

## **Educational development in Kenya and the role of information and communication technology**

**Wanjira Kinuthia**  
**Georgia State University, USA**

### **ABSTRACT**

While ICT continues to advance in western countries, African countries still experience a lag in its implementation, and that continues to widen the digital and knowledge divides. This article provides an insight into the state of educational development in Kenya and the role of ICT in narrowing the knowledge divide. It documents the progress made in educational development, while revealing the challenges faced. The article provides an overview of the historical and economic context, social factors, and the organization and state of education. While the context is Kenyan, the strategies discussed are applicable to other African countries with similar challenges.

**Keywords:** *Education in Kenya, ICT for development, Technology integration in education, ICT in Africa, Education for Development*

### **INTRODUCTION**

Throughout the world, there are over 125 million school age children who are not in school. Of those, a significant number are from Africa. Although 2015 was the target specified by the Millennium Development Goals (MDGs) and the Education for All (EFA) initiatives to achieve universal primary access, many of these countries are far from reaching this goal (Mukudi, 2004; UNDP, 2008; UNESCO, 2008a). Limited economic and organizational resources constrain their ability to build and expand their education systems yet the needs and demands for formal education in post-colonial Africa continue to grow. The case of Kenya, discussed herein, demonstrates the educational and socioeconomic challenges faced and the strategies implemented in an effort to improve upon and expand instructional delivery. The paper begins with an overview of the historical and socioeconomic context of the country followed by a discussion of the state of education. This discussion then leads into the role of information and communication technology (ICT) in educational development.

### **SOCIOECONOMIC CONTEXT**

Kenya, located in East Africa attained its independence from British rule in 1963. During that time, the economy focused on agricultural produce, primarily growing coffee and tea for the export market. Even today the mainstay of the economy is the agricultural industry, forming one-third of the GDP. Kenya is a major economic, financial, communication, and transportation center in Eastern African. As a member of the revived East African Community (EAC), it offers linkages to Africa and the rest of the world in terms of transportation linkages, communications infrastructure, and skilled personnel. Tourism is another significant contributor to employment, income and foreign exchange. Manufacturing and processing, especially of agricultural products, is also a large employment sector, as is the service industry (CIA World Fact Book, 2008).

The 2008 World Bank figures indicate that between 2005 and 2007 the economy grew from 5.5% to 6.5% after years of economic decline in the 1980s and 1990s ("Kenya - Data and Statistics," 2008). This decline was the result of inappropriate policies, inadequate credit, and poor international terms

of trade. The Gross Domestic Product (GDP) growth in 2006 was estimated at 6.1%. In contrast, the GDP in 2003 was \$12.7 billion with an annual growth rate of 5.8% in 2005, and a per capita income of \$471 (Human Development Reports - Kenya 2007/2008 Report, 2008; Kenya Education Sector Support Project, 2006; UNICEF, 2008).

The current population of the country is estimated at 36 million with an annual population growth rate of 2.3% (CIA World Fact Book - Kenya, 2008; UNESCO Institute for Statistics, 2008b; The World Health Report - Kenya, 2008). UNESCO reports also indicate that of the total population, 60% are youth under the age of 30 years. The World Health Organization (WHO) and the United Nations Development Program (UNDP) Human Development Reports estimated the life expectancy at birth to be about 50% to 52% in 2005. The Under Five mortality rate for the same year was reported to be 120 per 1000. In terms of government spending on health care between 1994 and 2004, the central government's expenditure averaged 7% (UNICEF, 2008). Figures from UNESCO and UNICEF also show that the adult literacy rate for age 15 and older for between 1995 and 2005 was 73.6%, reasonably higher than that of many countries in Africa. The combined gross enrolment ratio for primary, secondary and tertiary education in 2005 was 60.6% with the government allocating 29.2% of the budget to educations (Bunyi, 2006; UNESCO, 2008c).

## **HISTORICAL DEVELOPMENT OF FORMAL EDUCATION**

Like the rest of Africa, Kenya by its sheer nature, has many ethnicities and indigenes (Bunyi, 1999; Dei, 2000). In pre-colonial times, localized, relevant indigenous knowledge was very important in the organization and transmission of knowledge. But when formal education was introduced in Kenya during the British colonial era, ideological conflicts arose because this was a western-style education, provided mainly by the missionaries with the cooperation of the colonial government (Bunyi, 1999; Ntarangwi, 2003; Strayer, 1973).

In 1963, the country gained independence and a commission was set up to make changes in the formal educational system. The focus of the commission was to build a national identity and to unify the different ethnicities through subjects in school such as history and civics, and civic education for the masses. Between 1964 and 1985, the 7-4-2-3 education structure modeled after the British education system was adopted. The system was designed to provide seven years of primary education, four years of lower secondary education, two years of upper secondary education, and three years of university (Buchmann, 1999). The country was in dire and immediate need for skilled workers to hold positions previously held by the British. Hence, the government set out to quickly expand educational opportunities to its citizens, many of whom had been previously denied educational and economic opportunities (Ntarangwi, 2003).

Kenya has always placed education as a priority at all levels, promoting it as a key indicator for social and economic development. At independence there were fewer than 900 000 Kenyan children attending primary school but by 1992, the number had grown to 5.53 million (UNESCO, 2008c). At independence there were 6056 primary schools and 891 000 students enrolled in school. By 1990, there were over 14 690 primary schools, about five million students, and 200 000 trained teachers. The teacher/student ratio in 1991 and 1992 was reported to be 1:31. Further, proportion of girls in school had grown to about 50% (UNESCO, 2008). Despite a high attrition rate in secondary school, enrolments at this level have steadily been growing.

