Date : 23/05/2008

DOCUMENT DELIVERY SERVICES ENHANCE ACCESS TO INFORMATION RESOURCES IN REMOTE UGANDA

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Meeting: **74. Document Delivery and Interlending**
Simultaneous Interpretation: Not available

WORLD LIBRARY AND INFORMATION CONGRESS: 74TH IFLA GENERAL CONFERENCE AND COUNCIL
10-14 August 2008, Québec, Canada
http://www.ifla.org/iv/ifla74/index.htm

ABSTRACT

Improved document delivery service has played an important role in resource sharing, which has led to increased access and usage of information resources in Uganda. In the past, Makerere University Library (Mulib) users were discouraged by lack of full text articles. Mulib then changed a strategy and put Document Delivery Service (DDS) as an integral part of the electronic resources budget and information literacy activity plan. A DDS form was designed and put on the Mulib website for users who have Internet access; while print copies are distributed to eligible users and institutions/librarians. For the medical/health professionals, an additional print copy is included in the periodical Health Information Digest, which is distributed to rural health units/institutions. This paper presents two types of DDS. The first type is from international sources through collaborations/partnerships with Makerere University to benefit Makerere University community; while the second type is within Uganda - from Makerere University to benefit rural institutions and practitioners/extension workers. Depending on the situation, documents are repackaged from electronic into print format and delivered to rural areas by either post or fax. Where ICT facilities permit, electronic documents are delivered by e-mail and/ or in the case of health workers, by using personal digital assistants (PDAs) in a project supported by Makerere University Faculty of Medicine, Uganda Chartered Healthnet and Satellife. Mulib also conducts rural outreach sessions in mainly Universities, health units and paramedical training schools to introduce these units to global information resources and how they can be tapped. The paper outlines these activities and highlights the contribution of DDS as a practical strategy that has enhanced access to information resources by academics, researchers and practitioners.

1. INTRODUCTION

Uganda is situated at the Equator in the Eastern part of Africa. It is a landlocked country; the nearest port, Mombasa, being over one thousand miles away in neighbouring Kenya. This contributes to the high cost of reading materials and bandwidth; hence making document delivery a key option.

Makerere University was established in Uganda in 1922, making it one of the oldest public Universities in Africa. In 1958, an Act of Uganda's Parliament made Makerere University Library one of Uganda's legal deposit units. In 1972, Makerere University Library became the National Reference Library in addition to its primary role of serving the highest academic institution in the region.

Makerere University Library (Mulib) comprises of the Main Library and eight branch libraries. Two of the branch libraries are located off campus, and they are: Albert Cook Medical Library serving the College of Medicine, and Makerere University Agricultural Research Institute Library serving the Agricultural farm and institute; while the rest are located at the Main Makerere University campus, and they are: Education, Makerere Institute of Social Research, Institute of Adult and Continuing Education, Veterinary Medicine, Social Sciences, and the East African School of Library and Information Science branch libraries.

Mulib has continued to play a leading role in Uganda, and in 2001 when Ugandan institutions started subscribing to electronic journals, Mulib became Uganda's National coordinator for electronic resources (e-resources). Among other things, Mulib has the responsibility of mobilising other academic and research institutions in sustaining the subscription of e-resources, and it monitors and evaluates the usage of e-resources at country level. Furthermore, Mulib conducts information literacy and practical training sessions for librarians, academics and researchers in the use of global and local information resources.

One of the issues highlighted in the evaluation of e-resources usage was that users were discouraged by lack of full-text articles. Mulib then changed the strategy by putting Document Delivery Service (DDS) as part of the electronic resources activity plan and budget. The e-resources are paid for jointly to benefit Universities and research institutions in Uganda (country access). The DDS was then advertised, a form was put on Mulib website, DDS became an integral part of the information literacy sessions, and a librarian and one assistant were assigned the duty of DDS.

