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Enabling Technology Driven Library Environment in Sub-Saharan African Universities: a study of the Carnegie Continuing Professional Development Programme experience vis-a-vie the participants work enhancement

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Abstract:

This paper investigated how selected information professionals in the Sub-Saharan African Universities who participated in the Carnegie Continuing Professional Development (CPD) Programme have become innovative in the use of new emerging technologies for service delivery. The main objective of the study was to know how participants were making use of the emerging technologies learnt during the Carnegie CPD programme and evaluated the effectiveness of the training programme on participant's job performance. The target group for the study was the beneficiaries of the Carnegie CPD Programme from June 2014 to June 2015 held at the University of Pretoria, South Africa. Triangulation method of a qualitative research was used. The questionnaire was posted on the CPD Alumni online discussions group platform for the participant to complete. Data collected was summarized and presented in the form of tables, graphs, charts and statements to depict a clear representation of the responses. The results were analyzed and discussed and logical conclusions were made. The study found out that the Information Communication Technology (ICT) skills of participants have been evidenced by the application of these skills on their jobs as experienced librarians. However, the demand for ICT and information literacy training by students and faculty have increased due to the exhibit of skills and innovations by CPD

participants. The study therefore recommended that for any future CPD programmes that is intensive as the Carnegie CPD programme, participants should be given certificates that will highly be recognised by a university. In addition, librarians should begin to explore and aspire to participate in more CPD programmes to help them become more innovative in service delivery and to avoid becoming obsolete. Heads of Libraries should include in the yearly budget, new technology equipment for use by the libraries. Again, heads of libraries and academic registrars should recommend and approve CPD training programmes for the library staff. Also, financial support should be given by institutions for CPD programmes for librarians.

Keywords: Emerging technology, Librarians, Staff development, Continuing professional development, University of Pretoria.

Introduction

The University of Pretoria in 2013 announced a four-week residential Continuing Professional Development (CPD) programmes for qualified librarians from the Sub-Saharan Africa, for the period 2014 to 2016. The programme started in 2014 with two intakes as was the initial plan, the first intake started May 24 to June 21, the second intake started November 1st to 29, 2014. Upon the realization that many librarians applied for the programme, the number of intake was increased to three in 2015 and 2016. The programme is still ongoing till end of November, 2016. There have been five intakes as at end of year 2015. The various intakes were numbered in session from 1 to 8 supposedly. There have been CPD group 1, 2, 3, 4, and 5 in 2014 and 2015 with a total of 160 participants. CPD group 6, 7 and 8 will take place in 2016. With CPD 6 in February and 2016, a total of 192 participants have been trained. The target for this research is CPD 1 to 5 of 160 trained professional academic librarians.

The programme being sponsored by the Carnegie Corporation of New York, was dubbed theCarnegie Professional Development Programme (Carnegie CPD) and hosted at the University of Pretoria, South Africa. The programme brought together qualified librarians who are in active service and working in academic libraries from eligible countries namely; Ghana, Nigeria, Uganda, South Africa and Tanzania. The main aims of the Carnegie CPD programme as stated, were to empower the next generation of library and information professionals within Sub-Saharan African countries with hands-on skills to apply current and emerging Information and Communication Technologies (ICTs); and to build capacity amongst Library and Information Services (LIS) professionals to support and enable researchers. These aims in general will enhance the ICT skills of qualified librarians to enable technology driven library environment in the Sub-Saharan African Universities in support for research.

The Carnegie Continuing Professional Development (CPD) Programme was titled “Enhancing librarians’ ICT skills for research enablement in African universities” with

training contents such as, Digitization, Cloud services and storage, Mobile technologies, Devices use for information retrieval in libraries, Social media, Research Data Management (RDM), Virtual Research Environment (VRE), Open Access Repository, to mention but a few. The main objective of the research is to examine the contents of the Carnegie CPD programme and to find out whether it has achieved its intended aims.

Research Objectives: the objectives for the research were:

1. to identify new emerging technologies used in libraries in the sub-Saharan African universities.
2. to identify the skills used with the emerging technologies in libraries in the sub-Saharan African universities.
3. to identify the extent to which the Carnegie CPD participants are applying the new skills learnt in their work.
4. to ascertain the benefits and challenges applying the skills and to know whether the Carnegie CPD Programme is achieving its objectives.

Research Questions: the research answered the following main questions.

1. What are the emerging technologies in libraries?
2. What skills are used with the emerging technological equipment/devices available for libraries?
3. What kinds of technological equipment/devices are used to access and retrieve library information?
4. To what extent has the CPD participants used mobile devices for library service delivery?
5. What are the benefits derived through the application of the technological skills learnt?

Literature Review: The literature review is based on Continuous Professional Development (CPD), the development of academic libraries in the Sub Saharan Africa and the Carnegie CPD Programme content.

Continuous Professional Development (CPD) for LIS Professionals

Professional development is the training offered to professionals whilst in service and after the main stream traditionally structured education Professional development begins as one start to embark on his/her career when inducted into an office and it is continuous throughout one's career endeavour. According to Huckle (2001), CPD is a systematic ongoing process by which we can broaden and deepen our skills in addition to updating them. Shu Guo (2014), quoted Deiss (2001) saying that it is necessary to create "not only environments where continuous learning flourishes but systems that ensure continuous learning" because of the constant state of change in the library world. The library professional duties and services are changing so fast with technological development in developed countries and parts of the developing countries in Africa. Most libraries in the world and in Africa are making use of technology in one way or the other for quality service delivery. Libraries need to own technological/electronic equipment and resources and librarians need to imbibe the ideas and knowledge of the use of technology and skills required for service delivery and for global activities such as to search for information

online, to interact with colleagues, for interlibrary loans, research collaboration, online education and training (webinars), etc. The period when people travelled from one country, region, city, town and library to another seeking for information has passed. Today, one can sit in a comfortable zone and access all necessary information needed electronically with the use of a kind of technological tools available. The Open University online has stated that the revolution in communications which has brought computers, digital TV, smartphones and iPads has had as great an influence on all our lives as the coming of the railways did for our ancestors'.

The library environment in recent times will be made comfortable and librarians will not become obsolete if library professionals continue to groom themselves and acquire the various competencies and skills required in the new library work environment. Wright Jennifer quoted Thull and Hansen (2009), saying "Technology has made this easier; now, library instruction sessions no longer need to be confined to within the walls of the library; with most of the resources students want online, an instruction session can consist entirely of teaching the use of popular databases to make a more well-rounded experience, virtual tours of the library using footage conveniently housed either on the library's website or popular video sites can show students how to navigate the library before they ever set foot in it. More importantly, because these resources and more are available on the library's website, the learning experience does not have to end when the librarian leaves the room" These technologies, skills and more are the demands of the current library environment which librarians can only learn through continuous professional development training. Librarians cannot go back to sit in the classrooms of the traditional structured LIS schools to be enrolled to learn the new emerging library technologies and skills except for a continuous professional development training programme like that of the Carnegie CPD programme held at the University of Pretoria, South Africa. The training is aimed at technological skills development of LIS professionals in the sub-Saharan African Universities.