## **ORGANIZATIONAL STRUCTURE OF THE EDUCATION MANAGEMENT SYSTEM**

The Ministry of Education, Science and Technology (MoEST) is responsible for providing education to its citizens (Ministry of Education, 2008). The ministry's tasks include employment of teachers for

government schools, distribution of learning resources, and implementation of education policies. The education sector takes up about 30% of the government's annual expenditure accounting for the largest share of the annual budget. However, much of the expenditure goes toward higher education and teacher training. University education falls under the Ministry of Education, Science, and Technology. The ministry's mandates are: 1) Science Technology Innovation (STI) Policy; 2) Research development, research authorization; and 3) Coordinating Technical Education (TE). Among other roles, the higher education ministry is responsible for improving the quality, relevance, equity and access to higher education and technical training and to enhance the capacity of the national STI system towards demand driven STI, quality higher education and technical education services (Ministry of Higher Education, Science, and Technology, 2009).

MoEST is responsible for several sectors in education including: 1) Early Childhood Development and Pre-Primary Education; 2) Primary Education; 3) Special Needs Education; 4) Secondary Education; 5) Teacher Education (Primary Teacher Education, Diploma Teacher Education, and In-Service Training Program); 6) University Education; 7) Non-Formal Education and Adult Education; and 8) Technical and Vocational Education and Training.

The vision of the Ministry is to provide "quality education for development," while its mission is "to provide, promote and co-ordinate lifelong education, training and research for Kenya's sustainable development." MoEST focuses on certain priority areas, notably attaining Universal Primary Education (UPE) by 2105 within the context of the wider objective of the UNESCO/World Bank initiative Education for All (EFA) (Ministry of Education, 2008; UNESCO, 2006). The Ministry has several objectives:

- 1) Achieve EFA by 2015;
- 2) Achieve transition rate of 70% from 57% for primary to secondary school;
- 3) Enhance access, equity and quality in primary and secondary education; and
- 4) Develop a national strategy for technical and vocational education and training leading to the rehabilitation of the physical facilities and equipment and making sure that vocational and technical institutions are appropriately equipped by 2010;
- 5) Expand public universities and increase the number and proportion of all students studying science subjects to 50%, with at least one third being women by 2010; and
- 6) Achieve 50% improvement of adult literacy by 2015 (Ministry of Education, 2008).

The Kenya Institute of Education (KIE), a semi-autonomous governmental agency, is responsible for educational research and development of the curriculum. KIE is focused on providing quality, relevant and affordable educational and training programs in response to a changing social, economic and technological environment. The initiatives are met through continual research, evaluation, assessment and the monitoring processes (Kenya Institute of Education, 2009). KIE works closely with the Kenya National Examination Council (KNEC), the examining body responsible for developing and assessing national exams at various levels of learning including the Kenya Certificate of Primary Education (KCPE) and Kenya Certificate of Secondary Education (KCSE) (Kenya National Examination Council, 2008). The Teachers Service Commission (TSC) is responsible for teacher recruitment, human resources services, and place of government employed teachers (Ministry of Education, 2008). KIE is responsible for: 1) Conducting research and evaluation in education and training; 2) Designing and developing curriculum for all levels of education and training below the university level; 3) Developing learning resources, including books, manuals, and multimedia resources; 4) Conducting in-service training of teachers and trainers on new curriculum and trends in education and training; 5) Conducting dissemination programs for education administrators, evaluators, book publishers and other stakeholders; 6) Carrying out

evaluation of books to access their suitability; and 7) Developing on consultancy basis, programs for schools, colleges, organizations and technical training institutions.

## **EDUCATIONAL GROWTH AND REFORM**

### **Education and Self-Help**

Education in Kenya is directly influenced by government policies and is therefore constantly changing according to socioeconomic and political trends. Prior to independence, primary school education was the responsibility of local communities, non-governmental agencies, and church organizations. With the new government, the responsibility and administration gradually shifted to government agencies at the provisional and district levels from these local authorities, so in a move toward free primary education (Oketch and Rolleston, 2007). After independence, President Jomo Kenyatta initiated "Harambee," a Kiswahili word which means "pulling together" or "self-help" (Buchmann, 1999). Harambee was a call by the president and the government to come together for economic development, and education was considered a priority. As a result more schools, especially secondary schools were built and equipped using local resources and private donations.

While Harambee schools supplemented government education, they brought along certain complexities and discrepancies. First, Harambee schools were generally expensive but lacked quality and rigor since they received minimal or no government funding. Second, the decentralized structure led to disparities in the number and quality of schools, available in various regions of the country (Amutabi, 2003; Buchmann, 1999). Beginning in 1988, Harambee schools were absorbed into the provincial or district schools levels in an effort to equalize them with other government schools (Amutabi, 2003). When cost-sharing was introduced in the 1980s, the government's task was to recruit and pay the teachers, while parents were responsible for constructing buildings and providing educational resources through Harambee. However, this did not work as planned because in most areas, parents were financially unable to raise the funds (African Path, 2007).

In 2005, the government initiated a new arm to cater specifically for young peoples' needs – the Ministry of State for Youth Affairs (Department of Youth Training, 2008). The following year, the Youth Enterprise Development Fund (YEDF) was created and allocated one billion Kenya shillings to be disbursed as loans to the youth to set up enterprises at concessionary rates and without collateral (Ombok, 2007). In addition, policies were also put in place to promote youth participation in community and civic affairs and to ensure that the youth were represented especially in the creation of employment, giving priority to disadvantaged and disabled youth, those affected by HIV/AIDS, females, and school dropouts. Policies have since then been created to include the youth through the newly created Kenya National Youth Council (KNYC), which is responsible for co-ordination of youth organizations and liaising the youth with the government and other partners (Department of Youth Training, 2008; Ombok, 2007).

