, Egypt, Gabon, Ghana, Kenya, Lesotho, Mali, Mauritius, Mozambique, Nigeria, Rwanda, Senegal, South Africa and Uganda (see Table 1). The e-Schools Demo, which is designed to run for 12 months, will be monitored and evaluated by the Commonwealth of Learning and the INFODEV program of the World Bank. The e-school demonstration projects in each country are under the sponsorship of private partners for a period of 12 months (NEPAD Communications and Outreach & The MMI Group, 2005). Among other things, the e-school demo projects are expected to provide a platform for:

- Determining typical e-school scenarios and requirements in various circumstances in Africa;
- Highlighting the challenges inherent in the large-scale implementation of e-school programs;
- Monitoring the effectiveness of multi-country, multi-stakeholder partnership;
- Determining 'best practice' and working models for the large-scale implementation of e-school;
- Demonstrating the benefits of the envisaged satellite-based network; and
- Demonstrating the benefits of ICTs in African schools (NEPAD, Dialog, 2004).

Demonstration schools in the first phase of the NEPAD e-school implementation process will serve as models for ICT integration. These schools could encourage the staff to share their experiences and expertise with staff from other schools, or they could post their teachers to other schools that wish to start ICT integration. Alternatively, staff from other schools could be attached to these demonstration schools to observe best practices and immerse themselves in a culture that supports ICT integration during the second phase of the implementation process. The e-school demo projects have also benefited from the inputs of other organizations in Africa working in the field of educational technology. The e-Africa Commission consulted with organizations, such as the Mindset Network organization and the Khanya Educational technology Project, which have been involved in technology-enhanced education projects in South Africa for many years. Schools selected for the e-school demo projects provide a reasonable representation of the spectrum of African secondary school environment. The schools are required to comprise a mixture of rural and urban schools with differences in demography and infrastructural provision (Chetty, 2005). Therefore, ministries and departments of education in different countries participating in the e-schools demo projects are required to provide the basic infrastructural amenities, such as good roads, classrooms and electricity for rural and remote schools selected for the e-school demo project.

Prospects of the e-School Collaborative Initiatives

Realizing the lofty objectives of the NEPAD e-school initiative is based on the implementation structure established by the e-Africa Commission. This implementation structure requires national execution with close continental coordination. With the collaboration of major private sector partners, national governments will oversee the core tasks of: installing hardware and software in schools; providing supportive infrastructures; and deploying and training teachers for ICT integration. On the other hand, the continental tasks of formulation, coordination, monitoring and evaluation will be handled by the NEPAD e-Africa Commission (NEPAD, 2001). To ensure proper implementation, a National Implementation Agency (NIA) would be established in each of the participating countries. The NIA would have representation from the key players in the e-schools project, including government, private sector, development agency and CSO (civil society organizations) representatives. The e-schools national implementation entity will oversee the provision of infrastructure, content and teacher training and deployment. The national implementation entities have independent governing bodies with strong links with the government of the country (NEPAD, 2001).

To implement the NEPAD ICT program, under which the e-school initiative falls, the e-Africa Commission created a partnership known as Information Society Partnership for Africa's development (ISPAD). Many private sector entities operating in Africa, especially those in the field of ICT are partners in ISPAD and many e-school ventures. The private sector partners are grouped in consortiums for the NEPAD e-schools demonstration program in the participating countries (See Table 1). In line with this arrangement, two ISPAD-led consortiums are assigned to each participating country. Each consortium is responsible for three schools in its country of operation. The details of the allocation of consortiums for the e-school project to the participating African countries are provided in Table 1. Among of the participating private sector groups are: HP, Microsoft Corporation, AMD, Oracle Corporation South Africa, Cisco Systems, SAP and Intelsat. Others corporations participating in the initiative are Sentech, Grintek Telecom and ZTE Corporation Africa (Chetty, 2005). The multilateral and strategic method of project implementation has a number of advantages. These include among others, cost reduction, shared learning, access to expertise, standardization, resource mobilization and enhancement of political goodwill and support (NEPAD Communications and Outreach & The MMI Group, 2005).