Furthermore, the Albert Cook Medical Librarians conducted rural outreach information literacy sessions in six districts and 564 rural health workers were trained on how the global knowledge base can be accessed, as well as sharing the resources available at the Medical library. Document delivery (DD) request forms were distributed during the training sessions. In addition, a DD form is included in the periodical Digest that is distributed to health units in Uganda. As a result, DD requests started being made by rural health workers who had never made such requests before (Musoke, 2006).

To address the Information and Communication Technology (ICT) infrastructural challenges in rural Uganda, Makerere University Faculty of Medicine, Uganda Chartered Healthnet (UCH) and Satellife (of USA) started a Uganda Health Information Network (UHIN) pilot

project in September 2003. The project aims to improve health workers' access to accurate and timely information for informed clinical and managerial decision making leading to improved quality of health service delivery, among other things. The project has successfully built a wireless network using handheld computers/Personal Digital Assistants (PDAs), wireless access points, and the GSM/GPRS telecommunications network for two-way communication and data exchange in Rakai, Lyantonde, Mbale, Bududa and Manfwa pilot districts. The pilot project has proved the viability and cost-effectiveness of integrating PDAs, wireless access points (initially, WideRay Jacks, but now Africa Access Point from South Africa) and cellular telephone into a network capable of supporting information delivery in low-resource environments. Building on the initial accomplishments, UHIN expanded to encompass 150 health workers from health units in the pilot districts by March 2006.

This paper focuses on mainly two types of DD, namely, across borders from international sources to Makerere University on the one hand; and from Makerere University resources to other academic, research and health institutions in Uganda, on the other hand. The documents are delivered in either print or electronic formats depending on the ICT infrastructure and/or the choice made by the requesting institution/individual. Makerere University is also involved in commercial DD services, e.g. from The British Library (print) and Subito (electronic) where it pays annually for the service. The commercial DDS, however, will not be discussed in this paper. The paper focuses on the non-commercial DD activities to highlight how a University, which traditionally served its students and staff, has transcended its boundaries by extending service to other academic, research and health institutions in Uganda.

Given the ever-increasing volume and cost of published works, and yet Uganda is faced with limited ICT infrastructure compounded by the high cost of bandwidth, resource sharing and particularly DDS is more needed now than ever before.

2. DOCUMENT DELIVERY AND RESOURCE SHARING REMAIN ON THE AGENDA

To some Ugandan scholars and practitioners, information is available but not accessible; while to others, information is neither available nor accessible. Hence, although there is need to produce more information relevant to African scholars and practitioners, the first challenge is to ensure that the already available information can be accessed. Resource sharing by document delivery goes a long way to provide a solution to this problem.

In the recent past, there has been a global rapid growth of published works and improved methods of information processing and retrieval resulting from developments in technology. These advances have resulted in faster and better methods of accessing information in the developed world. However, in the developing countries, frustration resulting from limited information access continues as the cost of technological infrastructure and bandwidth remain prohibitive. Hence, resource sharing is one of the best available options.

It is therefore not surprising that networking and resource sharing have remained on the librarians' international 'agenda' for a long time. In the 1970s, these topics were course units in most Library and Information Science (LIS) programmes. Library cooperation to foster

resource sharing is a concept that has been frequently cited in LIS literature (Kaul, 1999; Kaul, 2001). Furthermore, the benefits of collaboration, consortia, networks and peer support have been emphasized in LIS literature for a long time. Most of the success stories reported by African Librarians (Wanyama, 2002; Demilew (2001), Gelaw (1998) Musoke (2007)) revolve around collaboration and networking within institutions to lobby policy makers, within the country to form consortia and share the subscription of e-resources, implement document delivery service and other resource sharing measures, build capacity and get professional support. The actual and potential of networking, cooperation and resource sharing in modifying the functions of acquiring, storing and disseminating information and knowledge to support teaching, learning, research and professional practice, therefore, need to be reported, discussed and best practices shared.

3. DOCUMENT DELIVERY SERVICES (DDS) AT DIFFERENT LEVELS AND IN DIFFERENT FORMATS

A dedicated DDS has played an important role in increasing access to information resources both at Makerere University and other institutions and professionals in Uganda who make requests for documents from Makerere University Library (Mulib). When users get access to journal abstracts, they request for DDS of full text journal articles. Full text journal articles, therefore, form part of the bulk of document requests handled by Mulib. As more full text online journals are accessed by Mulib, document delivery requests from abroad have tended to reduce.