### **The 8-4-4 System of Education**

In 1981, a Presidential Working Party was commissioned to examine curriculum reform of the entire education system in the country. The committee submitted a recommendation to change the 7-4-2-3 education system to the current 8-4-4 system of education, whose overall structure was similar to the U.S. education system. The 8-4-4 system was launched in January 1985, and was designed to provide eight years of primary education, four years of secondary, and four years of university education. Emphasis was placed on Mathematics, English, and vocational subjects. The focus on vocational education was aimed at preparing students who would not continue on with secondary education, those who would be self-employed, and those who would be seeking employment in the non-formal sector ("Ministry of Education," n.d.).

Prior to joining primary school, children between the ages of three and six are required to attend pre-primary (pre-unit) for one or two years. The main objective of pre-primary education is to cater to the total development of a child, including the physical, spiritual, social, and mental growth, brought about through formal and informal interaction with the parents and the community taking a leading role. A focus of pre-primary education has been health, nutrition, care, and basic education. Programs are run through partnership with the government, district-based agencies, local communities and external agencies.

Primary school is the first phase of the 8-4-4 education system and serves students between the ages of 6-14 years. The main purpose of primary education is to prepare students to participate in the social, political and economic well being of the country, and prepare them to be global citizens ("Education Info Center," 2006). The new primary school curriculum has therefore been designed to provide a more functional and practical education to cater to the needs of children who complete their education at the primary school level and also for those who wish to continue with secondary education. In addition it caters to students who wish, and have the means, to continue on with secondary school education. Primary education is universal and free but not compulsory. A major goal of primary education is to develop self-expression, self-discipline, and self-reliance, while at the same time providing a rounded educational experience. At the end of the eighth year, the Kenya Certificate of Primary Examination (K.C.P.E.) is taken and the results are used to determine placement at secondary school on a merit basis. K.C.P.E. candidates are examined in seven subjects: 1) Kiswahili; 2) English; 3) Mathematics; 4) Science and Agriculture (SCA); 5) Home Science and Business Education (HSBE); 6) Geography, History and Civics (GHC); and 7) Art, Craft and Music (ACM) (Education Info Center, 2006; Ministry of Education, 2008).

Primary schools are both public (government supported) and private (individuals and religious organizations). The two categories of primary schools are day schools and boarding schools with most being day schools. Although many schools were built through Harambee effort, a majority of the primary schools are in the public sector and depend on the government budget to fund their expenses. This includes providing teachers and meeting their salaries. The government expenditure on school supplies, books, equipment, uniforms, and maintenance is limited and is mainly financed through school fees, fund-raising, and individual parent responsibility (Buchmann, 1999).

Secondary school education begins around the age of fourteen. However due to delayed primary school entry and limited educational schools and facilities, many students especially those from rural areas experience late admission into the education system years. Secondary school education in Kenya is aimed at meeting the needs of the students who terminate their education after secondary school and also those who proceed onto tertiary education ("Education Info Center," 2006). Hence, the much of the 8-4-4 curriculum focuses on job-oriented courses which focus on business and technical education. Initially, the 8-4-4 system required students to prepare and take the 13 subjects in primary school and 12 subjects in secondary school but after review over the heavy load, it was reduced to eight and seven subjects respectively.

The required secondary school subjects are categorized into five groups as follows:

- Group 1: English, Mathematics, and Kiswahili;
- Group 2: Biology, Physics, Chemistry, Physical Sciences, and Biological Sciences;
- Group 3: History and Government, Geography, Christian Religious Education, Islamic Religious Education, Social Studies and Ethics, and Hindu Islamic Education;
- Group 4: Home Science, Art and Design, Agriculture, Woodwork, Metalwork, Building Construction, Power Mechanics, Electricity, Drawing and Design, and Aviation Technology; and
- Group 5: French, German, Arabic, Music, Accounting, Commerce, Economics, Typewriting and Office Practice.

Students are required to take all three subjects in Group 1 and at least two subjects from Group 2. They are also required to select subjects in the other three remaining areas. The selection of subjects is dependent upon what each of the individual schools offers. This is in turn dependent upon the resources and teachers available in the individual schools. At the end of the fourth year in secondary school, the Kenya Certificate of Secondary Examination (K.C.S.E.) is taken in the mandatory and elective subjects above in preparation for tertiary and higher education.

In 1980, President Moi introduced the Free Milk Scheme. This was popularly known as “Nyayo School Milk” for the president’s references to the term ‘Nyayo’ which means “following the footsteps” (of Kenyatta’s Harambee approach to government). The goal of the scheme was to boost the general health and attendance of primary school children age five to thirteen years. The scheme was fully funded by the government and provided milk to over 4.3 million children in about 11,000 schools countrywide at least twice a week (Cherono, 2005). The government parastatal, Kenya Co-operative Creameries (KCC), worked with education officers to ensure safe handling. Teachers reported that with the free milk program, attendance did increase. However, due to lack of capacity and logistics in delivering the milk, the program did not have long-term sustainability. However, there is a proposal to revive the milk scheme. The collapse of the school milk program was believed to have been as a result of the dissolution of KCC, which has since been revived under President Kibaki’s new government (Nation, 2006). The new milk scheme is proposed to kick start with a pilot program and extend to private and secondary schools.