Generally, the NEPAD e-Schools system has three levels of operation, namely: regional, national and the school level. According to the NEPAD Communications and Outreach & The MMI Group (2005), each participating country appoints a member of the national implementation team as the country's liaison person on e-schools project management and implementation activities. Each participating country is expected to sign the NEPAD e-school Memorandum of Understanding (MOU) with the NEPAD e-Africa Commission, the private sector members of ISPAD-led consortiums. In other words, the partnership model set up by the NEPAD e-schools project at continental level is also replicated at the country level. Such direct involvement of governments creates not only a sense of project ownership, but also the vital obligation of sustaining the e-school project in Africa. One of the envisaged advantages of the NEPAD e-Schools system is economics of scale. Through the e-Africa Commission, the e-school network will negotiate and access satellite Network and associated solutions as a group. This harmonized approach is intended to reduce the cost of the internet connectivity, digital content development and airtime to African schools by bulk purchasing of satellite capacity and by providing efficient management of satellite bandwidth (NEPAD, 2005; Farrell, 2006). This approach would promote resource sharing to overcome shortages currently experienced in many African states.

Table 1: *Assignment of Consortia to Countries and schools*

Country	School	Consortia
Algeria	Lycée Draa Mohamed Sadek	HP &Cisco
	Lycée Abdelhak Benhamouda	
	Lycée Bouchoucha	
	Lycée Cité Olympique	
	Lycée Abderrahmanr Ben Ouf	
	Lycée Ben Sahnoun El Rachedi	
Burkina Faso	Lycée Provincial de Ziniare (Launch School)	HP
	Lycée Yadega	
	Collége d'Enseignement Général (CEG) de Pobe Mangao	
	Lycée Untaani	AMD
	Lycée Provincial de Boulsa	
	Collége d'enseignement général de Komtoega	
Cameroon	Government High School, Buea - Bokwango	Microsoft
	Government High School, Mvengue	
	Lycee Classique d'Edea	
	Lycee Technique de Bamenda	AMD
	Government Bilingual Secondary School, Bafia	
	Government Secondary School, Mbansan (Launch School)	
Egypt	Iben senai secondary (Launch School)	HP
	Rafah Secondary School	
	Moubarak Secondary	
	Al Sadat	Oracle
	Arafaat Ahmed Mostafa	
	Alkhrga Secondary	
Gabon	CES Lucien NKOUNA-Bongoville (Launch School)	AMD
	CES Edouard MOSSOT-Moabi	
	Lycée Paul Marie YEMBI NDENDE	
	CES André Gustave ANGUILE	Oracle
	Lycée Richard NGUEMA BEKALE	
	CES Mouapa BEOTSA	
Ghana	Acherensua Secondary school	Oracle
	Ola Girls Secondary School (Launch School)	
	Akomadan Secondary School	
	Walewale Secondary School	Cisco
	St Augustine's Secondary School	
	Wa Secondary School	
Kenya	Mumbi Girls secondary	Oracle
	Menengai Mixed secondary	
	Isiolo Girls Secondary School (Launch School)	
	Maranda High school	Microsoft
	Chavakali High School	
	Wajir Girls secondary	

