INTERNET ACCESS IN KENYAN UNIVERSITY LIBRARIES
SINCE 1990s

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ABSTRACT

Presents literature based historical review of Internet access in Kenyan university libraries since the first connectivity in the country in 1994. The literature is based on four major newspapers in Kenya that are reputed for tracking Internet growth and its integration in the country's institutions. These major newspapers are The Standard, Daily Nation, Kenya Times and East African. Despite the fact that the Internet is increasingly being adopted in most universities the world over, universities in Kenya are struggling to provide efficient internet access to students and staff because of several constraints such as costs, infrastructure, policy and poor management vision. The findings of this work identify several areas that need attention to enhance a wider adoption and use of the Internet by university libraries in Kenya. Moreover, there is a need for demonstrated interventions that will provide conditions that enhance individual employees' interaction, acceptability and use of the Internet. In addition, university libraries should equip their employees with the required levels of Internet-related knowledge and skills. From a practical perspective, the training offered to the staff should be designed to not only offer mastery of the skills, but also promote positive perceptions and appreciations of the technology. There is also need for libraries to identify appropriate proactive measures that can promote positive Internet response. Similarly, university libraries require clear drawn-up ICT policies specifying the envisioned role of both general and specific ICTs. Extending the service to library clients at a subsidized fee should supplement the recurrent expenditure incurred in the provision of the service.

Keywords: Internet access; Internet connectivity; Internet adoption; Internet diffusion; University libraries; Kenya

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INTRODUCTION

Universities play a central role in the production of enlightened leaders with relevant skills and attitudes to the economic growth of the country. Any country aspiring to lay a strong foundation towards socio-economic development often put the responsibility to higher education institutions for equipping individuals with the advanced knowledge and skills required for positions of responsibility in government, business, and the professions (UNESCO, 1993). Higher education institutions produce new knowledge through research; serve as conduits for the transfer, adaptation, and dissemination of knowledge generated elsewhere in the world; and support government and business through advice and consultancy. In most countries, higher education institutions also play the important role of forging a national identity and offering a forum for pluralistic debate. Libraries of universities serve important roles of information for ensuring the achievement of the universities' mandate.

Kenya's university sector has undergone considerable expansion since independence in 1963. In the initial years after independence, Kenya placed a lot of emphasis on education (Ominde, 1967; Sifuna, 1990). The government of Kenya made deliberate efforts to accelerate the expansion of educational opportunities through strong state involvement and support to the sector (Sifuna, 1990). By 1999, Kenya was reported to be second to Ghana in Africa in terms of percentage of overall expenditure on education (Republic of Kenya, 1999). The government's commitment by 1975 was such that if the trend continued to the 1990s, the education sector would consume the entire government budget (Nguro, 1975). However, at the beginning of 1980, severe economic decline set into the country. As a result, the government was forced to seek international aid from bilateral and multi-lateral donors, among them the Breton Woods institutions, the World Bank and the International Monetary Fund (IMF). Unfortunately, much of the aid granted was geared towards promoting Structural Adjustment Programmes (SAPs) from the mid-eighties. SAPs were aimed at reducing the role of government in education in order to create competition and efficiency. Cost recovery and privatization were underlined under the theme of structural adjustment programmes as a means of getting government to reduce total funding of higher education (Agina and Kay, 2000). SAPs also focused on price decontrols, deregulation and privatization of key state resources. The SAPs in Kenya were also aimed at enhancing good governance by ensuring the followings: (Neumayer, 2006; Akokpari, 2005):

i. Political accountability exemplified by the existence of political pluralism.
ii. Competitive private sector supported by government policies that promote private investment.

iii. Separation of powers in the government structure with demonstrable respect and independence of the executive, legislature and judiciary.
iv. Effective public sector management supported by a professional civil service that is well remunerated.
v. Prudent and transparent management of public expenditure including budget preparation, financial accounting, procurement, and audit.
vi. A vibrant civil society able to protect the interests of citizens especially the feeble and poor in society by educating them about their rights and the workings of government.