At the secondary level, the number of boarding schools is higher than at the primary school level. Public secondary schools are funded by the government, local communities, or NGOs and are managed through boards of governors and parent-teacher associations. The private schools on the other hand are established and managed by private individuals or organizations. Many private secondary schools still follow the British education system, offering British O-levels, A-levels, and International Baccalaureate programs. Others schools follow the American education system. These British and American school systems mainly prepare students who plan on attending university abroad.

For students who go on to higher education in Kenya, there are seven public universities and 17 private universities with either full or interim charter. In addition to adding technical courses at the primary and secondary school level, vocational education has been a focus of the education system. The MoEST has developed a national strategy for technical and vocational education and training aimed at the rehabilitation of physical facilities and equipment and ensuring that vocational and technical institutions are appropriately equipped by 2010 (UNESCO, 2006) and there are many two and three colleges which offer certificate diploma programs. These public and private colleges offer technical hands-on skills in various fields including, engineering, medical sciences, nursing, education, computer science, mass communication, tourism, and business.

### **Introduction of Free Primary Education**

As noted, during the 1990s basic education went through various reforms but the un conducive political and economic conditions at the time were unable to support its growth. Having to depend on limited resources and donor funding, the government experienced difficulties maintaining educational standards. Subsequently the quality of education deteriorated and there was an increase in the numbers of school-age children who were not receiving formal education. Figures for instance show that massive school dropouts were recorded and that out of about one million students who enrolled in standard one in 1993 and in 1998, less than half a million got to standard eight (Oketch and Rolleston, 2007; Onyango, 2003).

When a new government was formed in 2003, one of the priorities was to re-avail educational opportunities in order to meet UPE the second of the eight MDGs. While this was a move in the right direction for economic development, providing UPE was not without its challenges:

- 1) When free primary education (FPE) was introduced, the enrollment significantly rose from 5.9 to 7.2 million. However, most schools were not equipped to handle the large numbers of students in terms of the number of teachers, physical classroom space, and learning resources (Mukudi, 2004). In some schools, some classes now have as many as 80-100 students and this has led to a dramatic increase in the number of privately owned and operated schools that target families who can afford to pay school fees.
- 2) In 1998 the World Bank and International Monetary Fund (IMF) made recommendations to restructure public institutions to streamline efficiency. One change the government made was to reduce human resources including a freeze on hiring new teachers by the TSC and this resulted in a significant shortage of teachers. Since 2003, the TSC has been working to retain teachers, and the first full recruitment of about 40,000 was proposed for the 2007 fiscal year. However, the education system still has a shortage of about 60 000 primary school teachers (African Path, 2008; Oketch and Rolleston, 2007).
- 3) Despite a sizable portion the budget being allocated to the education sector, the government still relies on donor-funding.
- 4) There are many cultural demands and practices that influence full participation in both the domestic and school environment, as many children are also responsible for domestic chores. Although the initial enrollments have been higher in the last five years, there is still the danger of dropout rates not being fully under control (Oketch and Rolleston, 2007). One positive outcome of FPE, however, has been the significant increase in the number of girls in school.
- 5) Maintaining the quality of education is a challenge that the government continues to address. With large class sizes and competing resources, parents with financial means pulled their children out of public schools and enrolled them in private schools.

Due to the large increase in primary school enrollment the number of students seeking secondary school education has grown significantly. In 1963 there were of 151 secondary schools and the total number of students enrolled was 30 120. Today there are about 3000 secondary schools and the enrollment is about 620 000 students. Of these, about 40% are female students (UNESCO, 2008). In 2008, President Kibaki announced that Kenya had introduced a free secondary schooling education program that targeted raising student enrolment to 1.4 million by the end of the year. The scheme proposed to pay tuition fees for students while parents would still be required to meet boarding school costs and school uniforms. US\$41 million was to be released to pay for the first phase of the program (BBC News, 2008).

## **EXAMINING SOCIAL FACTORS TO EQUALIZE OPPORTUNITIES**

### **Education, Gender, and Health**

The government of Kenya recognizes that provision of universal primary education is an important milestone to economic and social development. In particular it has been established that by providing primary education to women, a society is able to hasten its development. The government has also increased its budgetary allocation to education as well as introducing a Constituency Bursary Fund for efficient facilitation of education at the grassroots level (Ministry of Education, 2008). Research on poverty (Mukui, 2005) is being conducted to determine the progress that has been made in terms of economic development as it relates to education and other socioeconomic amenities.

Kamaara (1999) notes that one of the threats facing youth in developing countries is reproductive health and the data in Kenya indicates that 17% of girls between age 15 and 19 have at least one child. Kamaara also reports on a national study which found that about 36% of all pregnant young women aged 15-24 visiting antenatal care clinics had a sexually transmitted disease. Health education has since been integrated into the curriculum through subjects such as biology and social ethics (International Bureau of Education, 2004).

UNESCO, UNICEF, and other non-governmental organizations have been conducting research aimed at improving female access to education. Buchmann (2000) reports that determinants of educational inequality are generally informed by three perspectives: economic, resource constraints, and cultural perspectives. Each of these perspectives has been used to explain educational decision making in developing countries, and each predicts participation in formal schooling. In the case of Kenya, cultural norms and gender stereotypes do hinder girls' participation in school, where typically mathematics and science are seen as 'boys subjects' while home science is a 'girls' subject'. Some reports (Lloyd, Mensch, and Clark, 2000) indicate that although Kenya has high levels of primary school enrollment, data show that as girls enter secondary school, their teenage years their enrollment begins to fall compared to that of boys.