Country	School	Consortia
Lesotho	Lesotho High School (Launch School)	Oracle
	Bereng High School	
	St. Cyprian's High School	
	Sechaba High School	Microsoft
	Qacha's Nek High School	
	Sefikeng High School	
Mali	Lycée Fodie Maguiraga	AMD
	Lycée Bocar Cisse	
	Lycée Alfred Garcon	
	Lycée Mamadou Sarr	Cisco
	Lycée Attaher Ag Illy	
	Lycée Dowele Mariko	
Mauritius	Belle Rose State Secondary School	Oracle & Cisco
	Mon Lubin College	
	MEDCO (Cassis) Secondary School	
	Rose Belle High School	
	Windsor College	
	Ambassador College	
Mozambique	Escola Secundaria deEmilia Dausse	Microsoft
	Escola Secundaria de Angoche (Launch School)	
	Escola Secundaria de Cuamba	
	Escola Secundaria de Vilanculos	HP
	Escola Secundaria Joaquim Chissano	
	Escola Secundaria de Gurué	
Nigeria	Federal Government Academy Suleja (Launch School)	Microsoft
	Federal Government Girls College Bakori	
	Federal Government Girls College Owerri	
	Federal Science & Technical College Uyo	HP
	Federal Science & Technical College Lassa	
	Federal Government College Odogbolu	
Rwanda	Collège ST André (Launch School)	Cisco
	G.S. Muhura	
	Lycee de Zaza (in Kibungo-Zaza-Ruhembe)	
	Collège Christ-Rois de Nyanza (in Nyanza-Mugozi)	Microsoft
	Ecole Secondaire St Francois de Shangi	
	ESSA-Gisenyi	
Senegal	Lycée DE NIAKHAR (Launch School)	Microsoft
	Lycée WAOUNDE NDIAYE	
	Lycée DE DAHRA	
	Lycée DE BARGNY	AMD
	Lycée IBOU DIALLO	
	Lycée ALINE SITOE DIATTA	
South Africa	LG Holele High School	HP
	Lomahasha Secondary School	
	Maripe Secondary School (Launch School)	
	Isiphosethu High School	Oracle & Cisco
	Jamangile Secondary School	
	Ipetleng Secondary School	

Uganda	Bugulumbya Secondary School (Launch School)	HP
	Kabale Secondary School	
	Masaka Secondary School	
	Kyambogo College School	AMD
	Bukuya Secondary School	
	St. Andrew Kaggwa Senior Secondary School, Kasaala	

Source: Farrell, 2006 (pp. 43-45)

Challenges of the e-School Initiatives

Both the collaborative partnership and technological intervention of the NEPAD e-schools initiative are innovative approaches to education development in Africa. The collaboration is a good contractual framework for the support of secondary education in Africa. However, there are major obstacles that can hinder or delay the accomplishment of the e-school objectives in Africa. It must me added that some of these initial delays and start-up challenges are expected due to the fact that e-school project is a new and innovative reform approach in secondary education system in Africa. Hence, given the scale of the project couple with the variety of stakeholders, one should not expect a hundred percent hitch-free take-off and implementation activities especially within the context of developing countries in Africa.

Akinsanmi (2005) warns that unplanned introduction and application of ICT in education "without a sustainable model that includes ownership by beneficiaries can intensify existing inequalities in society, and reinforce an internal chasm separating the "haves" and "have-nots" in the society" (p.32). Similarly, sustainable approaches that have been tested and implemented in the advanced countries cannot serve as benchmarks for African countries (Akinsanmi, 2005). In reality, there is little guidance available for policy makers and interested corporate and civil society groups currently partnering or contemplating forming partnerships for the implementation of ICTs in education policies in SSA. Despite this gap in knowledge, many countries in SSA are embarking on this new field of largely untested grounds. To avoid past mistakes made by some African countries in educational technology, [4] more has to be known about the innovative strategies essential for a successful implementation of ICT in education policy by collaborative groups.

Despite the willingness of African countries to participate in the project, the expectations of African government, especially in regard to the sustainability of the project have not been well clarified. As the First Interim Report of the NEPAD e-Schools Demonstration Project (Farrell, 2006) highlights, many countries involved in the e-school project are in the process of developing national ICT in education policies while many do not have such policy framework. Ideally, the formulation of a policy framework in the area of ICT in education should be a good starting point in each participating country. A policy framework with a clearly defined roles and functions should guide ICT in education implementation activities beginning from the departments and ministries of education to the participating schools. The clarification of the role of governments, funding mechanism particularly before, during and after the pilot phase is crucial in order to sustain and realize the objectives of the e-schools initiative. The variations in the processes of demo projects suggest that many countries do not have a good understanding of the e-school project (Farrell, 2006).

The lack of clarity and failure to adequately explain the e-school project to participating African countries are attributable to some leadership gaps on the part of the e-Africa Commission. As the First Interim Report observes, the leadership of the e-school project from the e-Africa Commission "has been uneven" (*ibid,* p.31). Though the Commission has been effective in

handling some difficult areas, however, it has been generally criticized for not meeting its responsibilities after launching the e-school projects in different countries, and for leaving too much of the implementation activities on the ground to the consortia (*ibid*). Thus the application of different implementation processes and timeline by the various consortia without a specific guideline from the e-Africa Commission, has in effect, caused significant differences in implementation strategies and unrealistic timelines for the Demo timelines (*ibid*).