Libraries in the sub-Saharan African countries

With all the technology innovations and skills made available some of the university libraries in the sub-Saharan African countries are still lacking the technology innovations and skills applications due to these countries being underdeveloped or are developing. The Carnegie affiliated countries are Ghana, Nigeria, Uganda, Zimbabwe, Tanzania, Kenya, South Africa is among these countries but it is seen a developed country among others. For which reason the Carnegie CPD programme was carried out in South Africa which is one of the countries in the sub-Saharan Africa, but is considered a developed country in the midst of developing some countries which are Carnegie affiliated. Even for South Africa, some areas, particularly the rural areas, are equally undeveloped. However, the amount of knowledge created and consumed in South Africa is much higher than in the other Carnegie affiliated countries. Some of the Carnegie affiliated countries under listed are Ghana, Nigeria, Zambia, Uganda, Kenya, Tanzania, Zimbabwe.

Apart from South Africa the countries selected for the Carnegie CPD programme as mentioned above were seen as developing countries where the use of technology innovations and skills for library service delivery is very low. Access to the internet is also a major failure preventing the use of ICT's for smooth library service delivery.

Jimba and Atinmo (2000), has found out that Internet accessibility had no positive impact on the number of publications in five Nigerian research institutions. Adekunle (2003) mentioned Jimba and Atinmo as have listed several reasons for the surprising result of internet accessibility, such as low productivity in general, the content of the electronic databases not being relevant to the researchers in question, and that African knowledge was not integrated with the services.

Most academic libraries in Africa are still struggling with internet speed, acquisition of technology equipment, tools and devices and the technical know-how of people to manipulate these equipments. Digitization and other technology equipment's, tools and devices, software and training cost are very expensive to purchase considering income generated vis-a-vie budgetary allocations to libraries of the universities in the sub-Saharan African countries. According to Mutula, (2004) Libraries in Sub-Saharan Africa largely depend on grants from national governments for most of their recurrent and capital budgets and are consequently hard hit during times of budgets cuts. The equipments and resources mentioned above are manufactured in Europe and to consider the exchange rates of European currencies to the currencies of the countries in the sub-Saharan Africa makes it difficult to lay hands on those technology equipment and devices. Mutula, (2004) quoted (Martin, 1986) that, "librarians are known to have been some of the early entrants in the use of computers", hence the librarians in the sub-Saharan African countries are still struggling with technology use.

Technology-Driven Library Environment

Improvements in ICT skills have been enhanced and this has brought the activities of libraries and LIS professionals close to users. Library resources are freely accessed by user through the availability of the internet. Resources of most libraries across the world have one way or the other been digitized. As a result, libraries describe the digitized resources with terminologies such as electronic library, virtual library, online library, to mention but a few. Singh and Pinki (2009) mentioned that, 'technologies have created a new service environment that has pushed conventional boundaries much farther, with the calculated risk and opportunities. Libraries have reached a place in the world called globalization and information age where computers and different kinds of technological equipment, devices, tools and mobile applications are used to access and retrieve information, e.g. desktop computers, laptop computers, mobile phones, phablets, tablets, iPad, digital cameras, television, digital and camera wrist watches, to mention but a few. Globalization and the Information age facilitated the most use of information and communication technology in libraries. Globalization is a period of abundance of global information in different forms and in different media (information gateway) such as the electronic.

Technology has given a new face to the library environment with new technological equipment/ devices and skills emerging. The traditional library activities of acquisition, processing, storage and information access has given way to customer-centred proactive information services in libraries. All sections/departments in libraries have been automated, the acquisition, catalogue, reference, circulation to mention a few. The acquisition, processing and access to e-resources – online databases and electronic journals have been made possible through library networks and consortia. The daily routines of libraries are done through one or more technological equipment, tools and devices. Singh and Pinki (2009) asserted that,

“today, majority of the libraries are using computers and latest ICT tools and techniques for performing various housekeeping jobs such as, acquisition, processing, and serial control and also for delivering various computerized services to the users”.

Enabling the Use of Technology in the Sub-Saharan African Universities

Adekunle (2003), quoted Arunachalam (1998) and Odedra, et al (1993) and said “the least developed parts of the world, which includes most of sub-Saharan Africa, are often referred to as “information have-nots” (Arunachalam, 1998) and are considered as “the “lost continent” of information technology” (Odedra et al., 1993). Information and Communication Technologies (ICTs) today, have become the bedrock of every organization, institution and libraries and are increasingly playing crucial roles in academic library’s services delivery in the sub-Saharan African. Thereby enhancing the process of acquisition and knowledge sharing, the capacity to produce, access and use information widely. Researchers can sit in the comfort of their homes and with the use of ICT skills, collaborate with each other for a research output. This was not the case in the past. The Europeans who colonized the African countries are still providing assistance to them in different forms such as finance, technical support, and training, to mention but a few. Libraries in the sub-Saharan Africa including academic libraries still receive support from the Europeans for capacity building and access to information. Among these support is the Carnegie Continuing Professional Development (CPD) programme for five selected countries in the sub-Saharan Africa.

S**tatistics of use of mobile technologies in South Saharan Africa**

According to the GSMA report (2015), the Sub-Saharan Africa (SSA) has been the fastest growing region over the last five years, in terms of both unique subscribers and connections. By June 2014, there were 329 million unique subscribers, equivalent to a penetration rate of 38%. Consumers, governments and businesses across SSA are rapidly adopting mobile, not only as a basic communication tool, but also to access information and a growing range of new applications and services. As of June 2014, there were 608 million connections in SSA, including seven million machine-to-machine (M2M) connections. The GSMA report further stated that Unique subscriber penetration in the developed world is already very high and approaching saturation, standing at 79% at the end of 2014. The penetration rate will climb only modestly to around 81% by the end of the decade. In contrast, less than half of the population in developing markets currently has a mobile subscription, with the penetration rate at 44.6% at the end of 2014. This leaves significant room for growth, with the penetration rate expected to rise by about 11 percentage points by 2020 to 56%.