Research indicates that educating women influences many sociocultural and socioeconomic indicators including health care, infant mortality, and reducing population growth. Further, public health studies that link maternal education to health indicate that education is pertinent to national development, and that those inequalities in mortality may be related to the socioeconomic status of the population. In addition, higher levels of education are inversely related to levels of health and mortality and that the differences in the levels may be partially explained by the social and economic policies (Desai and Alva, 1998; Kunst and Mackenbach, 1994). Health education that specifically focuses on HIV/AIDS education has become a focal point in the government's agenda, and studies are being conducted to evaluate the knowledge, attitudes and sexual behavior with HIV/AIDS school age children (UNICEF, 2008).

### **Education and Diversity**

Regional disparities in education are closely related to, and often compounded by other socioeconomic factors. Beginning in the colonial period some groups, especially the nomadic and pastoralist groups have historically been marginalized, while those groups that had more interaction with the British during the colonial reign were exposed to Western-based education and economic systems earlier. Initially, formal education was linked to Christianity but beginning in the 1970s, the government made accommodations for Muslim students. This was done by acknowledging Madras and religious schools, and later in the 1980s by introducing Hindu and Islamic Religious Education and classes in the curriculum (Alwy and Schech, 2004; Buchmann, 2000). The government and various NGOs are currently working to make accommodations for children from nomadic, pastoralist, and other underrepresented groups by increasing resources, teachers, and building more boarding schools for them.

The prevalence of disability in Kenya is mainly due to limited preventive and rehabilitation services. The government has taken measures to cater to the quality of special education in the country and the MoEST has adopted an integration policy that provides children with special needs, both physical and mental to cater for in regular schools (Ministry of Education, 2000). Presently, there are 57 primary schools for children with disabilities which enroll a total of 8000 children. There are an additional 103 integrated units in mainstream primary schools, three high schools for students with physical disabilities, two high schools for students with hearing disabilities, and one high school for students with visual disabilities.

Special education in the country was further addressed by the implementation of degree courses at Kenyatta University's Faculty of Education. Special Needs Education (SNE) is disseminated through a centralized curriculum (Ministry of Education, 2008). Some schools have vocational training integrated units in secondary schools and agricultural technical trade schools to cater for learners who are able to physically work in skills and trades areas. Education assessment and resource centers have also been established to provide early intervention services with assessment and appropriate placement. While this approach implies that all students attain the same learning experiences, their special needs can put them at a disadvantage. Hence, the KIE is mandated to develop curriculum, research and develop relevant curriculum, and provide supporting materials for SNE.

The Consortium for Street Children (2002) estimates about 250 000 street children in Kenya, with over 60 000 in Nairobi. Many are second or third generation street children while others have more recently been orphaned (Ouma, 2004). UNESCO reports that as a result of the discrimination they suffer, street children and children orphaned by AIDS are more vulnerable than other children as they struggle to survive daily, putting them at a higher health and social risks. Shetty and Powell (2003) also note that children who have lost both parents are more likely to drop out of school than those who have lost one parent.

In one study, data indicated that 52% of children orphaned by AIDS were not in school, compared with 2% who were not orphaned. Of the orphaned children, 56% of the girls and 47% of boys were likely to drop out of school within 12 months of a parent's death. Although the government has put measures in place to enable orphaned children access to FPE, the children still have health and emotional needs, as many of their caretakers (often grandparents) do not have the economic means (Nyambedha, Wandibba, and Aagaard-Hansen, 2001). Further, the Children's Act passed in 2001 to address the needs of children has not been fully implemented due to limited financial resources and lack of capacity. The government is however working closely with UNESCO, UNICEF and other NGOs to cater to the children's needs.

## **THE ROLE OF ICT IN THE EQUALIZING PROCESS**

### **Factors leading to Underutilization of ICT**

Kessy, Kaemba, and Gachoka, (2006) and Ford (2007) discuss several reasons for under use of ICT in education in the African context. The cost of adopting ICT including acquiring hardware and software, setting up telecommunication networks, and the maintenance and repair of facilities is often prohibitive for developing nations. Kessy et al. recommend privatization as a means to enhance competition and reduce cost. In general, African countries have poor infrastructure including unreliable transportation, limited electricity supply, and broadcast and telecommunication facilities. This makes it difficult for institutions to maintain Internet connections and in the case of Kenya electricity is not government subsidized making it relatively expensive at an average cost US\$ 0.08/KWh compared to US\$0.02/KWh.

To be effectively adopted, ICT requires good governance and appropriation of allocated government funds and foreign aid. In many developing nations lack of ICT policy, poor ICT project management, and corruption has led to ineffective implementation, adoption of different systems and standards, duplication of effort, and waste of technology resources. Efforts are often uncoordinated and initiatives are often in competition with each other rather than complementing each other. In addition there are many unsustainable ICT programs where schools have computers that do not work as resources that are often redirected and misuse (Ford, 2007; Kessy et al., 2006).

The cultural context of ICT adoption, language barriers, and attitudes toward ICT affect the rate at which it is adopted. Perceived difficulty in the integration of ICT in education is based on the belief that technology use is challenging, its implementation requires extra time, technology skills are difficult to learn, and the cost of attaining and maintain resources is prohibitive (Fourie and Alt, 2002). For instance, as Ford (2007) notes humanities teachers are the most resistant to computers. Limited skilled human resources and students' limited computer knowledge which is precipitated by the reluctance or inability for schools to introduce ICT often result in limited use of resources, creating a vicious cycle (Kessy et al., 2006). Further, Ford (2007) states that in many instances teachers believe that using computers deprives students of the time needed to study for their national examinations and that computers disrupt the traditional structure of the classroom.

### **The State of ICT for Educational Development**

Computers were introduced to Kenya in the 1970s and the Internet became available in 1993 (Ford, 2007). As of March 2008, 7.9% of the population was accessing the Internet, with the majority being government and private sector employees. Beyond these users, cybercafés are the major providers of Internet service for the majority of the population. While there are over 30 Internet Service Providers in Kenya and the number continues to grow, access is still limited, especially in rural areas (Internet World Stats, 2009).

