

# Efficacy of Information Science in Bridging the Digital Divide in Kenyan Institutions of Higher Education and Learning

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**Abstract:** - Digital age is heavily characterized by the merits of advanced technologies where digital divide evidently features out to be a spectacular concern affecting development of knowledge geographical society. Due to this development, the innovation of new technology is unfairly utilized by the rich members of society at the expense of poor ones. Quite a lot of research work done in developed and developing countries testify to the evidence of this technological divide. This paper suggests appropriate solutions to reduce this technological imbalance. The objectives of this article is to elucidate fundamental indicators of information science in bridging the digital divide in institutions of higher learning with reference to the University of Nairobi, to assess information science initiatives being undertaken in mitigating such unfavorable divide, to examine how broadband subscription can be applied to support learning and research in universities, and to find out factors that influence ownership, use and non-use of digital information devices. This paper will also enhance effective remedy and equal access to information and communications technology in institutions of higher learning. Understanding this article will enable us to discover major factors that inhibit access and utility of digital information being transition of digitization of resources, poor internet connectivity, insufficient ICT devices, and lack of skills and familiarity in the use of the same. It goes ahead to recommend on the need to train and reposition the information professionals and custodians, formulation of information science programs, sufficient acquisition of ICT resources, enhancement of bandwidth management, and impartation of information science in schools. The ultimate conclusion underscores the initiative of institutions of higher education and learning to do everything possible in bridging digital divide, with regard to the need for enhancing information science and ICT courses in pre-university learning institution.

## I. INTRODUCTION

The future is heavily leaning on those people who are able to invent new skills in the realms of technology as they relate with natural science (Leslie, 2014:16). These are the kind of people who are aware of how to interact with information, occasioning the immediate requirement to appeal to information science owing to its significance. Individuals together with affiliated groups are getting to be more needy for advanced knowledge and skills for digital information in a bid to leverage on scholarly opportunities; application for civic services; student loan facilities; health management, retirement investments and to participate in the political process; and otherwise to make the choices that affect their

lives. For this reason, information science has almost everything it takes to lead people to the required depth in information technology in order to acquire, access and utilize information in relation to learning and research.

## II. DIGITAL DIVIDE

This divide refers to a split that separates the two groups of people, one of which have an access to information courtesy of digital technology, and the other group without the same (Min, 2010:2). Research evidence indicates that very few people are linked to internet, and quite a lot from the rest are still dreaming of acquiring the first mobile phone gadget. This brings into view the disequilibrium in accessibility to technology together with the needed skills and resources for effective participation in the digital era. This article underscore the need to shift the focus from merely addressing disparities in accessing computers and the internet towards one that incorporates and examines how internet information resources are differently accessed and used.

The understanding of digital divide among many is based on examination of differences in individual information science skills acquisition and the understanding of demography and socioeconomic aspects between users and non-users of digital tools (Ferro, Helbig & Gil-garcia, 2011). Having determined the social aspect of the problem, its resolution will be determined by the society's democratization degree, living standard, the society's literacy profile, polish and breath, and by people's specific cultures and ethnicity. Computer literacy comes in handy here by enhancing acquisition of digital skills, familiarity, attitudes and behaviours in a bid to enhance individual development as well as benefiting the entire society (Eneh, 2010:1741). Availability of infrastructure of information and communication technology (ICT) could be essential irrespective of the fact that it only promotes conducive conditions because if information science abstains from taking its active role in orienting the users of technology, then the availability of such equipments won't avail its purpose of bridging the divide. The article also brings basic indicators of the digital divide in order to pave way for subsequent initiatives to the solution.

Statistics predict that the internet use will keep being afforded by the few privileged members of societies. The global internet users don't exceed 10%, besides the widening gap

between developing and developed countries as from early 1990s (Nishida, 2013). Almost 2.1 billion (75%) internet users among all global internet users (2.8 billion) dwell among the twenty top countries, leaving the rest (25%) who account for 0.7 billion to be irrationally dispersed in the remaining 178 countries, of which each country represents something below 1% of the sum total of internet users (Internet Live Stats, 2014).