Again, there is the need for NEPAD e-Africa Commission to emphasize the fact that the e-school initiative is for the purpose of supporting the business of secondary education in Africa and not a technology project. Thus, the e-schools project is in the first instance an educational project, and only in the second instance a technology project. This clarification is important for two reasons. First, there is a dangerous assumption among many policy makers in Africa that ICT will solve many educational problems facing countries in the region. As Butcher (2003) rightly observed, ICT is not a panacea to the various problems facing secondary education in Africa. A study on the use of ICTs in schools in OECD countries shows that "ICT rarely acts as a catalyst by itself for schooling change, yet can be a powerful lever for realizing planned educational innovations" (Venezky & Davis, 2002, p.13 cited in Butcher, 2003. p.76-77). Second, the e-schools project should not be seen as a way of creating market opportunities for corporate entities operating in Africa. Various studies show that effective and sustainable integration of technology in education is financially intensive (Hawkins, 2002). It is obvious that African countries cannot implement ICT in education projects alone due to high investment cost; hence partnership with the private sector is indispensable. However, foreseeable source of the problem is in the area of business interest among private sector partners and investors in the e-school initiative. It is always very challenging to pursue private investment interest and maintain open standards and platforms that are accessible to the different countries involved. This must be handled very carefully. Undue pressures by the private sector to ensure early return on their investments in the projects will only make the entire scheme another white elephant project in Africa. Such pressure for short-term investment return and financial benefits will jeopardize the chances of accomplishing the primary objectives underlying the projects. It is therefore important to emphasize from the onset that the e-schools initiative is a long-term collaborative project and financial returns to such ventures often require longer term perspectives. The appreciation of the reality among partners implicit in the e-schools project contractual obligations will go a long way to ensure its sustainability.

Conceptually, there is a broad misunderstanding of the true meaning of "ICT" among many policy makers in Africa. Many technology policy makers tend to interpret the "C" in ICT as "computers," hence there is a lack of multiple conception of ICT and a focus on computers for educational enhancement in African schools. In reality, ICT is not limited to computers or satellite and internet technologies. In addition, traditional media technologies such as radio, cassette and television are also part of ICT because they all have to do with "information" and "communication" and they are all tested educational technologies. The role of such traditional media in education, especially in sub-Saharan Africa, is underscored by the high cost of computer technologies for educational purposes in such countries. Mutula (2003, p. 3) argues that, "multiple technologies should be allowed to compete so that the most cost effective [ones] can be chosen." This conception of educational technology is reinforced by the observation made by the former Education Minister of South Africa, Kader Asmal, when he said, "We should be reminded that ICT connectivity is not about how many computers are in schools, but how teachers and learners use various technologies to achieve educational goals and improve their teaching and learning experiences" (Ministry of Education, South Africa, 2003 cited in Parrott, 2003).

Many of these challenges are intertwined with the overall developmental problems in Africa. One of the major challenges to the e-school initiative is the overwhelming control of the telecommunication system by the African governments. For political reasons (Mbarika, 2002), many governments in Africa control and regulate the telecommunication industry, thereby

discouraging free enterprise competition and the associated benefits. The lack of competition and participation by the private sector in the telecommunication industry has given way to inefficiency, high cost of service and redundancy in the telecommunication sector in many African countries. This is one of the major contributing factors of low teledensity[5] in the region. The growth telephone fixed (land) lines used in the measurement of Teledensity, remain slow. See figure 1.