At the 10th General Conference of the Association of African Universities held in Nairobi, Kenya, in February 2001, it was observed that most public universities lacked autonomy and were merely state-controlled systems (Waihenya and Siringi, 2001). Other than the general shortage of funds, other factors such as mismanagement, political interference and lack of vision hampered the growth of these universities at large (Waihenya and Siringi, 2001). Moreover, like other sectors, university libraries came under increased economic pressure that compromised the efficiency of their services. By and large, university libraries especially in the public sector have, since the 1990s, been characterized by outdated collections as subscriptions and new acquisitions are minimal (Odini, 1999). Fiscal resources have also constrained the automation efforts by most of these libraries (Mutula, 2001a).

University libraries being largely dependent on their parent universities for funding suffered from the negative implications of SAPs. To supplement their fiscal resources, university libraries sought donor support to initiate information technology projects and sustain them (Rosenberg, 1998; Mulimila, 2000; Mutula, 2001a). They also introduced a number of fee-based, income generating services such as photocopying, binding services, and more recently, Internet services. While a handful of institutions have received considerable donor support, most of the libraries in the public universities in Kenya to date use conventional methods of acquiring, storing, managing, and retrieving information (Mutula, 2001a). By contrast, though universities in countries such as Chile, Peru, Costa Rica, and Ecuador like their Kenyan counterparts initially relied on donor support, they in addition collaborated with private companies to automate their operations and improve information service delivery (Montealegre, 1999).

Despite the aforementioned challenges facing higher educational sector in Kenya, there has been a remarkable growth of university educational sector since 1980s. Kenya currently has 7 public and 13 private universities. During 2004/05 academic year, about 80,000 students were enrolled in the seven public universities of Nairobi, Moi,

Kenyatta, Egerton, Jomo Kenyatta, Maseno and Masinde Muliro (Nation Correspondent, 2007). Most of the public universities in Kenya have a minimum of two constituent colleges and have in the last six years embarked on vigorous nationwide programmes of expanding university education infrastructure to take advantage of the increasing enthusiasm for higher education among the working people. The public universities in Kenya are expected to have a faculty student ratio of 14:6. However, the introduction of parallel degree programmes (i.e. degree programmes undertaken in the evenings and weekends largely by working people) by public universities in the last six years has overwhelmed staff capacity. A report on the transformation of higher education and training in Kenya indicated that the number of lecturers in the public universities, which currently stands at 4,650, should be increased to 6,000 (Nation Correspondent, 2007).

Private universities in Kenya had a student enrolment of 10, 050 in 2005. There was only one private university in Kenya in 1980 with an enrolment of 20 students. However, in the last two and half decades, Kenya has witnessed significant growth in the private university sector. The growth of private universities in Kenya has been fuelled by several factors, which include the limited opportunities available in public universities; the constant closures of state-funded universities due to perennial students' unrest and lecturers' sit-ins for better pay packages, and lack of space to accommodate the increasing number of students. Prior to the establishment of private universities in Kenya, most people who could not get a chance to study in public universities moved abroad making education costly both to the individual and the country (Kenya Times, 2006). Some of the private universities in Kenya include: University of Eastern Africa-Baraton, United States International University, (USIU), Catholic University of Eastern Africa (CUEA), Daystar University, Scott Theological College, Strathmore College, East African School of Theology, Kenya Highland Bible College, Nairobi Evangelical Graduate School of Theology, Pan Africa Christian College, St Paul's United Theological College, African Nazarene University, Kenya Methodist University, Kabarak University, Kiriri Women's University of Science and Technology, Australian University Institute, Kenya College of Accountancy, Kenya School of Professional Studies, Kenya Science Teachers College and Kianda College (Aduda, 2001; Mutula, 2001a).