The cost of bandwidth has remained too high for many Ugandan institutions to afford. This means that such institutions are not able to access online resources. The African Virtual Universities Consortium is one of the strategies that may assist African Universities to buy relatively cheaper bandwidth in future. Currently, Ugandan institutions benefit from sharing the meagre resources among themselves and from collaborations with international institutions.

Given the fact that Mulib is one the oldest library in the region, as well as being a national legal deposit unit, it has a rich collection of local materials and research works (published and unpublished works available in different forms: theses and dissertations, research articles, Government and Non-Government reports, conference and workshop reports/ proceedings, periodicals, newspapers, the first books and other publications, photographs and other archival materials). These materials are relevant sources of information for research, teaching, etc and have attracted the majority of international requests for DDS. At national level, the local materials and full text journal articles have the highest demand for DDS. The local materials are either photocopied and sent by post, fax or they are scanned and sent as e-mail attachments.

3.1 Documents from international sources through cross-border collaboration or partnerships with Mulib

Currently, Mulib handles both the Electronic Document Delivery Services (EDDS) and the non electronic DDS from four major institutions after thorough checking of the subscribed databases and finding out that the required articles/documents are not available. Two of the sources serve the Medical school library users. The EDDS sources are: University of

Tennessee (USA), University of Bergen (Norway), Case Western Reserve University (USA) and Kent-Surrey-Sussex (UK) (the last two are exclusively for medical library users).

The non-commercial DDS is provided through partnerships with other Universities. That type of DDS is important as it strengthens the collaboration between the University libraries and it is one of the strategies for sustaining DDS (Musoke & Kinengyere, 2008). Examples of non commercial cross-border EDDS are:

i. Makerere University Library and the University of Tennessee Library: In a Memorandum of Cooperation set up by Mulib and the University of Tennessee Library (UTL), Knoxville, USA in May 2002 and renewed in March 2007, it was agreed to develop and support Mulib's EDDS. The services between UTL and Mulib are governed by the IFLA International Lending and Document Delivery: Principles and Guidelines for Procedures (http://www.ifla.org/VI/2/p3/ildd.htm) and mutually agreed upon revision to the IFLA guidelines. The service was launched in September 2002. A separate e-mail account was established for the service (eddsutmul@mulib.mak.ac.ug). However, due to e-mail quota limitations, a yahoo e-mail was opened (makerereedds@yahoo.com) after which Mulib staff used web tools, UTL's Catalogue, and the system created to place and track orders (http://jethro.lib.utk.edu/makerere.html). In June 2003, the library stopped using Prospero software for picking documents from UTL and started getting articles as email attachments via the UTL's Ariel email feature, which was a faster method. The use of e-mail indicated the modernisation of DDS. Between September 2002 and September 2005, four hundred and fourteen (414) articles had been requested for and received. There was a remarkable increase in 2006, when 222 articles were requested for and received compared to only 79 articles received in 2005. In 2007, there were 189 article requests made by Makerere.

ii. Makerere University Library and the University of Bergen: In October 2001, Mulib and the University of Bergen Library (UoBL) signed a memorandum of understanding in which both libraries identified areas of collaboration. One of the objectives of the collaboration was to facilitate Inter Library Lending (ILL) between UoBL Science library and Mulib following a framework of International guidelines of ILL. This facilitated access to the UoBL through the online database "BIBSYS". Mulib then got registered as an official user of UoBL and was given an account to freely access the library holdings through BIBSYS. Since January 2002, there have been information literacy sessions focusing on e-resources, and Mulib users get introduced to the BIBYS database. This has been specifically for academic staff in the science-based departments. On average, forty requests for DDS are received from one science department in a year. The documents are delivered from the UoBL by fax. On the other hand, Mulib receives, on average, five requests for Mulib local collection materials, which are scanned and sent as e-mail attachments to UoB. The collaboration with UoBL expanded in 2005 to include a digitization project for Mulib local materials to increase their access.

iii. Makerere University Albert Cook Medical Library and Case Western Reserve University (USA), and Kent, Surrey and Sussex (KSS) Health Authority (UK): Albert Cook Medical library serves over one thousand medical students and academic staff. It also extends a service to health workers in Uganda.