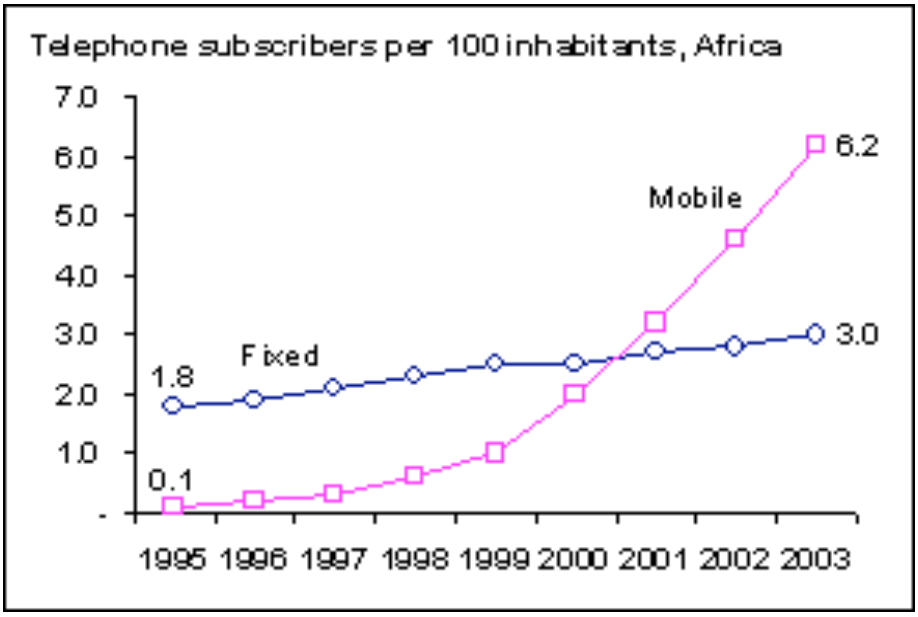

Figure 1: *Growth of Mobile phones in Africa compared to fixed lines*
Source: South African Institute of Distant Education (2005)

The recent boom in the growth and development of the telecommunication sector in many countries around the world, such as internet connectivity, the use of and the diffusion of mobile phone technology are associated with the involvement of the private sector. The liberalization of the telecommunication sector and the participation of the private sector will ensure healthy competition, which will improve the quality of service provision and of course reduce the cost of telephone lines and internet hosts[6] in African countries. Fortunately, many countries in sub-Saharan Africa have begun the process of liberalizing and privatizing their telecommunications sectors (Mutula, 2003). It is expected that this will eventually reduce tariffs and bring down cost in such countries. The above factors will not only improve teledensity in Africa, but also enhance the application of ICTs for the improvement of secondary education in the region.

Moreover, much of Africa lacks the power and telecommunication infrastructure to realize the potential of the modern ICTs (World Bank, 2001). As the Canadian-based International Development Research Center (IDRC) notes, the over-dependence of African countries on foreign technicians and consultants for the maintenance of telecommunication infrastructures and the development and enactment of key telecommunication guidelines, remains a major challenge to the application of ICTs in education in the region (IDRC, 1990 cited in Mbarika, 2002). Such dependence on foreign technicians has stifled the development and utilization of local know-how and expertise in the field of telecommunication and information technology. Furthermore, the reliance on foreign input has negatively affected recent ICT policies in many countries. In some occasions, such policies have been structured to benefit external interest and not the

development needs of the country. Therefore, the long-term sustainability of initiatives like the e-schools project will remain questionable until African countries can demonstrate their ability to locally produce and maintain the technological software and hardware needed. Thus, there is the urgency for the training and development of indigenous skills and capacities in various African countries to service the emerging ICT sector in the region.

The expansion of basic services and the development of sustainable infrastructure are key challenges of the e-school project in Africa. Basic infrastructures are critical for successful implementation of the NEPAD e-school strategy. Technical and basic infrastructures, coupled with sustaining schemas, make up structures that will empower or constrain the application of ICT in secondary education in Africa. Infrastructure requirements are costly and involve various stakeholders, particularly the governments of African states. Adequate provision of infrastructure, particularly electricity to schools in rural communities is crucial in the realization of the fundamental objectives of the e-school project. African countries need to commit themselves to innovative rural electrification projects to benefit both rural schools and communities. This can be more innovative with the application of a solar energy system for electric power in communities that are far removed from urban centers.