The GSMA report (2015) further stated that, the telecommunications infrastructure in Sub- Saharan Africa continues to evolve and develop across key sectors. Consumers, businesses, government and society at large are rapidly embracing Information and Communications Technology (ICT) mobile innovations, resulting in an increase in accompanying technologies, and creating potential for further growth. By the end of 2014 it is forecast that there will be over 635 million subscriptions in Sub-Saharan Africa. This is predicted to rise to around 930 million by the end of 2019. The rapidly changing social and technological dynamic in ICT, complemented by new devices, has driven the increase in subscription numbers in the region. The major challenge facing mobile operators and other industry stakeholders is to

connect the still unconnected populations in these developing regions. The increasing level of maturity in developed markets, combined with the recent strong growth in developing markets, means that there will inevitably be a slowdown in global subscribers. Over the six years to 2014, unique subscribers grew at a CAGR of 7.6%. This figure is forecast to slow to 4.0% over the period out to 2020. The role of mobile in delivering digital inclusion to the still unconnected populations feature phones and more recently the increasing adoption of smartphones, are bringing internet access to the masses across the region, with SSA having seen the fastest growth in subscriber numbers of any region in recent years. For example, MTN in South Africa recently implemented its first smart metering project for the City of Johannesburg. This project aimed to install 50,000 meters by June 2014 as part of the first phase of the project, which is due to complete in 2015. Airtel Congo has partnered with a local vehicle tracking company to offer fleet location services to its customers. MTN Rwanda recently reported that the fastest growth in connections was in the area of point-of-sale (PoS) terminals, a market that had seen rapid growth over recent years. MTN Uganda, plans to invest UGX 238 billion (US$89 million) on upgrading its networks in 2015. Vodacom is currently preparing to extend its network coverage to two underserved central provinces of the Democratic Republic of Congo (DRC), by deploying around 61 antennas in remote areas- covering a total of around 15 million people.

Figure 1

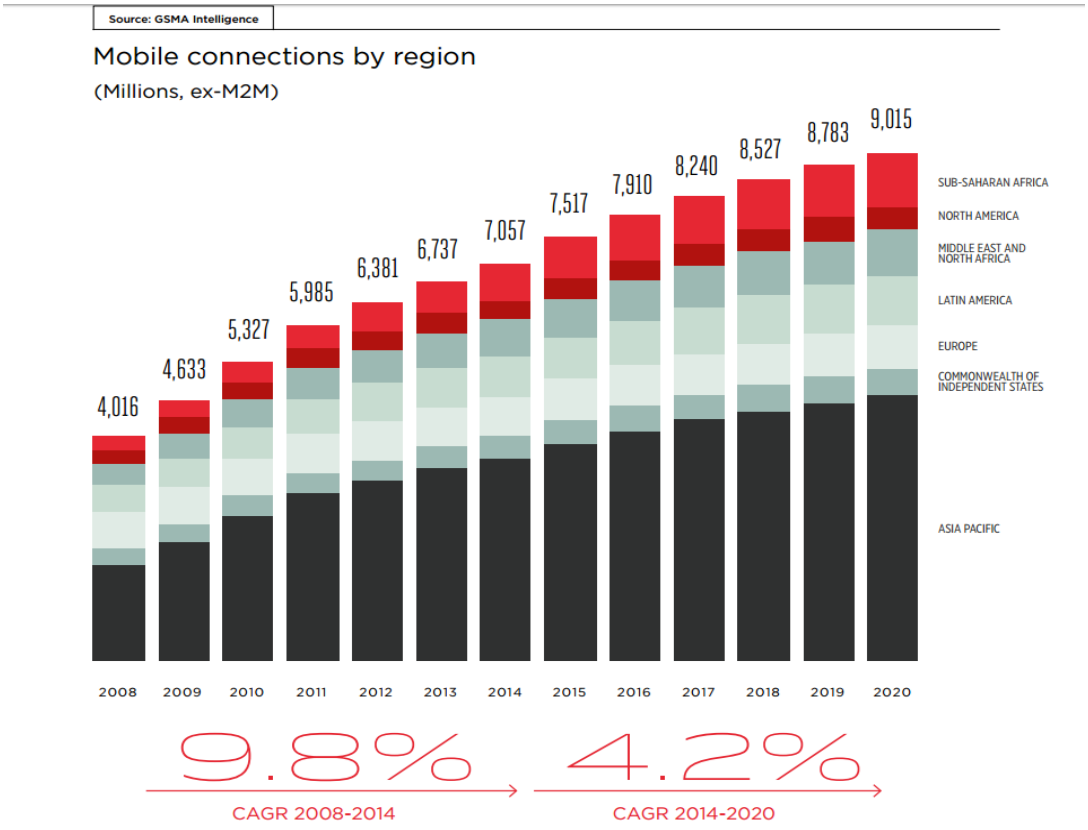
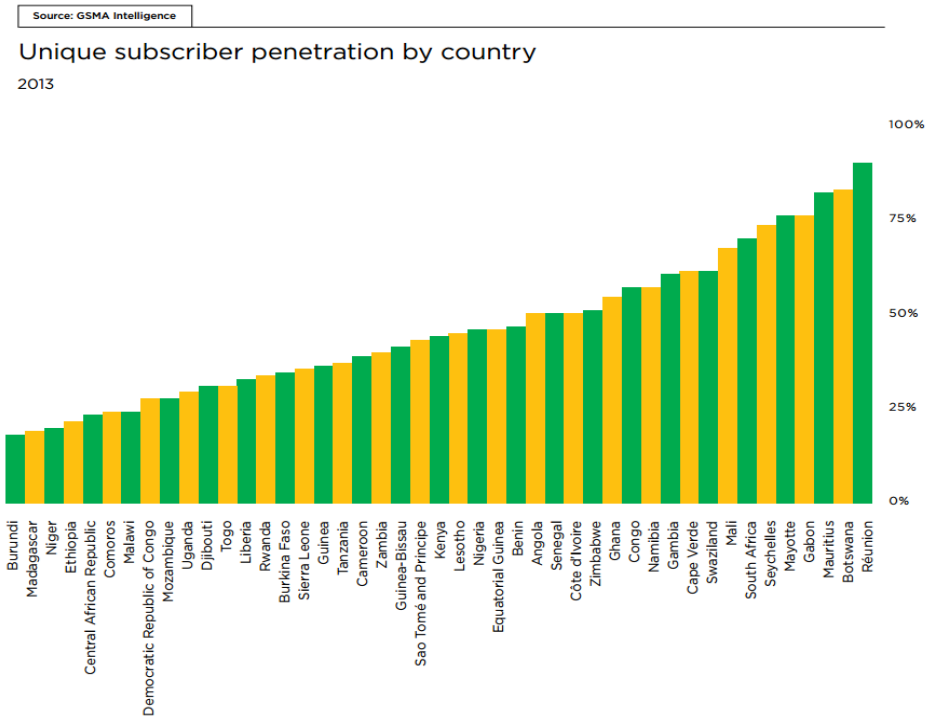