GROWTH OF INTERNET CONNECTIVITY IN KENYA

The history of Internet connectivity in Kenya dates back to 1994 (Kenya Institute of Management - KIM, 1999) when the African Regional Center for Computing (ARCC) set up the first full Internet connectivity in the country through the support of the US National Science Foundation thus making Kenya among the first African countries to

get Internet connection. Two years later, Jambonet, Kenya's National Internet backbone, was established and ushered in dramatic changes in Internet provision in the country by enabling key urban centers to access the Internet (Mutula, 2001b).

A National Task Force on electronic commerce was established in May 1999 with a view to providing an enabling environment for electronic trade in the country. As a result, awareness of the potential of Internet increased with many stakeholders indicating interests in applying Internet in their business. By 2000 it was estimated that the number of Internet users was around 30,000-50,000 with a projected monthly growth of 300 people per month (Mweu, 2000). By 2001, Kenya had several Internet Service Providers (ISPs) with those officially registered standing at 34 (Kenyan Institute of Management, 1999). Improvements in bandwidth were also registered. For example, the Internet no longer relied on 9.6 Kbps capillary leased lines as was the case in the early years. Instead, 4 Mbps bandwidth and asymmetric VSAT (Very Small Aperture Terminal) satellite configurations were being employed (Mutula, 2001b).

The liberalization of the telecommunication sector has been going since the 1990s paying way for competitive pricing of services resulting from the increased number of players such as ISPs in the sector. Plans for privatization of the incumbent Kenya Telecommunication Company (Telkom Kenya), the sole provider of Internet backbone are at an advanced stage. Once the privatization of Telkom is complete, this will further promote a conducive environment for fair competition in the telecommunication industry and subsequently, improve the country's telecommunication-based services. Similarly, the 1998 Kenya Communications Act, Section 23 (412) (Kenya Government, 1998) provides for a regulatory authority (the Communication Commission of Kenya – CCK) that would (a) promote effective competition between persons engaged in commercial activities connected with telecommunications services in Kenya, and (b) provide international transit services by persons providing telecommunications services in the country (Kenya Government, 1998). The CCK long-term plan is to raise Kenya's telephone line density to 20 lines/100 people in urban areas and 1 line/100 people in rural areas by the year 2015. Kenya has currently about 10 million mobile phone subscribers against fixed lines of 280,000 (Reuters, 2007).

More recently there has been a significant development in the telecommunication in Kenya. Since African Online, an Internet and content provider opened shop in Nairobi Kenya in 1995, it has expanded its services and has branches in major outlaying towns of Kenya such as Nakuru, Kisumu, Mombasa and Nanyuki providing infrastructure for all public and private universities in Kenya to connect to the Internet (Daily Nation, 2005). Kenya is the leading east African country besides Tanzania and Uganda in

Internet growth. As a case in point, Kenya recorded a 200 per cent rise in 2004 in Internet growth with the number of Internet users reaching 1.5 million, up from 500,000 users in 2003. Comparatively, Tanzania recorded a 150 per cent rise in users in 2005 from 2004 to reach 300, 000 mark. On the other hand, Uganda had over 200,000 Internet subscribers in 2005 (The East African, 2006).

The East Africa Community economic block of which Kenya, Uganda, Tanzania Burundi and Rwanda are members has developed a vision for the regional e-government framework whose purpose is among others provision of online public services and e-education (Nyanchama, 2004). In 2006, African Online introduced in the Kenyan market wireless broadband Internet connectivity through iBurst technology. The technology can run connection speeds of up to 1 megabyte per second. At such enhanced speeds, subscribers can have access to quality data, voice and video using their PCs or laptops. The product was expected to reduce the cost of accessing a broadband wireless Internet connectivity while assuring users permanent connectivity. Until iBurst was introduced in the Kenyan markets, existing wireless technology in the country costs were USD1200 monthly charges and installation costs of USD300, which had remained out of reach for thousands of potential users. To get connected on the wireless broadband loop, subscribers have to buy iBurst equipment from Africa Online at a one off price of Kenya shillings 16, 000 (USD230) (The Standard, 2006). The subscriber is then hooked up at a monthly fee of Kenya shillings 8, 000 (USD 115) (to local servers) and at a speed of 1 megabyte.