At the Medical library, the majority of the DDS requests are from graduate students and academic staff. The requests range from 800 – 1500 annually. The Medical Library gets most of the documents from Case Western Reserve University (CWRU) Library initially supported by the Fogarty Foundation. The electronic DDS started in 1994 when the requests were sent by e-mail to CWRU Library and the articles faxed to Albert Cook Medical library. When faxing became too expensive, the documents were sent to Uganda by post, which was taking between 10-20 days. This was too long, and a solution to the 'snail' postage method had to be found. From October 2004 to-date, a modification to the slow method was to receive the articles by e-mail. However, this also became problematic due to the fact that e-mail accounts have limited space/quota. A database was then designed by CWRU Library located at http:129.22.120.23/Illiad/illiad.dll with username and password, and this is a fast method as the library can get the articles within a day or two only.

KSS Document supply service is limited in the number of documents because most times, the needed documents are not found on the Union list of Serials (showing the holdings in the KSS Library Network). Otherwise, the service has a dedicated fax machine and the KSS partners meet the cost of faxing articles. The medical library sends the requests by e-mail.

The above shows a range of document delivery possibilities created by collaborative arrangements with Universities in the developed world. These arrangements are critical to resource sharing and need to be supported.

3.2 Document Delivery as an outreach service within Uganda

Academic institutions such as Universities have been criticized and referred to as 'Ivory towers', which concentrate on knowledge creation through research and capacity building through training, with hardly any support to the immediate community needs or the wider society. To address this concern, Makerere University extended its mission to include outreach. Although the University Library would ordinarily serve its primary users – the university students and staff- Makerere University Library has been involved in document delivery as an outreach service aimed at sharing resources to enhance access to information by other Universities, Research institutions and Health units in Uganda.

Mulib has conducted training in the twelve registered public and private Universities, as well as the major research institutions such as Virus Research institute and National Fisheries Research Institute. Mulib supplies print and electronic documents to other Universities. An example of print documents supplied in the past three years indicates generally that the number is decreasing as Table 1 shows. The decrease in the number of document requests is due to the increased full text journal articles accessible to the Universities and the slowly improving ICT infrastructure in the Universities. The number of articles/documents, however, is rather misleading because once supplied, the lecturers reproduce/photocopy documents for their students. This means that although one article may be supplied from Makerere to a University, hundreds of students get copies of this article. The student population in all the registered universities has been growing steadily over the years.

Table 1: Print documents supplied to some Ugandan Universities by Mulib in the last 3 years

Institution	**Documents supplied per year** 2005	2006	2007
Gulu Univ (North) - public	26	15	11
Mbarara Univ of Sc & Technology (West) - public	29	20	15
Uganda Christian Univ Mukono (Central) - private	21	11	10
Uganda Martyrs Univ (Central) - private	17	16	12
Total	**93**	**62**	**48**

Furthermore, as pointed out in the introduction, the medical librarians conducted rural outreach training sessions in six districts and continues to distribute a periodical information Digest with a DD request form. This has stimulated interest in DDS that has enhanced access to information resources. The table below gives an example of the documents supplied, the mode of supply, etc. The abstracts are sent to those who request for literature searches on specific topics. They then request for selected full text articles from the abstracts.