### III. INITIATIVES UNDERTAKEN IN BRIDGING THE DIGITAL DIVIDE

In many disciplines of education ICT is used to accelerate learning and enhance the capacity of students substantially and faster. The network that undertakes research and education in Kenya, courtesy of Education Network Trust (KENET) takes the greatest initiative in promoting ICT utility education, research and learning among institutions of Kenya's higher education and learning (Tilvawala, 2009:5). It spearheads the commitment of the government of Kenya to explore reforms in the pricing of internet as well as facilitating internet links among universities in Kenya. The other initiative is that of the government's initiative to pilot the one laptop per child (OLPC) program, aimed at digitizing the on-coming generation. It does this by providing inexpensively produced "XO" laptops to those regions in which children are financially incapacitated. This will meet out the major cause of digital divide in pre-university institutions, which mainly bear the brunt of unfair variations in ICT skills among its students based on the opportunities availed to them. It will be accomplished by the provision of gateway proficiency in digital skills so as to avoid some learners from failing to measure up to the level of their colleagues when they ultimately get to universities.

### IV. CHALLENGES IN BRIDGING THE DIGITAL DIVIDE

Institutions of higher educational learning are faced with a great challenge of deficient capacity and access to digital facilities and infrastructure to enrich students and enhance the mutual sharing of research and academic materials globally through the wave. This is made worse due to the fact that such caliber of institutions are shouldered with the responsibility of providing adequate resources and information in a bid to achieve bibliographic essentials of students, educators and researchers. The other challenge is the incompetence of providers of these ICT facilities in universities. Many patrons in information technology opt for digital services and resources when working in the digital environment over paper based services, yet the key information custodians – librarians – in those institutions are technologically handicapped in their provision of digital services needed (Gbaje & Ukachi, 2011: 65-69). Owing to this, information custodians together with university libraries' management struggle a lot to be relevant and up to date with ICT in their bid to maximize effective utility of ICT infrastructures in offering the most required services in this digital age.

There is also a deficit in the users' own inability to acquire basic knowledge of ICT, which inhibits them from operating such digital equipments, rendering them inadequate in their utility of the same (Okoli, 2010: 109-110). The other challenge was characterized by staffs' discordant mind-set which contributes much to deterrents of management effectiveness in handling digital information materials, besides deficient staff that are qualified and skilled to utilize such devices (Amaechi, 2010). Digital literacy training in learning institutions is to be underscored and be taken a step further by calling upon library departments in those institutions to employ a small staff of full-time trainers/teachers so as to make computer training to be key component of the institutions (Enis, 2012). These teachers will become the information custodians who will enable the institution to train various courses that can enhance students' computer literacy. This endeavour can also pose some challenge owing to the fact that those ad-hoc classes won't address all educational needs of students, which can create conflict with learning schedules. The creation of active interaction between information resources and the information custodians, the latter will be more motivated to actively participate and enjoy the benefits of ICT, thereby enhancing effectiveness and efficiency of services in their areas of jurisdiction.

### V. SUMMARY OF THE FINDINGS, CONCLUSION, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

#### *Summary of the Findings*

Factors hampering access and utilization of electronic information devices include the transitional period faced by university when digitization of resources was being enhanced technically to satisfy the need for the increased utility of ICTs to access information. Besides, the elevated communication infrastructure, with the subsequent expansion of ICT facilities purposed for expansion of information resources and easing location of such information, came in with such dynamic restructuring of the entire system, which has invited challenges of familiarizing with the same by the information custodians. Owing to this transition of the university's ICT, the initial group of staff and students require to be well directed in ICT utility, as the new ICT generation keep coming up with bigger population of users. Currently, university libraries provide very superficial and uncoordinated literacy instructions which is only accessed by a few students. Poor internet connectivity is another hindrance occasioned by frequency in dwindling internet signals in several sessions in the process of seeking information. The other problem is the complex structure of the digital information, which calls for students with higher ICT literacy to maneuver through and interact skillfully. This poses great disadvantages to those students whose previous educational background was devoid of ICT. The unequal utility of information technology resources in the university is evidently attributed to insufficiency of ICT devices, occasioned by the outnumbering

of these devices by the many students enrolling in the university on each intake. This is also coupled by lack of skills and familiarity in the use of the same, especially among the newly admitted students in the university.