In a study by Wabuye (2003), results indicated that while ICT has penetrated many sectors including banking, transportation, communications, and medical services, the Kenyan educational system seems to lag behind. The study found that computer use in Kenyan classrooms is still in its early phases, and concluded that the perceptions and experiences of teachers and administrators do play an important role in the use of computers in Kenyan classrooms. This highlighted the need to provide pre-service and in-service training programs to enable them to successfully teach using computers in the classrooms is pertinent. Wabuye's study also determined that the government and the MoEST needed to review both teacher preparation and staff development programs, as well as develop a revised national plan to implement ICT into the curriculum.

In another study, (Momanyi, Norby, and Strand, 2006) conducted a survey analysis to determine the technology goals and needs in schools in Kenya. Findings in their study indicated that the respondents considered equipping secondary schools with computer technology as being important, but that it was less important to equip primary schools with computers. (Ford, 2007) reports that Kenya has approximately 19 890 primary schools, many of which are in rural areas. Of those, only 15% have electricity and only 500 schools have computers albeit with limited Internet access. There are about 4000 secondary schools with 85% of those being located in rural areas. 65% of those schools have electricity. Only about 750 schools have an average of 10 computers each although connectivity is limited. There are 22 teacher-training colleges, most offering some ICT curricula and technology integration. Many of these colleges have between 20-60 computers and trained ICT tutors but Internet connectivity is limited and mostly available though dialup.

In 2008, the Ministry of Youth Affairs' Youth Enterprise Fund (YEF) started a Digital Villages project designed to connect rural and urban areas with ICT. The project is funded through government and private sector resources. Each constituency is to be provided with at least eight computer workstations and training in entrepreneurship. In addition to intended positive outcomes on agriculture, health, and commerce, other expected results are enhancements in the education system such as increasing online course offerings and improving school management systems including recording and reporting examination reports (Wanjiku, 2008). In seeking to increase social, cultural and economic capital, the Digital Villages project is important for several reasons:

- 1) As a means to enhance sustainability for the local communities;
- 2) It uses a cross-sectoral approach in its funding;

- 3) It uses an integrative governmental cross-sectoral approach in its use of ICT (e.g., in agriculture, health, and commerce);
- 4) It integrates the use of ICT in formal education and non-formal education and training; and
- 5) It uses a community approach to development.

For most developing nations, the dynamic nature of technology is difficult to keep up with, often forcing teachers to use traditional teaching methods and less effective instructional technology techniques. Kessey et al suggest seeking concessions with companies such as Microsoft® for discounted software. Alternatively, the use of Open Educational Resources (Johnstone, 2005) and Open Source Software (Coppola and Neelley, 2004) is an option that allows users to freely create and distribute software and educational resources without the prohibitive costs or licensing limitations. Progress has been made with using open source computer operating systems and software being localized to the languages and contexts with examples of Microsoft® and Google® which now have Kiswahili applications.

### **Kenya Vision 2030**

Kenya Vision 2030 is the nation's new development blueprint for 2008 to 2030 which aims at making Kenya a newly industrializing, "middle income country providing high quality life for all its citizens by the year 2030" (NESC, 2007). The plan is to be implemented in successive five-year terms with the first plan covering 2008-2012. The education goals of the 2030 Vision are to provide globally competitive quality education and training and research for development. This is to be achieved through reducing literacy by increasing access to education, improving the transition rate from primary to secondary schools, and raising the quality and relevance of education. Other goals are the integration special needs education into learning and training institutions, and increasing the adult literacy rate to 80%. The government also aims to increase the enrollment in schools to 95% as well as the transition rates to technical colleges and higher education to 8%. In addition, the rate of students joining universities should expand from 4.6% to 20% within this period, while simultaneously boosting emphasis on science and technology courses.

The government has specified the implementation strategies which include integrating early childhood into primary education, reforming secondary curricula, updating teacher education, and strengthening partnerships with the private sector. In addition, the government has goals to improve special needs programs and adult training program, and to revise the higher education curriculum. Specific educational development projects for 2012 are to increase the number of secondary schools by building 560 new secondary schools, to establish a teachers' recruitment program to employ 28,000 more teachers, to establish a computer supply program that will equip students with modern ICT skills, to build at least one boarding primary school in each constituency in the pastoral districts for nomadic populations, and to roll out the education voucher system program in five districts.

Vision 2030 also aims to capitalize on knowledge in science, technology and innovation (STI) in order to function more efficiently, improve social welfare, and promote democratic governance. STI is to be applied in all the sectors, and the education and training curricula in the country will thus be modified to ensure that the creation, adoption, adaptation and usage of knowledge becomes part of formal instruction. A new incentive structure will also be developed to support the use of STI in specialized research centers, and universities.

### **CONCLUSION**

The problems in providing educational opportunities stem from a lack of financial resources, rising foreign debt, and a limited distributive capacity. Further, nations in Africa have not been able to supply ample schools, teachers, and resources to keep up with this demand, resulting in compromised quality of education. In addition, many African governments face the predicament of educational expansion that corresponds with economic development. Despite the setbacks, access to education is a strong focus of most governments.