Table 2: Document requests to and deliveries from Albert Cook Medical library by upcountry health workers either after the rural outreach or using the Information Digest form (2004- 2007)

YEAR	TYPE OF LITERATURE	NO. OF DOCs.	MODE OF REQUEST	MODE OF DELIVERY	SOURCE OF INFO. FOR DOC. REQUEST	RECIPIENT
2004	Abstracts	10	E-mail	E-mail	Ug. Health Info. Digest form	Kabale Hospital
-do-	Full Articles	4	Telephone	Post (EMS)	Forms given during outreach	Jinja Hospital
-do-	Abstracts	15	Posted form	Post (EMS)	Ug. Health Info. Digest form	Buluba Hospital Nursing Students
-do-	Full Articles	5	Posted form	Post (EMS)	Forms given during outreach	Buluba Hospital Nursing Students
-do-	Full Articles	6	Posted form	Post	Ug. Health Info. Digest form	Diocesan Health Coordinator Jinja
2005	Abstracts	98	Telephone	Post (EMS)	Ug. Health Info. Digest form	Bugiri Hospital Doctors
-do-	Full Articles	31	Telephone	Picked by requester	Ug. Health Info. Digest form	Bugiri Hospital Doctors
-do-	Full Articles	6	Telephone	Post	Ug. Health Info. Digest form	Bugiri Hospital Doctors
-do-	Full Articles	2	Form brought by hand	Picked by requester	Knew of the service during Postgraduate course	St. Luke's Dispensary (Arua)
-do-	Full Articles	5	Telephone	Post	Ug. Health Info. Digest form	Lira Hospital (Dr.)
-do-		60	E-mail	Picked by requester	Ug. Health Info. Digest form	Lecturers, Mbarara Univ of Science and Technology

2006	Abstracts Full Articles	45 65 40 52	Telephone E-mail Telephone E-mail	- Post - Picked by requester -do- -do-	Ug. Health Info. Digest form Ug. Health Info. Digest form	Bugiri Hospital Doctors Bugiri Hospital Doctors
2007 (Jan-Oct)	Full articles	12	Telephone Posted form	Picked by colleague	Former student Ug Health info Digest form	Kabale hospital pharmacist; Gulu Ug Peoples Defense Forces Doctors

3.3 Other DD Services

Related to the above, are the Uganda Health Information Network (UHIN) electronic DDS using PDAs and implemented by the Makerere University Faculty of Medicine, Uganda Chartered Healthnet (UCH) and Satellife as pointed out in the introduction (section 1); and the DDS to students with visual impairment.

3.3.1 Electronic DDS using PDAs

One of the specific objectives of UHIN project is to support health workers in pilot districts to improve the quality of healthcare by providing them with relevant health information on prevention, diagnosis, treatment and general patient care related to major health problems of the districts. The project has continually delivered relevant and timely Continuing Professional Development (CPD) materials on topical issues selected by the district health service team in consultation with the Ministry of Health (MOH). The project has so far provided the following:

a) 150 PDAs complete with recharging cables and expansion cards distributed to 150 health workers in Rakai, Mbale, Manafwa, Lyantonde and Bududa districts.
b) 70 solar chargers distributed to PDA users without access to Uganda electricity power supply.
c) Training of 150 health workers in the use of PDAs for data collection and transmission, and accessing content delivered through the network.
d) Training of 5 technical personnel from pilot districts (one from each district core team) to train new PDA users, troubleshoot the network, and use data tools such as MS Access.

The local content has been handled by the Uganda Chartered Healthnet staff, while the international content is handled by Satellife. Local sources of content include African medical/health journals and credible sources recognised by the Uganda Ministry of Health. In addition, local newspapers/print media was delivered on a daily basis. International content, on the other hand, has been selected from peer-reviewed medical journals with a greater focus on Africa-related or Uganda-specific content. The table below shows an example of regular content delivery.

Table 3: Example of regular delivery of documents from June 2006 to May 2007

Date	**Documents delivered**
June – July, 2006	Updated content on diarrhea, pneumonia, and malaria.
August, 2006	New content on dental health, eye health, and female genital mutilation.
September 2006	New content on River blindness, epilepsy, fetal alcohol syndrome, and hydrocephaly.
October, 2006	New content on burn care, diabetes, HIV/AIDS, and parasitic infections.
November 2006	New content on parasitic infections, and HIV/AIDS.
December 2006	New content on HIV/AIDS, and malaria.
January 2007	Repeat content on diarrhea, pneumonia and malaria
February 2007	New content on skin diseases, HIV/AIDS; repeat content on pneumonia, diarrhea and malaria.
March 2007	New content on diarrhea, pneumonia and malaria.
April 2007	Repeat content on diarrhea, pneumonia and diarrhea, HIV/AIDS, skin diseases, and reproductive health.
May 2007	Recap all the diseases and provide updated content.