Figure 2



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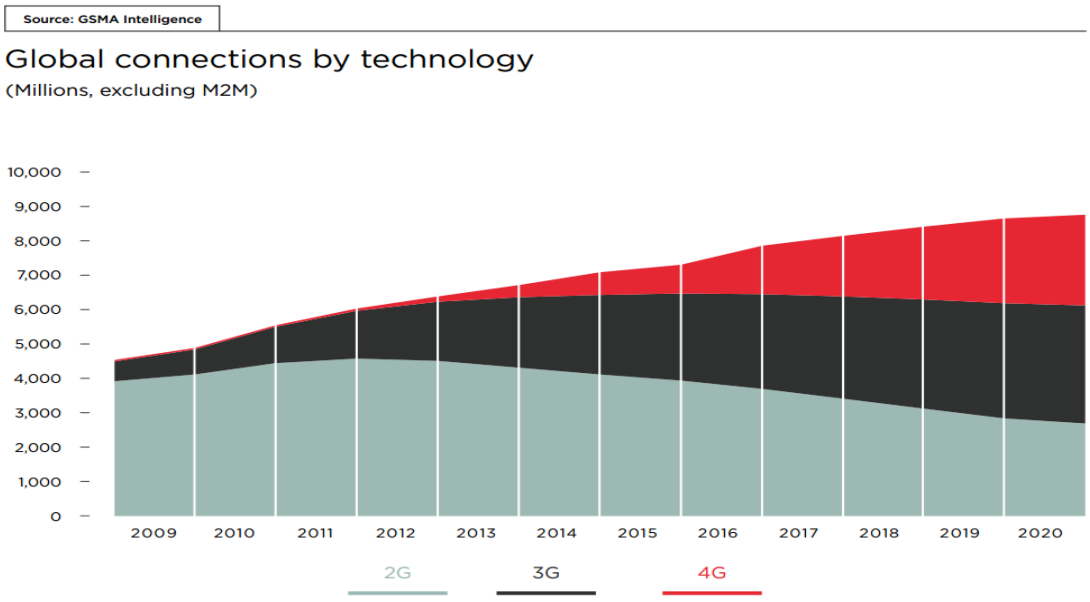
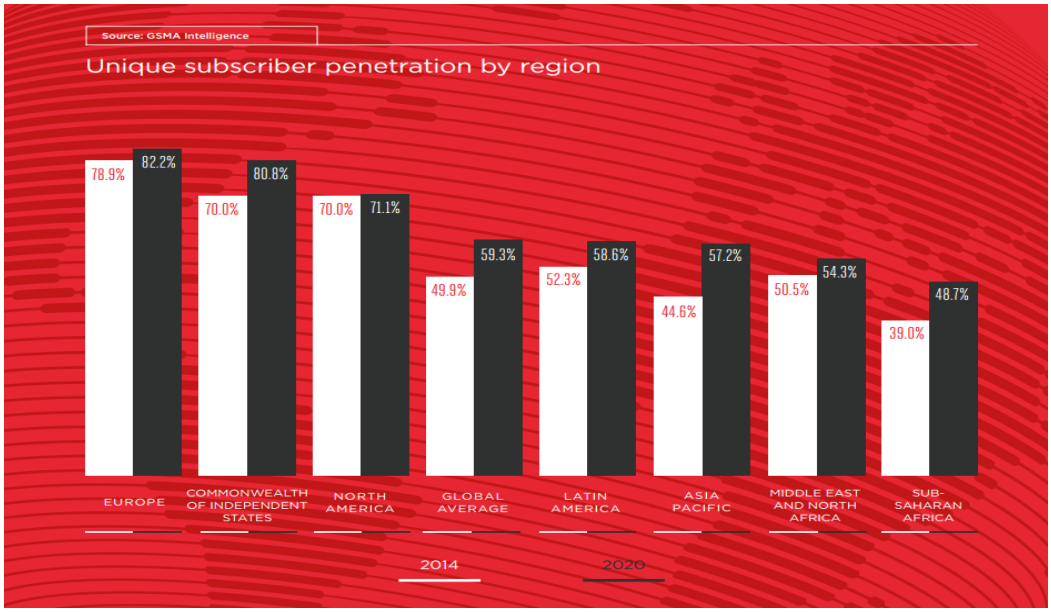


Figure 4



Some Carnegie CPD Programme Experiences

Digitization Experience

Equipment: Digitization has become paramount for the library and information profession. Super scanner is used for scanning books, Theses and Dissertations to mention a few. It can scan from 7 to 1000 pages. Very good quality in scanning documents, maps, and almost scans everything. Scan can be done in photoshop (Adobe) and compressed into pdf. Nikon slide scanner can scan one slide at a time. Other scanners are i2S DigiBook scanner, PlusDeck 2c, Nikon 9000 Coolscan, Scribe scanners, Epson 1740X, Kodak/Minolta Microfiche scanner, iTTUSB Turntable, etc. Some of these scanners were seen at the University of South Africa (UNISA) library, University of Pretoria (UP) library, and the National Library of South Africa (NLSA) on a tour to these libraries during the Carnegie CPD programme.

Digitization Software and Document Archiving: The process of digitizations makes use of scanners and softwares. Documents are scanned, edited and archived into an archival server. The GNU Image Manipulation Programme (GIMP) software is used and into which files are imported and edited. ABBYY Finereader, Adobe Photoshop and Adobe Acrobat XI Pro are used for image manipulation (clear the background of a scanned document). Documents are stored in an Institutional Repository (IR), Calibre electronic storage software or into a Zotero for easy retrieval and referencing. More than 44,000 documents can be archived in a repository.

Experience with some technology and skills use for user services in libraries

Self Circulation System: Check-in and Check-out equipment

- Book sorting equipment
- Library Security System
- Electronic security entry with swipe identification cards
- Electronic book check-out and alarm system: The library collection is protected by electronic security systems which cause alarm when items are

not checked out before leaving the library. The electronic check-out and alarm systems use technologies such as Radio-Frequency (RF), Radio-Frequency Identification (RFID) or 3M Detection Systems. RFID is an advanced system of RF which has many other uses including library stocktaking. The RFID security system is similar to 3M Detection Systems which combine flexibility and style with state-of-the-art technology to help provide excellent detection and reliability. A library can choose from RFID or 3M technology to find the perfect detection system for use in the library.

- Closed-Circuit Television (CCTV) Camera.

The library as a 'MakerSpace' with 3D Printers

A makerspace is a physical location where people gather to share resources and knowledge, work on projects, network, and build. Makerspaces provide tools and space in a community environment a library, community center, private organization, or campus. Expert advisors may be available some of the time, but often novices get help from other users. The makerspace sometimes referred to as a hackerspace is often associated with fields such as engineering, computer science, and graphic design. The concept emerges from the technology-driven "maker culture," associated with Make magazine and the Maker Faires it promotes. This idea of a collaborative studio space for creative endeavors has caught hold in education, where the informal combination of lab, shop, and conference room form a compelling argument for learning through hands-on exploration. On campus, the makerspace is being embraced by the arts as well as the sciences, and a new energy is building around multidisciplinary collaborative efforts. 'Makerspaces' enables peer learning, curiosity, experimental play collaboration, inquiry based, creativity, knowledge networks, trans-literacy, etc with the use of plastics for molding and a 3D Printer for printing the plastic molds. Registration for a 3D design Gallery can be done at www.tinkercad.com, e.g. www.tinkercad.com/things/ and at Google microspaceplaybook.