Based on educational levels, the study targeted postgraduate respondents' owing to their greater acquaintance of ICTs in all the time that they have been in the university. Their undergraduate counterparts could not have been more ideal because for most of them their pre-university schools were devoid of ICTs facilities to acquaint them with the relevant experience needed in this research. Besides, most undergraduate students ended up in this university fresh from secondary schools without having passed through any intermediary training/course, like computer packages.

### *Conclusion*

Based on the results of this study, it can be concluded that institutions of higher education and learning is serious in doing all that they can in their initiative to bridge digital divide in their academic areas of jurisdiction. This effort is challenged by the influx of more and more students being admitted in such institutions. The capacity and quality of ICT equipment is up to date but the quantity of the same is still wanting.

There are very few secondary schools and pre-university institutions that offer comprehensive information literacy and ICT courses and training. This gives the universities greater burden of combating with such deficiencies regarding the required ICT skills and acquaintance among newly admitted students.

Qualified information custodians in universities are lacking, hence limiting the excellence of students in ICT skills. Besides, university libraries are having great limitations in effecting literacy and ICT education because this aspect of library objective was not spectacular during planning and development of such libraries.

### *Recommendations*

There is need for training and repositioning of information professionals.

There is a dire need for flexibility in professionalism, which is even more demanded in the current times owing to the rapid changes of academic librarians' roles. For this reason there is need for information custodians in the university to be well qualified and constantly be scheduled for workshop and conferences to keep updating their skills so as to show relevance in helping students. Adequate ICT skills should be characterized by professionals in library and information endeavors so as to be better endowed with skills of managing information centers. These professionals should then go further by enhancing the definition of the roles within information provision because traditional skills that they will have obtained by giving instructions only to institutions is so deficient to solve requirements of users as well as improving

access to information. It is also necessary to develop concepts and technical skills in the area of information management. This can be made possible by scheduling a series of structured training, practical experience and other initiatives geared towards attaining personal information that will go a long way to help information users in adopting various resourceful ICT channels as well as enhancing those information provisions that are most demanded. The staff should also take opportunities for enrolling in relevant courses and updating themselves with current trends provided by such channels as discussion forums, email lists and blogs. It is also necessary for them to come up with networks that will link them up with their colleagues with whom they share common profession, as well as with those in different profession which are related to information sciences. There is need for participation in relevant conferences and seminars, together with consultation of various information science literatures. Tools in Web 2.0 are very resourceful to librarians as well as their involvement with popular developments in the arena of information.

Development of information and knowledge portals should be enhanced. Proliferation of digital contents has greatly enhanced information access. Information users have been relieved from recording addresses to numerous sources of information. However, there is a growing confusion caused by ramifications of tools for information access. A single hub that incorporates each of these tools simply makes it possible for users to access various sources of information, but ignores the need to exhaust significant contents of each source. This also necessitates custodial responsibility of managing and monitoring the portal and many other available tools of information access. This custodian is to ensure the up datedness and sufficiency of the portal. There is need for a staff member to be allocated with the custody of updating the website.

Access to online resources should be enhanced. Eligibility of information access by those students and staff members who don't reside in the institution should be given more facilitation in order to curb such deficiencies that are currently facing the institution. Such facilitation will go a long way in equipping users with technicalities of downloading information materials from designated online databases using their own mobile phone service providers. Accessing digital content remotely is becoming more essential especially to the more advanced scholars of the like of postgraduate students due to their limited time in the institutions's premises, besides being custodians of many other tasks like employment.

A library multimedia resource centre is needful for its assistance to users in accessing and utilizing online resources, multimedia support services, educational presentations, playing music or video and e-learning. This multimedia will enable libraries to consolidate various services that are being rendered within their localities, thereby reducing students' mobility and strain in information searching. It will also act as a conducive place for conducting various sessions of information literacy.