The above table shows, among other things, that emphasis was put on diarrhea, pneumonia and malaria because these topics were identified by health workers as major health problems at that time, making it necessary to provide more information for better management of the diseases. Content was delivered on Mondays, Wednesdays and Fridays respectively, and this was supplemented by daily deliveries of news from local print media (some health workers can not afford to buy daily newspapers and yet they contain important health information). Updated content includes important information not provided in the previous deliveries and new developments e.g. the DDT public hearing which health workers needed to know. Some PDA users also reported content loss (loss of 'libraries' created on the PDAs). The repeat deliveries were made to replace the lost content.

In summary, the process of document delivery involves the following: electronic content/documents are selected from global and local sources by Uganda Chartered Healthnet and Satellife. The content is then repackaged in either PDF or html format and uploaded onto a server at Makerere University Faculty of Medicine. The documents are then delivered onto a portable Wireless Access Point (initially Jacks, but now African Access Point) located/deployed in district hospitals and health sub-districts (health centre VI). Health workers with PDAs then go to the Access Point and download the content onto their PDAs, use the content, share it and may repackage it further and share it with colleagues or health workers in lower units.

Collaborative networks for facilitating experience sharing and problem solving in relation to the use of PDAs have been established in pilot districts. In Rakai district (Southern Uganda), for example, there were two PDA user clubs at the time or writing this paper —one in Kalisozo hospital, and the other at Rakai hospital. Each club has over 20 members from nearby health centres. Members of the PDA user group meet twice a week to discuss content received in that week, and see how best to apply it for their daily practices, and

reformatting/repackaging the content in a way suitable to lower level health workers with whom the content is further delivered and shared.

A PDA content user survey findings of March 2007 indicated, among other things, that most health workers acknowledged the commendable improvement in access to current literature/content. The literature/content received had updated their knowledge and consequently improved their day-to-day management of patients. Seventy-two (72%) of the health workers reported that the delivery of content three time a week (Monday, Wednesday and Friday) with daily deliveries of local newspapers was adequate and should continue. However, health workers reported that more local articles should be delivered. Furthermore, the survey pointed out that content deliveries were affected by inconsistent electricity supply to power the Wireless access points. There is, therefore, need to find a long lasting solution to the powering of Access points.

3.3.2 DDS to the visually impaired University students

Through affirmative action, Ugandan public Universities admit students with disabilities forming about 1% of the students' population. One of the challenges has been to extend DDS to this category of Library users. Mulib recently acquired equipment (embosser) to enhance its DDS to this category of users.

4. CONCLUSION

The paper has highlighted the various DD activities undertaken by Makerere University Library and a successful electronic DDS using PDAs by health workers in rural Uganda. A range of document delivery possibilities created by collaborative arrangements with Universities in the developed world has also been presented. Although the Universities in developing countries have less to exchange, it is hoped that other University librarians in the developed world who read this paper would be inspired to take on similar arrangements with universities in developing countries in the spirit of 'Libraries without borders'.

Indeed DDS remains an important strategy to enhance access and use of information resources. In Uganda, DDS has steadily been growing. As scholars, researchers and practitioners get access to more full text online journals, the demand for full text journal documents may gradually reduce in institutions with a reliable Internet access. However, given the current high cost of bandwidth and other ICT infrastructural challenges in Uganda, many academic and research institutions may not easily access online resources. Document supply services will, therefore, remain a key strategy in ensuring access to information resources. Hence, cooperation and resource sharing are likely to remain on the global LIS agenda for sometime. In Uganda, the DDS will continue to be advertised to maximize its benefits.

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