Mobile Technologies and Mobile Applications Skills for User Services in libraries

Mobile technologies and mobile applications are relevant for research in libraries. Mobile phones are changing; however education institutions and students are catching up with these technologies. Librarians are also changing the way they run in order to catch up with the trends of these technologies, reshaping and revamping the librarianship profession. Some mobile technology equipment and devices used in libraries are laptops, tablets, phablets, smartphones, etc. Mobile applications used with these technological equipment and devices are QR Code app, kindle app, Evernote, Google Drive, EBSCOHost and SlideShark, to mention but a few.

- QR-Code application is generated with a username and password through qrcode.kaywa.com. It is used to disseminate text information up to 160 characters, video, images, websites, and any information to be put across via SMS, Business card, Personal profile, URL, news, etc, is coded and post for reading by scanning the code with a mobile phone or tablet that has the application software. The application for 'kaywa' qr code reader is downloaded from Apple or Android store to scan the code. Libraries use QR Codes for bibliographic data capturing, library news, etc. QR Code reader and QR Code generator - can be used by scan. They are the fastest and most

user-friendly QR Code scanners available. If your iPhone, iPad, or iPod came with a built in scanner, it will be easy to scan a QR Code or you download the application from app store. One can also develop an application through the following links for free or paid version.
www.mobincube.com, http://ibuildapp.com/, http://www.appmaker.com/.

- Evernote is an advanced note taking mobile application for research and administrative work. There is also Evernote for desktop and Evernote on the web.
- Kindle application is used to access kindle text on mobile phones and tablets.
- Google Drive is a free cloud storage, e.g. Google Drive for mobile, Google Drive on Desktop and Google Drive on the Web.
- SlideShark is an application that connects an iphone to a laptop for a powerpoint presentation by installing PowerPoint application to an iphone using an application software called SlideShark'. SlideShark usually called a presenter's best friend is the leading app for viewing and sharing PowerPoint content on the iPad, iPhone and iPod touch. With SlideShark, mobile users can easily view and present PowerPoint slides the way they were meant to be seen with animations, fonts, colors, graphics, hyperlinks and videos intact. Why carry around your laptop for your next presentation? SlideShark arms you with the solution you need to become a presentation rock star! Simply download your slides to the app and then tap to play your presentation from your iOS mobile device. It's that easy. Show your slides from the device or connect to a projector to present to large audiences. You can even broadcast your slides in real time to remote or in-person meeting attendees. After the meeting you can share an online version of your slides and track your audience's viewing behavior. With SlideShark, you have the power to present and share your messages anytime, anywhere no matter what the situation might be."

Web Technologies and Social media

Various web technology forms have evolved. From web 1.0, to web 2.0, web 3.0, web 4.0 and the coming of web 5.0. Web 1.0 as web of cognition i.e. read only web, Web 2.0 as people-centric and participative web i.e. read-write web, Web 3.0 as web of knowledge connection i.e. read-write execution web, Web 4.0 as Ultra-Intelligent Electronic Agent i.e. read-write-execution web with concurrency and Web 5.0 as a quasi emotive web described as fifth generation web. These include the social media tools such as Facebook, Blogs, Twitter, LinkedIn, Google images, to mention but a few. Also, research collaborative tools such as, Academia, Wikispaces, Pressbooks, ORCID, Researchgate, etc. Google Citation and Zotero for reference management. Skype chat and Whatsapp for Webinars and teleconferences.

Driving the visibility of research

The library users must be connected on Facebook or on any social media platform for information sharing. Users should be connected in groups and the LIS professionals should use web technologies and social media to market the library as well as to drive the visibility of research. Awareness creation about the tools for research collaboration, digital scholarship, open access, internet achieving initiatives and research assistance.This poses a challenge to the librarian playing a role as a librarian and a researcher providing information for research support by working directly with faculty, staff, students and other researchers of the university

community. The research environment is gradually changing such that many of the former limitations on research collaboration and the visibility of research out are being swept away by the internet. The internet presents an opportunity for unlimited dissemination of information at virtually less cost. The OCLC listed competencies for social networking in libraries, skills, knowledge and attitudes that will help the staff stay abreast in the area of research. Research output will increase and will be visible when researchers from various countries work together. During the Carnegie Continuing Professional Development Programme at the University of Pretoria South Africa in November, 2014, Prof. Archie L Dick mentioned that senior library leaders should collaborate with younger librarians for a research output and young librarians should get connected to research teams and get involved in writing and publishing.

Finding researchers and web links to work with, collaborate with each other for information sharing. The use of blogs to develop and deliver long substantial messages, Twitter for shorter messages or links to resources, images such as photographs, graphics and other forms can convey messages and facts in ways that influence research. Videos are great advocacy tools through video sharing channels and embedded websites, other online platforms for information access. Some general applications are library news and events, new additions to the collection, links to articles relevant to courses and research topics, pictures of new development, communicate with the user community to solicit feedback.

The value of knowing and using new Technologies

The following are some values of learning new technologies:

- Creativity in the library profession.
- Fast and Effective service delivery.
- Ease of work.
- User satisfaction.
- Library staff/service provider satisfaction.
- Happiness and confidence of work.
- Trust in the library and the library staff.

Research Methodology

The methodology used for the research is the triangulation method of a qualitative research. The online survey questionnaire was posted on the CPD Alumni group Facebook platform for the participants of 2014 and 2015 CPD group to complete. The data that was collected was summarized and presented in the form of tables, graphs, charts and statements to depict a clear representation of the responses. The results were analyzed and discussed and logical conclusions were made.

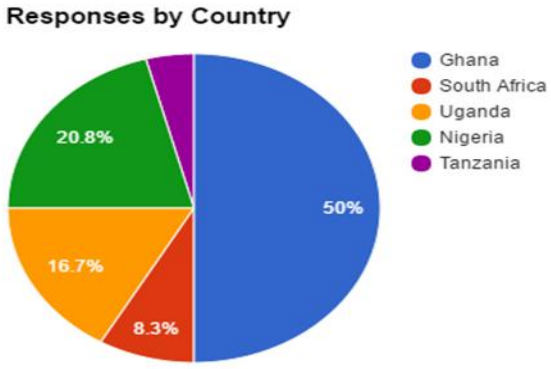
Data Analysis of responses

Carnegie CPD Participants intake and Responses by group and Country: Out of a total of 160 Carnegie CPD participants of the 5 groups 24 responded to the questionnaire postered on the CPD alumni page and through emails which represents 15% of the total 100%. Group intake and responses by country is shown in table 1 and diagram 1 whilst responses by groups is shown in diagram 2 below.