Similarly, Kenya Data Networks (KDN) in 2006 launched a broadband wireless connectivity to the Internet. The product, known as Butterfly, enables electronic gadgets including palmtops, notebook laptops and desktop computers with wireless capability to connect to the Internet. KDN has partnered with Internet Service Providers (ISPs) to roll out the service countrywide. Users will be required to subscribe to an ISP to access the service, which is currently available only in Nairobi. Butterfly offers communication solutions for data, voice and video. The service uses the wireless-fidelity technology (WiFi), an Internet connection through radio waves devoid of cords or wires (The Standard, 2006).

The Kenyan government is also working on an under sea fibre optic cable running from its coastal town of Mombasa to Fujaira in the United Arab Emirates covering 4400 kilometres. The cable known as the East Africa Sub-Marine System (TEAMS) will connect the country to the global fibre optic network. This fibre cable is expected to sharply reduce Internet costs and make the country much more attractive to Internet individual and university users (The Standard, 2006). Similarly, The World Bank, in

April 2007, approved USD165 million (Kenya shillings 12 billion) in financing for Kenya, Burundi and Madagascar for high-speed Internet connections. In this project, Kenya is the largest beneficiary, getting about USD110 million (Kenya shillings 8 billion). This project will enhance Internet connectivity in the East African region, the only place in the world not connected to the global broadband (The Standard, 2007). The funds would also support the connection of main towns of all participating countries. This project should enable universities in Kenya, as well as in the East African region to collaborate with one another in research and scholarship.

Kenya is ranked as one of the leading countries in Internet growth in Africa. According to Research and Markets, an international investment consultancy firm, Internet penetration in Africa was in 2006 estimated at 4 per cent, up from just 2.6 per cent in 2005. Kenya, together with Nigeria and Morocco were reported to present some of the greatest opportunities for growth. However, in terms of penetration, Reunion and the Seychelles are reported to have the highest Internet penetration, where 20 per cent of the population has access to the worldwide web, followed by Mauritius and Morocco. This compares to penetrations of over 50 per cent in most developed countries (The East African, 2006).

Internet Connectivity in Kenyan University Libraries
Pioneering Internet connectivity in the seven public university libraries in Kenya was achieved between 1997 and 2001. In particular Egerton University library was connected in 2001, Maseno University in 1999, University of Nairobi in 1999, Catholic University of Eastern Africa in 1999, University of Eastern Africa- Baraton in 1999, United States International University in 1998, Moi University in 1998, and Jomo Kenyatta University of Agriculture and Technology in 1997. Initial initiatives of Internet connectivity in some private universities such as USIU, Baraton and CUEA were all fully funded by their parent institutions whereas public universities all depended on donor agencies, particularly the World Bank and Overseas Development Agency (Odero, 2003).

The initial Internet connectivity in the public universities has for the last 10 years been through dial-up access, with only three universities employing digital leased lines. However, this situation has changed and by and large most universities have full Internet access. The use of dial-up connectivity did not augur well for the public universities since such access is dismally slow and mostly unreliable. African Online and Swift Global have for a long time remained the main Internet service providers to universities in Kenya, but the liberalization of the Internet sector has brought into the market new players. During initial ICT implementation in Kenyan universities, most of

the libraries had state-of-art computers that were part of university wide World Bank donation. However at that time the numbers of computers connected to the Internet was dismally low and differed from one library to the other: Moi University for instance had 5 computers running parallel, Egerton University 1, Maseno University 1, USIU 12 with 1 computer dedicated for staff use only, University of Nairobi's main and campus libraries 21, CUEA 2, and Baraton 4 computers. Currently most universities have dozens of computers in their libraries largely for library automation, with limited Internet access to the clients (Odero, 2003).

Technical capacities to handle and maintain the Internet infrastructure are low in most of libraries. Consequently, the libraries have had to rely on IT departments within the universities for technical support. Only two libraries – Moi University and University of Nairobi have systems managers. In Maseno University library, this responsibility is assigned to one individual considered more conversant with the Internet. In USIU, the chief librarian doubled as the systems manager after the former systems manager left the institution.