The university requires efficient service in broadband management. Though bandwidth is an expensive resource that calls for economic utility, the institution is suffering from low bandwidth owing to the considerable increase of internet utility. Network infrastructure/bandwidth should be increased from time to time in order to improve the current deficient access to online resources due to anticipated increase in its utility. The bandwidth utility increment is attributed to the increase in student numbers, increase in computers owned by the university, growing volume of resources on the internet, and new services on the internet.

Marketing of information services is essential for the enhancement of information literacy. Users. Users need to know the resources that satisfy their needs. The users' activities with the ICT devices should be such vibrant in order to elicit the updates. As the channels increase it becomes more likely user awareness to increase. There is need to several information pointers, courtesy of providers of information services. Social networks and Web 2.0 tools are some of the channels that can be used for this purpose. Libraries should provide the latest items and facilities for the patrons' utility as well as aiding them to have a dedicated library page syndicating all interesting library contents. The networks will elevate the library's initiative to 'walk' to the "millennials" instead of waiting for the "millennials" to walk to them. The same networks will attract feedbacks and give patrons good recognition as information-seeking partners. Equally important are brochures, RSS summaries, posters, newsgroup feeds, websites, orientation, email alerts and personal contacts. Library visits has a pivot significant role when it comes to the effectiveness and nature of marketing information services, as it is an opportunity for reaching out to them.

There is need for maintaining and updating of information resources after their investment, which include computer and network hardware, softwares of application programs and antivirus, and information materials like print materials, portals, websites, e-learning content and database access rights. Such initiative will give the offer great opportunities for the patrons to access and tap information with minimum distraction from the otherwise malfunctioning hardware and software. This brings to bear the fact that there is a great deal of limitations on users' rights and time and skills to tailor this discrepancies in the course of searching for information.

#### *Suggestions for Further Research*

The need for information literacy and learning skills in institutions of higher learning calls upon more research to be done on the creation of effective programs in addressing new information and communication technologies. This will go a long way to link up lecturers, students and management for the purpose of research, teaching and learning issues. A research on how to include information literacy competency curriculum will enable learners to benchmark with high standards of literacy competence as required by professional

life and lifelong learning. This will go a long way to highlight the core virtues of information literacy and aid in the enhancement of information skills course contents. It will also boost the ease of transferring credits from the first to the second university, as well as credit comparisons.

Adaptation of students' technology use should be sought in the initiative to beef up devices on

digital strategy, such as boosting the compliance of mobile phones with websites in a bid to manage such enrollments internationally. There is need to research on how to exploit the opportunities that are currently utilized by digital technology including cell phones when it comes to digital learning. Hybrid information services are to be skillfully tailored to curb the menace of technological transitions, whereby both print and electronic information resources can smoothly complement and substitute each other at some points of utility.

Much should be sought on how to appreciate and capitalize on the dynamics of marketing networks. A network that serves the whole university has a formidable determination on decision-making processes adopted by her students. The university network that is cohesive is comprised of admissions officers, current students, faculty and alumni. Relationships that are strategic enough need to be initiated by institutions for a mutual benefit with her stakeholders as a means to facilitate maximum interactions with potential students.

Dynamism of ICTs owing to advancement in technology calls for the need for frequent benchmarking of ICT facilities with the current state of state of the art. The conclusion of the research may be appropriate for only a limited time span at the given moment of study and at the given level of technology, which calls for improvement of information access by its clientele. More research need to be done to find possible incorporation of new and emerging advancements in information communication technology, changing nature of categories among users, and the need for information provision together with its approach. There is need to segment the users so as to determine their information needs and the patterns which these users adopt in seeking the information. Such segmentation may be based on the course enrolled by users, the academic year, gender, work roles and level of study.

Studies should be carried out on how integrated library systems can be explored and improvement done on it so as to enhance its support for the many resource management and applications in the setup of a university, which includes local content, digital repositories, mobile devices, e-resources and e-learning activities.

Studies should look into how Ministry of Education Development Plan for Education and Research should amplify the significance of libraries' willingness to chip in for developing the methodologies in studies and teaching. This

will ensure excellent information literacy among the graduates of universities and polytechnics.

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