Table 1: ***Group intake and responses by country***

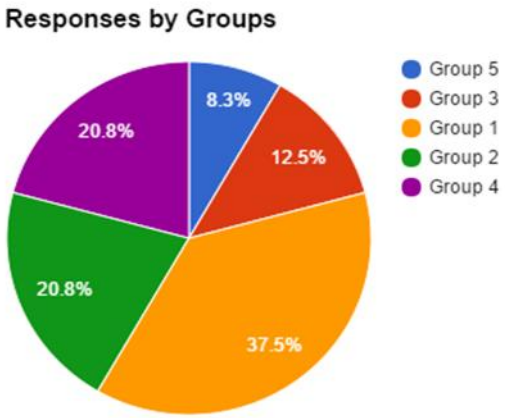
Groups	**Country**	**CPD intake by group**	**Percentage group intake**	**Survey Responses by Country**	**Survey Responses by Group**	**Percentage responses by all**
Group 1	Ghana	32	20%	12	9	5.6%
Group 2	Nigeria	32	20%	5	5	3.1%
Group 3	Uganda	32	20%	4	3	1.9%
Group 4	South Africa	32	20%	2	5	3.1%
Group 5	Tanzania	32	20%	1	2	1.3%
		160	**100%**	**24**	**24**	**15%**

Diagram 1 - **Percentage of responses by country**: the diagram below shows responses by the 5 countries; Ghana 12:50%, South Africa 2:8.3%, Uganda 4:16.7%, Nigeria 5:20.8% and Tanzania 1:4.2%.



Responses by Groups: the diagram below shows responses from the 5 groups which were group 1 - 9:37.5%, group 2 - 5:20.8%, group 3 - 3:12.5%, group 4 - 5:20.8%, and group 5 - 2:8.3%.

Diagram 2 - **Percentage of responses by group**

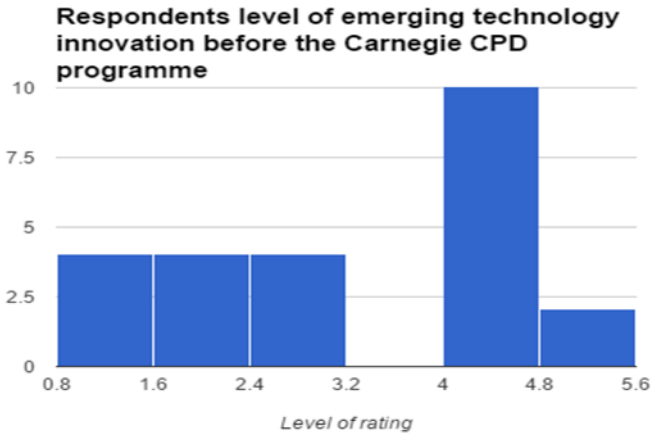


Overall Satisfaction with the Carnegie CPD programme: 96 respondents representing 83.3% indicated that they were very satisfied, 3 respondents representing 12.5% were satisfied whilst 1 respondent representing 4.3% was somehow satisfied with the programme.

Responses from participating institutions: Some universities that participated in the Carnegie CPD programme were; Entrepreneurship training institute, Kwame Nkrumah University of Science and Technology, University of Cape Coast, Makerere university, Ashesi University College, Sunyani Polytechnic, Muteesa 1 Royal University, Muni University, University of Ibadan, University of Nigeria - Nsuka, Aga Khan University, University of Education - Winneba, Federal University of Technology-Owerri, Kumasi Polytechnic, University of Ghana, University of Jos, University of South Africa, National Open University of Nigeria, The University of Dodoma, University of Education, Winneba and the University for Development Studies.

Respondents level of emerging technologies and innovations before the programme: rating from 1, highly innovative to 5, less innovative, diagram 3 below shows responses and percentages indicating that most of the participants were less innovative before the Programme.

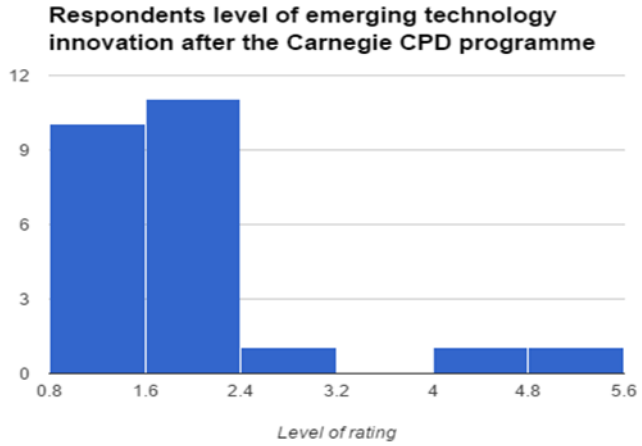
Diagram 3



Highly innovative	1 -	4 : 16.7%
	2 -	4 : 16.7%
	3 -	4 : 16.7%
	4 -	10 : 41.7%
Less innovative.	5 -	2 : 8.3%

Respondents level of emerging technologies and innovations after the programme: rating from 1, highly innovative to 5, less innovative, diagram 4 below shows responses and percentages indicating that most of the participants became highly innovative after the Programme.

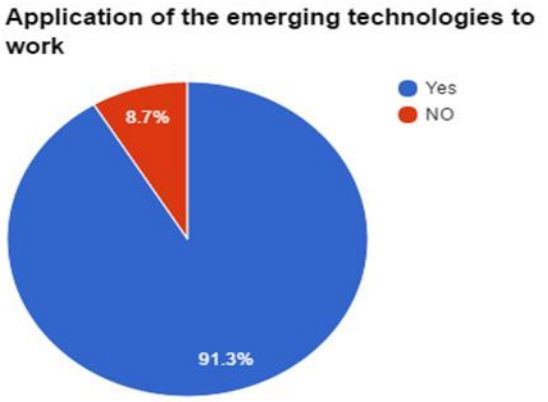
Diagram 4



Highly innovative	1 -	10 : 41.7%
	2 -	11 : 45.8%
	3 -	1 : 4.2%
	4 -	1 : 4.2%
Less innovative.	5 -	1 : 4.4%

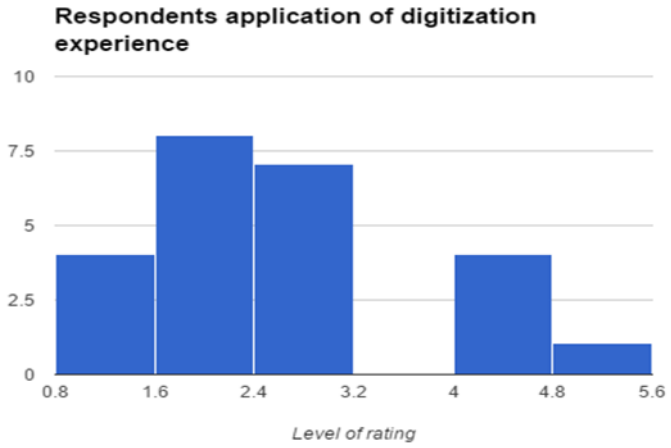
Application of the emerging technologies to work: 22 respondents representing 91.3% are applying the emerging technology innovations to work whilst 2 respondents representing 8.7% are not applying the emerging technology innovations to work indicating that a greater number of the Carnegie CPD participants are applying the emerging technologies learnt. Respondents who said no to the application of the emerging technologies gave reasons as lack of finances, unavailable technology equipment, and changes in assigned roles. This is shown in diagram 5 below.