With the exception of Moi University, all other universities did not have independent clear ICT policies and plans. Both Catholic University of Eastern Africa and United States International University have their libraries Internet visions integrated in their respective universities campus-wide vision (Mutula, 2001a). The library management is involved in the ICT projects implementation at varying levels. Although most management staff is kept informed of the implementation process, some feel that they are not adequately involved in the process. For libraries whose projects are part of campus wide ICT policies such as USIU and CUEA, only the university librarian and systems manager are actively involved in the various phases of implementation. In some libraries, like Moi University, the university librarian, together with the systems manager, makes most of the ICT decisions (Mutula, 2001a).

Policies Governing Internet Use in Kenyan Universities
Though there are silent policies and guidelines governing Internet use in most of the libraries, these have not been documented. Internet accessibility and use by staff is fairly controlled in nearly all the libraries. The control measures vary across the libraries. The commonly cited include (Odero, 2003):
• Restricted physical accessibility – (Baraton, University of Nairobi, Maseno, Egerton, and Moi University): In this case computers connected to the Internet are located in specific rooms under the management of an assigned individual. Any member of staff who needs to use the Internet must get clearance from the library management.

- Charging for Internet use – (Maseno, Egerton and Moi universities): Because of economic hardships facing most public universities, libraries have initiated a number of income generating activities. Thus library employees are charged for using the Internet like any other end user. Exceptional cases are made if staff can prove that they are performing an official assignment like ordering for materials or official communication.
- Restricted time for staff use of the Internet - (CUEA and Baraton universities): Under this arrangement, specific hours have been assigned for free accessibility by the staff. Often these are hours after work or over lunch breaks. The idea is to monitor and control the amount of time spent by staff on the Internet at the expense of their other library duties.

At USIU and Jomo Kenyatta University of Agriculture and Technology (JKUAT), section heads have connected terminals at their work desks, which can be used by the other members of the section. None of the libraries has proper training programmes for their staff. Internet training has largely been left to the individuals' initiatives. However, USIU and JKUAT have had a series of basic in-house training for the section heads and other senior members of staff on Internet use. The University of Nairobi had a series of training programmes in 2001 including Internet training for different cadre of staff. However, only senior members of staff have so far benefited from the training.

Staff Capacity

Odero (2003) in a study of determinants of Internet adoption and assimilation in University libraries in Kenya interviewed senior management on their perceptions of the readiness of the staff to embrace the Internet. Overall, 75 percent of the interviewees were optimistic of the improved usage of the Internet by the members of staff. Words such as "enthusiasm", "eager to learn" and "excited", recurred frequently in their descriptions of libraries response to the Internet. The study found that there was keen interest shown by the younger staff for ICT adoption and use than was observed among the older staff.

On the whole there was low utilization of ICT by library staff. Odero (2003) attributed the low level of individual use of this technology to the poor supporting infrastructure in place and the cost of maintaining these services. She observed that deliberate efforts to Integrate Internet into daily operations were evidenced in only two libraries: Catholic University of Eastern Africa (CUEA) and United States International University (USIU). In both cases, the students pay for Internet services as part of their fees, making it possible for these universities to sustain the services in the libraries. USIU uses the Internet for user services (e-journals), ordering of library materials, accessing online

catalogues, and electronic communication. CUEA uses it mainly for user services and external communication. Odero (2003) observed that in general, senior management of the various libraries was optimistic that the on-going projects would facilitate greater accessibility and use of the internet technology in the libraries.

Factors Constraining Internet Access in Kenyan Universities
There are various constraints that need addressing to enhance Internet access and use in Kenyan university libraries. Kenyan Internet connectivity's slow progress, especially during the later part of 1990s, can be attributed in part to the negative impact of SAPs. SAPs largely failed to remedy the major structural and institutional weaknesses that affected the Kenyan economy. Not only SAPs lead to deteriorating recurrent government support to the education sector (such as reduction of staff recruitment and cuts in budget allocations), it also introduced cost sharing and user charges for a number of services, making education an expensive necessity for most Kenyan families (Waihenya and Siringi, 2001).