To conclude, in Kenya as elsewhere, ICT can play a significant role in equalizing opportunities for marginalized groups and communities. But the paradox is that for those groups that are unable to cross the technology divide, ICT is yet another means to further marginalize them. Education has a major role to play in resolving this paradox, but education itself is affected by the paradox. Thus, unless ICT becomes part of both the delivery and content of education, the disadvantage will deepen and development will suffer. But the failure to use ICT is itself a result of the digital and knowledge divides that exist, and their causes are deeply embedded in the complex historical and socio-cultural context of the country. Fortunately, with the Vision 2030 goals, the Kenyan government has begun to implement strategies that will address these issues.

## REFERENCES

- Alwy, A., and Schech, S., 2004. Ethnic inequalities in education in Kenya. *International Education Journal* 5(2), 266-274.
- Amutabi, M. N., 2003. Political interference in the running of education in post independence Kenya: A critical retrospection. *International Journal of Educational Development* 23, 127–144.
- Buchmann, C., 1999. The state and schooling in Kenya: Historical developments and current challenges. *Africa Today* 46 (1), 95-117.
- Buchmann, C., 2000. Family structure, parental perceptions, and child labor in Kenya: What factors determine who is enrolled in school. *Social Forces* 78 (4), 1349-1378.
- Bunyi, G., 1999. Rethinking the place of African indigenous languages in African education. *International Journal of Educational Development* 19, 337–350.
- Bunyi, G., 2006. Real Options for Literacy Policy and Practice in Kenya [Electronic Version]. Retrieved March 4 2008, from <http://unesdoc.unesco.org/images/0014/001459/145956e.pdf>
- Cherono, P. K., 2005. School Milk Program Kenya. Retrieved March 25, 2008, from <http://www.fao.org/es/esc/common/ecg/187/en/Kenya.pdf>
- CIA World Fact Book - Kenya. 2008. Retrieved March 12, 2008, from <https://www.cia.gov/library/publications/the-world-factbook/geos/ke.html>
- Consortium for Street Children, 2002. Information about Street Children – Kenya. Retrieved March 18, 2009, from <http://www.streetchildren.org.uk/reports/Kenya%20Child.doc>
- Coppola, C., and Neelley, E., 2004. Open source - opens learning: Why open source makes sense for education [Electronic Version], from <http://dlist.sir.arizona.edu/453/01/OpenSourceOpensLearningJuly2004.pdf>
- Daily Nation. (2006, June 2). School Milk Plan On, Says Board. Retrieved March 19, 2009 from <http://www.propertykenya.com/news/005251-school-milk-plan-on-says-board.php>

- Dei, G. J. 2000. African development: The relevance and implications of “indigenoussness”. In: Dei, G. J., Hall, B. L. and Rosenberg, D. G. (Eds.), *Indigenous Knowledges in Global Contexts: Multiple Readings of our World*. (pp. 70-86). Toronto: University of Toronto.
- Department of Youth Training, 2008. Ministry of State for Youth Affairs. Retrieved April 2, 2008, from <http://www.youthaffairs.go.ke/>
- Desai, S., and Alva, S. 1998. Maternal education and child health: Is there a strong causal relationship. *Demography*, 35 (1), 71-81.
- Education Info Center, 2006. Kenya High Commission, Ottawa Canada. Retrieved March 1, 2008, from <http://www.kenyahighcommission.ca/primary.htm>
- International Bureau of Education, 2004. Development of Education in Kenya [Electronic. (2004). Version]. Retrieved March 18 2007, from <http://www.ibe.unesco.org/International/ICE47/English/Natreps/reports/kenya.pdf>
- Ford, D. M., 2007. Technologizing Africa: On the bumpy information highway. *Computers and Composition*, 24 (3), 302-316.
- Fourie, M., and Alt, H., 2002. Challenges to Sustaining and Enhancing Quality of Teaching and Learning in South African Universities. *Quality in Higher Education*, 6 (2), 115-124.
- Free Primary Education in Kenya: One of Kibaki’s Trump Cards? April 11 2007. *African Path*, Retrieved March 19, 2009 from [http://www.africanpath.com/p\\_blogEntry.cfm?blogEntryID=584](http://www.africanpath.com/p_blogEntry.cfm?blogEntryID=584)
- Free Secondary Schools for Kenya, Feb 11, 2008. *BBC News*. Retrieved from <http://news.bbc.co.uk/2/hi/africa/7239577.stm>
- Human Development Reports, 2008. Kenya 2007/2008 Report. Retrieved March 15, 2008, from [http://hdrstats.undp.org/countries/data\\_sheets/cty\\_ds\\_KEN.html](http://hdrstats.undp.org/countries/data_sheets/cty_ds_KEN.html)
- Internet Worlds Stats, 2009. Internet world stats: Usage and population statistics. Retrieved March 17, 2009, from <http://www.internetworldstats.com/africa.htm#ke>
- Johnstone, S. M., 2005. Open educational resources serve the world. *Educause Quarterly*, 28(3), 15-18.
- Kamaara, E., 1999. Reproductive and sexual health problems of adolescent girls in Kenya: A challenge to the church. *Reproductive Health Matters*, 7 (14), 130-133.
- Kenya - Data and Statistics., 2008. World Bank. Retrieved March 18, 2008, from <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/KENYAEXTN/0,.mnuPK:356536~pagePK:141132~piPK:141109~theSitePK:356509,00.html>
- Kenya - Education Sector Support Project [Electronic. Version], 2006. World Bank. Retrieved March 18 2008, from <http://www-wds.worldbank.org>
- Kenya Institute of Education, 2009. About the Kenya Institute of Education. Retrieved March 19, 2008, from <http://www.kie.ac.ke/about/index.php>