Diagram 5



Application of the digitization experiences into participant's work: rating from 1, highly innovative to 5, less innovative, diagram 6 below shows responses and percentages indicating the rate at which participants are applying the digitization experience. Responses shows high to medium level of the digitizations experience application.

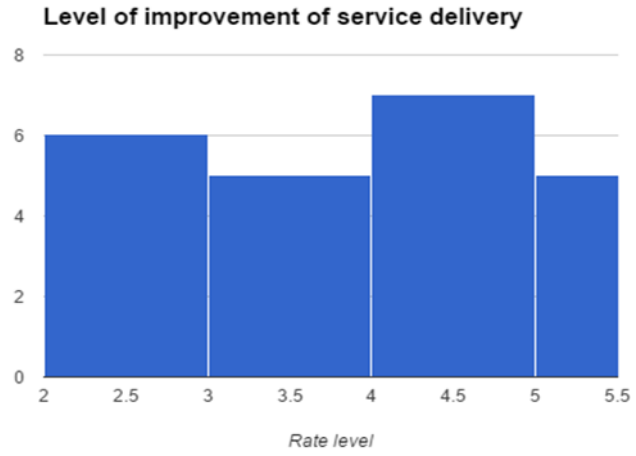
Diagram 6



High 1 - 4 : 16.7%
2 - 8 : 33.3%
3 - 7 : 29.2%
4 - 4 : 16.7%
Low 5 - 1 : 4.2%

Level of improvement of service delivery: the ratings in diagram 7 below from low to high shows the level of improvement in service delivery. Responses shows high to medium level improvement in service delivery.

Diagram 7



Low 1 - 0 : 0%
2 - 6 : 25%
3 - 5 : 20.8%
4 - 7 : 29.2%
High 5 - 6 : 25%

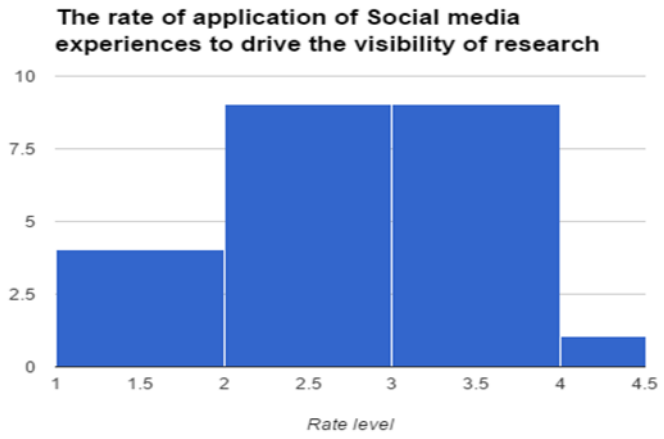
Application of mobile and web technology driven services

Mobile and web technology driven services respondents have applied to work includes:

- Web Technology Skills for user services such as social media sites, e.g. Facebook, Blogs, Twitter, LinkedIn, YouTube, Google images, Gmail, Google hangout, drop box,
- Mobile technologies and Mobile Application such as QR-Codes app, kindle app, Whatsapp,
- Virtual research and collative tools such as Academia, Wikispaces, Pressbooks, ORCID, Researchgate and Google Drive.
- Online discussions, conferences and training through Webinars and Skype.
- Reference management with Zotero and Google Citation.
- Digitization, Internet archiving and institutional repository using GIMP software,

The rate of application of Social media to drive the visibility of research: the rate of social media application into library services is shown in diagram 8 below. Responses shows high to medium application of social media into library services.

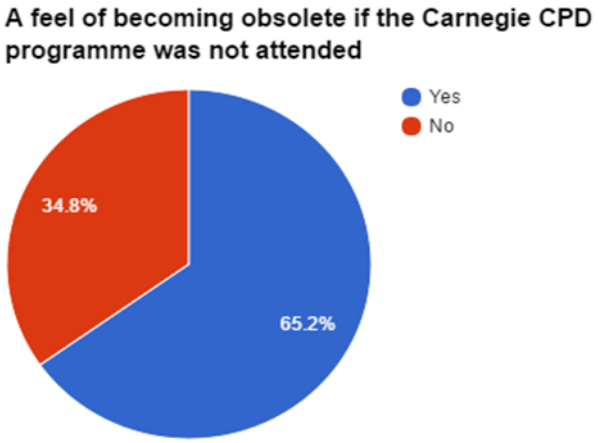
Diagram 8



High 1 - 5 : 20.8%
2 - 9 : 37.5%
3 - 9 : 37.5%
4 - 1 : 4.2%
Low 5 - 0 : 0%

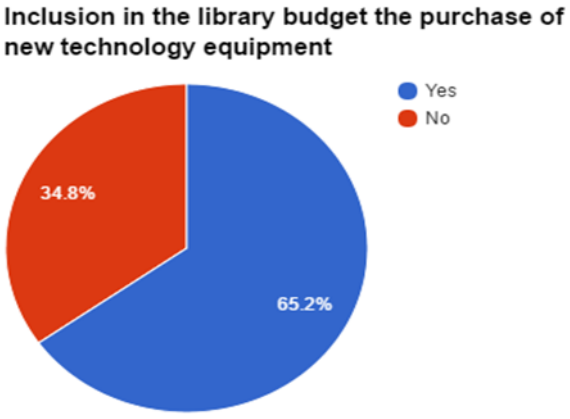
A feel of becoming obsolete if the Carnegie CPD programme was not attended: diagram 9 below shows the responses on becoming obsolete if the Carnegie CPD programme as not attended. 65.2% of the respondents felt they would have become obsolete if they have not participated in the Carnegie CPD Programme. The remaining 34.8% on the other hand felt they will not have become obsolete if they have not participated in the Carnegie CPD programme stating reasons as being familiar with some of the new technologies and skills learnt through Information and Communication Technologies (ICT) training.

Diagram 9



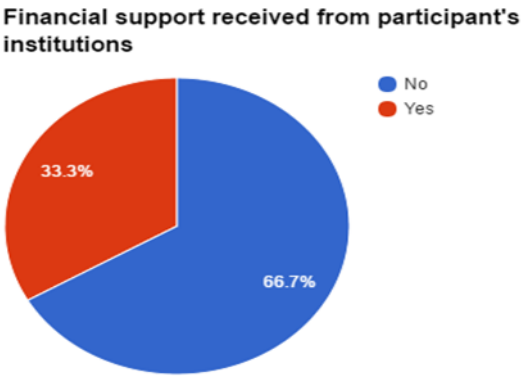
Inclusion in the library budget an amount for the purchase of new technology equipment: diagram 10 below shows responses on budget for new technology equipment for the library. 16 responses representing 65.2% of the participants indicated that there is budgetary allocation for the purchase of new library equipment whilst 8 responses representing 34.8% of the respondents stated that there is no budgetary allocation for the purchase of new library equipment.