Kenya, like the rest of east Africa region, lacks terrestrial Internet connection to the international bandwidth. The World Bank observes that the East African is the only region that still relies mostly on expensive and poor quality satellite infrastructure with costs ranking amongst the highest in the world. It estimates that the regions international wholesale bandwidth prices are 20 to 40 times higher than those in the United States. Consequently, businesses are unable to compete in the global economy, university students suffer because they cannot access the Internet, and government agencies cannot communicate effectively with each other because they are not connected (The Standard, 2007).

Eldon (2005) enumerates problems facing Kenya's telecommunication sector to include among others: high cost of hardware and software, and poor basic telecommunication infrastructure, lack of an integrated national informatics policy, lack of a national ICT policy, and the slow pace of liberalisation of the telecommunication sector.

Brain drain of skilled staff to lucrative destinations especially in Europe and America is of national concern**.** Kelly (2005) citing a World Bank report noted that nearly 40 per cent of highly skilled Kenyans emigrate to rich countries and such brain drain significantly impedes national development. The report notes that the rate of migration in Kenya's case is about double that for black Africa as a whole. The report further points out that 38.4 per cent of university-educated Kenyans are said to be living in Europe, North America or their antipodes. The report observes that the degree of brain

drain experienced by Kenya and some other low-income countries is also much greater than for larger and rapidly developing countries such as China, Indonesia and Brazil.

Kenya Times, a daily newspaper in Kenya, in one of its lead articles pointed out that African countries are losing top of the cream academicians and researchers due to lack of facilities and poor infrastructure (Kenya Times, 2006). These professionals comprise experienced and highly skilled people who move out to further their studies after qualifying in their home countries and thereafter opt to stay and seek better opportunities. They also include those who pursue specialised higher education upon completion of secondary school and choose to remain overseas when through with their studies. The emigration of Kenyan professionals abroad has been attributed to factors such as poor academic infrastructure, ill equipped institutions, poor welfare schemes, and lack of conducive academic environments in higher educational institutions. Kenya Times (2006) also reported that there were more than 300,000 highly skilled and experienced professionals from Africa living and working in Europe and North America comprising doctors, lecturers, researchers, nurses and professional managers. Migration of these highly skilled cadre of academic professionals, has led to an acute shortage of academics in Africa's higher education institutions especially in the key fields of science and engineering. It is estimated that Africa ranks second in the number of its expatriates in the western countries with more than 40,000 Ph.D. holders in Europe and the United States most of whom are highly skilled in academia, health, senior management and information and communication technology.

Poor Internet connectivity has also been identified as a key factor to the deteriorating quality of education offered in universities in Kenya. The Kenyan Minister of Education, Professor George Saitoti, noted that it was depressing that both public and private universities continued to rank poorly internationally saying it was partly due to the fact that researches conducted were never posted on the Internet and other avenues where their peer can access them globally, leading to the assumption that not much is being done by the scholars (Daily Nation, 2007). The Minister said that the Internet spurred by forces of globalisation enables foreign universities especially in developed world to effectively market their academic programmes, thus fast grabbing a sizeable chunk of students from Kenya.

Kenya government has not removed value added tax on Internet charges to spur wider adoption of the technology in universities and among Kenyans. Kenyan universities are also not competing effectively in the global markets because they are not leveraging the Internet to offer academic programmes through e-learning (Daily Nation, 2007). Additionally, in Kenya most Internet users including universities have for a long time

relied on dial up technology that wholly depends on availability of a telephone line. This exposes users to the danger of running huge telephone bills despite the quality hiccups that come with the model. Such dial ups can offer maximum speeds of up to 56kbs under ideal conditions (The Standard, 2006). Such speeds are considered too low for efficient Internet access besides the fact that they can support very limited applications for university research and teaching purposes. Similarly, Kenyan universities have for a long time used code division multiple access (CDMA) for Internet access. CDMA does not cater for the mobile worker and runs speeds of up to 156kbs. Moreover, CDMA is not considered a broadband solution since its speed is limited to 156kbs. Broadband solutions have speeds of 256k to 512k in Africa (The Standard, 2006).