- Kenya National Examination Council, 2008. KNEC. Retrieved March 19, 2008, from <http://www.examsCouncil.or.ke>
- Kessy, D., Kaemba, M., and Gachoka, M., 2006. The reasons for under use of ICT in education: In the context of Kenya, Tanzania and Zambia. Paper presented at the 4th IEEE International Workshop on Technology for Education in Developing Countries, Iringa, Tanzania.
- Kunst, A. E., and Mackenbach, J. P., 1994. The size of mortality differences associated with educational level in nine industrialized countries. *American Journal of Public Health*, 84 (6), 932-937.
- Lloyd, C. B., Mensch, B. S., and Clark, W. H., 2000. The effects of primary school quality on school dropout among Kenyan girls and boys. *Comparative Education Review*, 44 (2), 113-147.
- Ministry of Education, 2008. About the Ministry. Retrieved March 11, 2008, from <http://www.education.go.ke/Resources.htm>
- Ministry of Education, Science and Technology, 2008. Mandate. Retrieved March 19, 2009 from <http://www.scienceandtechnology.go.ke/>
- Momanyi, L., Norby, R., and Strand, S., 2006. The need for integration of technology in K-12 school settings in Kenya, Africa. *Association for the Advancement of Computing in Education Journal*, 14 (2), 154-177.
- Mukudi, E., 2004. Education for all: A framework for addressing the persisting illusion for the Kenyan context. *International Journal of Educational Development* 24 (231-240).
- Mukui, J. T., 2005. Poverty Analysis in Kenya: Ten Years On [Electronic Version]. Retrieved March 1 2008, from <http://www.worldbank.org/afr/padi/Poverty%20Analysis%20in%20Kenya%20by%20John%20Mukui.pdf>
- National Economic and Social Council of Kenya (NESC), 2007. Kenya Vision 2030. Retrieved March 17, 2009, from [http://www.investmentkenya.com/Documents/Publications/Vision\\_2030\\_BROCHURE%20\\_July\\_2007.pdf](http://www.investmentkenya.com/Documents/Publications/Vision_2030_BROCHURE%20_July_2007.pdf)
- Ntarangwi, M., 2003. The challenges of education and development in post-colonial Kenya. *Africa Development*, 28 (3 and 4), 211-228.
- Nyambedha, E. O., Wandibba, S., and Aagaard-Hansen, J., 2001. Policy implications of the inadequate support systems for orphans in Western Kenya. *Health Policy*, 58, 83-96.
- Oketch, M., and Rolleston, C., 2007. Policies on free primary and secondary education in East Africa: Retrospect and prospect. *Review of Research in Education*, 31 (131-158).
- Ombok, E., 2007. Kenya's Billion Shillings Investment. Retrieved April 3, 2008, from <http://www.yesweb.org/news/download/Kenya's-billion-shillings-investment-11-april-07.pdf>
- Onyango, D., June 19, 2003. The Real Education Test for NARC Begins. *Sunday Nation on the Web*. Retrieved March 19, 2009 from [http://www.nationaudio.com/News/DailyNation/19012003/Comment/SpecialReport190120033\\_4.html](http://www.nationaudio.com/News/DailyNation/19012003/Comment/SpecialReport190120033_4.html)

- Ouma, W. G., 2004. Education for street children in Kenya: The role of the Undugu Society [Electronic Version]. Retrieved March 18 2008, from <http://www.unesco.org/iiep/PDF/pubs/T27.pdf>
- Shetty, A. K., and Powell, G., 2003. Children orphaned by AIDS: A global perspective. *Seminars in Pediatric Infectious Diseases*, 14 (1), 25-31.
- Strayer, R. W., 1973. The making of mission schools in Kenya: A microcosmic perspective. *Comparative Education Review*, 17 (3), 313-330.
- UNDP, 2008. Millennium Development Goals (MDGs). Retrieved March 15 2009, from [http://www.undp.org/publications/MDG\\_Report\\_2008\\_En.pdf](http://www.undp.org/publications/MDG_Report_2008_En.pdf)
- UNESCO, 2006. EFA News [Electronic Version], 6. Retrieved March 11 2008, from [http://www.education.nairobi-unesco.org/PDFs/EFA/EFA\\_ENGLISH\\_2005-6.pdf](http://www.education.nairobi-unesco.org/PDFs/EFA/EFA_ENGLISH_2005-6.pdf)
- UNESCO, 2008a. EFA Global Monitoring Report 2008. <http://www.unesco.org/en/education/efareport/reports/2008-mid-term-review/>
- UNESCO, 2008b. UNESCO Institute for Statistics: UIS Statistics in Brief. Retrieved March 12 2008, from [http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=121&IF\\_Language=eng&BR\\_Country=4040](http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=121&IF_Language=eng&BR_Country=4040)
- UNESCO, 2008c. Kenya Basic Education Indicators. Retrieved March 1, 2008, from <http://www.education.nairobi-unesco.org/PDFs/kenya.pdf>
- Wabuye, L. C., 2003. Understanding Teachers' and Administrators Perceptions and Experiences towards Computer Use in Kenyan Classrooms: A Case Study of Two Schools. Ohio University, Athens.
- Wanjiku, R., 2008. Kenya Rolls out Digital Villages Project. Retrieved April 2, 2008, from <http://www.infoworld.com/news/feeds/08/04/02/Kenya-rolls-out-Digital-Villages-project.html>
- World Health Report - Kenya. (2008). Retrieved March 1, 2008, from <http://www.who.int/whr/2004/annex/country/ken/en/index.html>

---

Copyright for articles published in this journal is retained by the authors, with first publication rights granted to the journal. By virtue of their appearance in this open access journal, articles are free to use, with proper attribution, in educational and other non-commercial settings.

Original article at: <http://ijedict.dec.uwi.edu/viewarticle.php?id=740&layout=html>