Another issue of concern is the excessive bureaucracy that characterizes African governments and policy implementation. This makes one to ask how fast the e-school strategies can be put in place to realize the fundamental objective of educating African youths at the ripe age for secondary education and practical training. Generations have come and passed without secondary education and another generation is about to miss this life time opportunity as plans are underway. There is a clear indication that excessive bureaucracy is a setback for policy implementation in Africa. While governmental processes should take their due course, efforts should be made by African governments to cut down on unnecessary and time-wasting bureaucratic processes that can lead to delays of e-school projects, technology roll-outs, and proactive management of the entire project.

Finally, there is also the question of school and community buy-in in the NEPAD e-school projects in different African countries. Although not by design, the e-school initiatives seem to have overlooked the role that schools and communities can play in the sustainability of their e-school projects. Technological and financial resources are not the only vital resources for the success of ICT in education. The involvement of schools and local communities from the planning stage is crucial to success of the project. Thus, the role of the community may be particularly helpful in ensuring the safety and security of ICT infrastructures installed in local secondary schools. Experience shows that local schools where ICT hardware such computers and satellite receivers are installed, are targets of thieves and hoodlums. As stakeholders in the e-school project, the watchful eye of community groups can prevent such thefts. To a large extent, rural and urban communities in Africa will be pleased to be part of such initiative.

CONCLUSIONS

The NEPAD e-school initiative uses policy network framework to harness the potential of ICTs to improve, enrich and expand access to secondary education in Africa. The goal of The NEPAD e-school project is idealistic, however, it remains to be seen how realistic the means to accomplish such goals are. The project has the potential of uplifting secondary education in Africa from its present sordid state, if implemented well. However, the project cannot accomplish its objectives in isolation. The e-school project stands a better chance of succeeding when implemented as a complement to large scale secondary education reform by African governments. The system of the e-school project is not necessarily new in Africa. The NEPAD e-school initiative is only new in terms of its scale and *modus operandi*. Prior to the inception of the NEPAD e-schools project, public-private partnerships have delivered educational curriculum to secondary schools through

ICTs. For example, the Mindset Network Organization and the Khanya Educational Technology Project are two examples of collaborative initiatives in South Africa. Both initiatives employ different forms of ICTs for curriculum improvement and delivery. Therefore, the e-Africa Commission and the various consortia can learn from the existing strategies of these pioneer organizations on how to successfully implement e-learning activities in Africa.

Due to the cost of investment, an effective and sustained technology intervention in secondary education cannot be unilaterally implemented by African governments, hence the need for multi-sectoral collaboration. The development strategy of collaborative partnership on which the initiative is launched has been tested as a rewarding method of development delivery in parts of Africa. Thus, the success or failure of the e-school project is primarily anchored on the resolve of the partner members, especially African governments, than the private sector partners. The ideals of the e-school project can be realized with political goodwill and support of African countries. This will not only ensure the sustainability of a new paradigm of education delivery, but also add value to secondary education system in Africa.

Endnotes

[1] GER2 is the number of children enrolled divided by the number of children of school-going age. Niger, Burkina Faso, , Tanzania, Burundi, Chad, the Central African Republic, Mozambique, Madagascar, and Rwanda stand, out as having the lowest GER2s, while Mali, Uganda, the DRC, Ethiopia, Angola and Senegal are in the next lowest group (Lewin, 2004).

[2] The GER2 is 53 percent in South Asia; 65 percent in East Asia and the Pacific; 60 percent in Arab and North African countries; and 82 in Latin America and the Caribbean (Lewin, 2004)

[3] In the 1970s and mid-1980s many African countries like Malawi, Zambia, Zimbabwe and Côte d'Ivoire mounted several unsuccessful educational technology projects aimed at expanding secondary education opportunities (Kaye, 1976; Paretton & Creed 2000).

[4] In the 1970s and mid-1980s many African countries like Malawi, Zambia, Zimbabwe and Côte d'Ivoire mounted several unsuccessful educational technology projects aimed at expanding secondary education opportunities (Kaye, 1976; Perraton & Creed 2000).

[5] Teledensity is the number of main telephone lines (land lines) for every one hundred inhabitants (Darkwa and Mazibuko, 2000; Mbarika, 2002)

[6] Internet host refers to number of computer in the economy that are directly hooked to the internet (Mbarika, 2002)

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