A report on transformation of higher education and training in Kenya observes that students in the public universities are not provided with adequate and current reading material as the number of books and journals available in libraries is not sufficient for the increasing number of students in universities. Most of the libraries become congested towards and during examination periods and do not meet the benchmark ratio of 60 book titles per degree programme. Moreover, university libraries should be made digital to enable lecturers and students share information. Provision of teaching facilities such as lecture halls, seminar rooms and laboratories equipped with adequate infrastructure including the Internet should be provided in order to improve the working condition of staff and as a means of improving the quality of education in the public universities (Nation Correspondent, 2007). ICT resources are scarce in a number of Kenyan Universities and this is exacerbated by under-utilization of available facilities including the Internet. The under-utilization of available ICTs is attributed partly to inimical policies such as unnecessary restrictions on access to the technologies at some public universities in an attempt to limit vandalism and theft of computers (Mutula, 2001a).

Policy Implications and Recommendations
There is no doubt that the Internet represents an area of immense opportunity, but without the ability to think about its potential in an innovative way, Kenyan university libraries will not be able to identify with, nor seize the vast potential offered by the Internet. There is need, for demonstrated interventions that will provide conditions that enhance individual employees' interaction, acceptability and use of the Internet. Amongst others, such innovative approaches could include the use of a rewards system for those staff who initiate and are involved in Internet-based projects such as designing of web pages, publishing on the Internet, developing electronic subject guides and links

for users, or even mandatory measures such as using e-mail for most of the internal communication.

Moreover, for most Kenyan university library personnel, the Internet introduces new experiences unknown in the past. There is a need for libraries to equip their employees with the required levels of Internet-related knowledge and skills. This should start with basic areas such as familiarity with keyboard, mouse navigation, and general typing skills, to more advanced Internet browsing and information search skills. From a practical perspective, the training offered to the staff should be designed to not only offer mastery of the skills, but also to promote positive perceptions and appreciations of the technology. Increasing the opportunities of learning by using the Internet would create an environment where the Internet is more appreciated, understood and applied than is the case at the moment.

Library management can also use the knowledge about the efficacy of alternative sources of Internet-based information to more effectively introduce the technology to its staff. As a matter of urgency, libraries should strengthen their in-house technical capacity as well as devise ways for easier communication interactions between the technical staff and other members of staff. To achieve these, libraries need to consider a number of things. Firstly, libraries should recruit staff with demonstrated knowledge and skill that can function in an intensive ICT environment. Libraries may need to draw policies that make it mandatory for any new staff to be proficient users of such modern technologies such as the Internet. This should not just be stated in their curriculum vitae but should be practically tested during their interview. It is high time library and information professionals emulated established professions such as accountancy, medicine and law who are quite clear about what is a mandatory basic qualification for their profession.

Similarly, basic library training should be made mandatory for all cadres of staff. Library training develops in an individual not only an awareness of the work environment but also an appreciation of the various functions and tools used in these environments. Moreover, the revolutionary developments in the ICT arena means that any skills and knowledge obtained during formal training often get obsolete quickly. The need for regular refresher courses becomes almost inevitable. In the absence of training opportunities for all staff members, 'training of trainers' should be targeted at having a fair representation of staff from different cadres.