Diagram 10



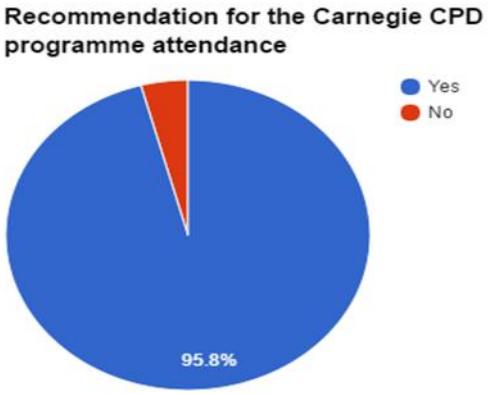
Financial support received from participant's institutions: diagram 11 below shows responses on financial support from institutions for the library staff who were selected for participation in the Carnegie CPD Programme. 66.7% of the respondents indicated that they received financial support from their institutions whilst 33.3% indicated that they did not receive financial support from their institutions.

Diagram 11



Recommendation for the Carnegie CPD programme attendance: diagram 12 below shows recommendations of the Carnegie CPD Programme by participants to their colleagues. 23 responses representing 95.8% of the respondents indicated that they will recommend the Carnegie CPD Programme to their colleagues whilst 1 response representing 4.2% indicated no.

Diagram 12



Findings

Carnegie CPD Participants work enhancement

The work of the Carnegie CPD Programme group 1 - 5 participants of 2014 and 2015 has been enhanced in the following ways seeing these as benefits of the programme.

- Visibility of the library and higher patronage.
- Work is made easier and faster and a feel of relevance at job place.
- Open minded and global thinking, a feel of being motivated to bring change.

- More users interested in the library and are more curious with what the library has to offer and an increase in the use of the library online resources.
- The Facebook page has improved the services of the library. The QR-Codes makes users to access some resources of the library. Students and faculty are using Zotero for referencing.
- It has saved the institution time and money as information is disseminated faster by using social media to reach library users outside the library premises.
- Automation of the library services has eased work. Response from library clients off the campus by use of social media. Trying to setup an IR to capture students and lectures publications.
- Easy communication with the users, one-to-many with the use of like a Facebook page and WhatsApp which are cheap to means of communication as buying airtime to make calls is now more expensive than buying data bundles.
- Wider coverage of information and feedback from clients. Swift communication of library services and products. Promotion of the image of the library and the library staff.
- Marketing the library services has made the library to become more visible.
- Work is simplified, enabling a lot of sharing with users and able to reach a bigger audience with the use of social media.
- Easy to work, increased patronage, easy access to information not found in the library, social media presence as well as educating staff on technologies and Research Data Management (RDM).
- The library work has become more interesting. Being more confident in the things I do. Through the leadership lessons I now see my fellow colleagues point of reasoning believing that everyone has something to offer.
- More innovative with application of technology to work, more efficient and effective with library services delivery. Also, gained a depth of practical and theoretical knowledge in e-research tool, as well as gained the confidence in engaging and interacting with the academic community to leverage these technologies in academic activities.
- Confident in using some of the technologies to deliver library services.
- Enhanced productivity, increased use of library products and services, awareness creation of library services to users and improvement of digital reference skills.
- The exposure has re-ignited passion for the profession and working space.
- It has enhanced work and enable the discharge of duties more effectively.
- Introducing clients to new technologies application in research and using cell phones to deliver services.

Challenges

Despite the above benefits and work enhancement of the Carnegie CPD group 1 - 5 participants there are also some challenges faced in applying the emerging technologies introduced during the Carnegie CPD Programme. These challenges are subject to the individuals and institutions. What was a challenge for one institution is not a challenge for another institution. These are:

- Financial
- Unavailable technologies

Comments /Suggestions from respondents

- Stipend should be increased.
- Replication of the Carnegie CPD Programme in other sectors for greater benefits.
- A commendation for the University of Pretoria CPD faculty and the Carnegie corporation of New York for the great opportunity to learn new technologies.
- Being introduced to new areas of study. The first of its kind outside my country.
- The content was very much loaded to be delivered within a month. The period should have been extended.
- A commendation for this research work.
- Organization of intermittent refresher programmes with a call for paper from the Carnegie CPD alumni for publication in a journal named after the programme.
- The Carnegie CPD Programme has brought meaning to the library profession and has empowered librarians giving them direction for a brighter career.
- The Programme was well structured, apt and educative taking into consideration the mode of delivery and assessment.
- More libraries in the African region are encouraged to seek for more grants to continue such training to help bridge the digital divide between the developed and developing countries.
- Overwhelmed with piled up of assignments.
- More avenues should be created for the Programme to be continued to benefit most institutions.

Plans for continuous professional development beyond the Carnegie CPD Programme

- Motivated to enroll in a master's degree in library.
- Cascading what was learnt and building up the career the affect the library positively in the next five years.
- Enrolled in the Carnegie MIT Programme at the University of Pretoria, South Africa.
- The hope to participate in more CPD programmes.
- Enrolled in a PH.D. Programme.
- Participation in webinars to remain conversant with emerging trends.
- Training colleagues and upcoming LIS professionals.
- The desire to organize a CPD Programme in one's country for LIS colleagues.
- Intended to keep up to date with emerging technologies to avoid becoming obsolete.
- Organizing periodic workshops to share experiences.
- Motivated to start publishing research articles.

Conclusion

Holistically, librarians have embraced ICTs, the infrastructure situation is slowly improving, knowledge of ICTs is very often only at the level of basic ICT literacy with vast differences between different countries and different LIS schools and a huge need for training librarians and faculty. General issues about technology are ethical and intellectual property issues. The internet is one thing but high broadband and bandwidth are needed for better flow of communication internationally. Sufficient bandwidth are needed for online conferences coupled with other possible challenges

such as finance, time for training, cost of training, acquisition of new technology equipment, regularly upgrade of software to mention but a few.

Recommendations

The following were recommended for consideration:

- There should be Continuous Professional Development Programmes in the form of trainings, workshops and conferences organized for the LIS professionals.
- Heads of libraries and institution should budget for trainings and workshops for the library staff.
- Library staff to avail themselves for training programmes in any form, e.g. online, physical; in-service and out-of-service.
- Library and Information professionals should adapt to change to avoid sacrosanct ways of service delivery.
- In addition, professional librarians should begin to explore and aspire to participate in more CPD programmes to help them become more innovative in service delivery and to avoid becoming obsolete.
- Heads of Libraries and institutions should include in the yearly budget, new technology equipment for use by the libraries.
- Heads of libraries and academic registrars should recommend and approve CPD training programmes for the library staff.
- Financial support should be given by institutions for CPD programmes for librarians.
- Last but not the least, the Carnegie CPD programme was very intensive therefore for any future CPD programmes that is very intensive as the Carnegie CPD programme, participants should be given certificates that will highly be recognised by a university.

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