The disparities between university libraries in Internet connectivity underscore the need for libraries to identify appropriate proactive measures that may promote positive

Internet responses among different groups of staff. If adoption champions are identified in advance from various levels of library staff, they can be instrumental in assisting efforts to institutionalizing emerging information technologies. Therefore the library management should monitor and understand the stance of individuals in relation to these technologies. A feasible method that could be employed to achieve this is to involve staff in all implementation phases. Regular discussions regarding the subject should be introduced both in formal and informal staff meetings to elicit reactions and arouse the interest of staff. This will help in the identification of potential key persons that could be instrumental in influencing others' opinions and use of these technologies. However, plans for ICT implementation bring best results when they are embedded in, or informed by, a strategic vision for their operation in a manner considered consistent with the institutional needs. Therefore, despite the sense of urgency, Kenyan university libraries must approach Internet implementation in a more focused and systematic manner and not just be subjects of external agencies pressures

Despite the good intentions of donor support, library managements need to assess the appropriateness of Internet projects in the light of both short-term and long-term needs of their libraries and more significantly, in the light of libraries' own capacity to implement and sustain such projects. In similar vein, each library requires to have clearly drawn-up ICT policies specifying the envisioned role of both general and specific ICTs. It is only under such clear visions, that libraries would know how to interact with or accommodate other external parties in building their own Internet-based services. Accessibility and affordability of the Internet by individual actors are crucial to its adoption and assimilation. Amongst the major bottlenecks to individuals' use of the Internet include restrictive measures such as charging for staff use of the technology, red tape procedures in obtaining permission to use the Internet, and limited and uneven distribution of Internet-connected terminals.

Extending the service to library clients at a subsidized fee should supplement the recurrent expenditure incurred in the provision of the service. Similarly, networking different terminals and running the Internet services simultaneously using just one or two telephone lines significantly reduces the telecommunication expenses. Such approaches should suffice in sustaining Internet services, eliminating the need to directly charge the staff for the service. Moreover staffs' use of the Internet can be justified if such usage is integrated into the routine library operations such as ordering of materials and provision of information.

Finally, infrastructural factors significantly impede the smooth and extensive operation of Internet-based services in university libraries in Kenya. Libraries should consider the

viability of other alternative means of facilitating the use of telecommunication-based technologies, beyond computers. One possible area for exploration is the use of wireless cellular phones. Already there are positive indicators of a growing cellular phone industry in the country. With the market for the cellular phone expanding in Kenya, the unit cost for these services is likely to reduce while the service efficiency is enhanced. University libraries in Kenya are yet to figure out how they can use mobile phone connectivity that stand at 10 million in a population of 33 million people to enhance the provision of information services.

CONCLUSION
The authors have demonstrated that University libraries' personnel initial adoption response to the Internet in Kenya was highly dependent on organisational support in two respects. First, the institutions provided the basic required resources and offered training opportunities, albeit limited, to some of the staff. However, inequality in the personnel's accessibility to the Internet impeded the efforts of the majority to adopt and use the Internet. Similarly, lack of visionary and proactive initiatives on the part of senior library management, absence of ICT policies and plans, and inadequate in-house technical support hampered effective adoption and use of the Internet. Additionally, limited integration of Internet-based services into the mainstream of the library operations in Kenyan University libraries is evident in due in part to the fact that the Internet is considered as a mere income generating activity. Unreliable telephone and power supply together with high costs of maintaining full-fledged Internet service, restricts the extent to which the libraries can integrate the Internet into their operations, and in turn, undermines individuals' assimilation efforts.

Secondly, the authors have demonstrated that individuals' initial exposure to the Internet in general, somehow determines their future interaction with the technology especially with regard to how the library deals with the staff at the initial Internet implementation stages. Within the Kenyan University environment, restrictive measures taken to control staff use of the technology in the libraries have impacted negatively on their perception and use of the Internet. Nonetheless, low adoption and use of the Internet in the Kenyan University libraries is largely attributable to the general ignorance of its potential and limited technical capacity, thus causing them to rely on external agencies. However, the services rendered by such external agencies are far below the required standards. Moreover, there seems without substantive autonomy, strategic visions and plans to implement Internet services by University libraries in Kenya. Finally, notwithstanding the various Internet projects, much groundwork still needs to be done. The University libraries in Kenya have not considered seriously integrating Internet services into their mainstream operations. If they had, why would

they need to charge library staff serving the Internet? In brief, the Internet is grossly underutilized in Kenyan university libraries.

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