

Developing the National Research Index for Information Sharing Model

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Abstract

At the last UbuntuNet–Council of Members meeting (Kigali, 21-23rd April 2010) it was recognised that UbuntuNet alliance has progressed faster in achieving R&E objectives compared to the majority of member NRENs. Notable achievements include gateway access to global R&E networks like GEANT and DANTE, IP addressing of NRENS and the realization of increasingly affordable bandwidth with typical prices at USD 500 per Mbps, among member institutions.

The challenge is how to accelerate progress to a level where NRENs are able to utilize the available regional resources that are now largely redundant and under utilized.

A high impact opportunity to effectively utilise the regional infrastructure is readily available with library consortiums that exist in most NREN countries to share the vast research information (in both electronic and physical form).

This paper proposes a development approach for an NREN information index **that is user centred** for information sharing, integrated with key tenets of a functioning/viable NREN and replicable in varying institutional e-readiness contexts. *The simple definition for an Index in this context is a system used to make finding information easier.* The NREN index will be scaled up into a regional research index that can act as a gateway to access this rich information across borders by providing searchable metadata that can enable researchers to identify information relevant to their needs.

An approach is commonly understood to be a coherent set of activities, guidelines and techniques that can structure, guide and improve a process.

If successfully deployed, NREN information index, can fast track information sharing and trigger content development at the NREN level as well as nurture the development of new research interest /groups at the regional level

Keywords:

Index, Research, Information Sharing, Innovation, Approach

1. Introduction

At the last UbuntuNet–Council of Members meeting (Kigali, 21-23rd April 2010) it was recognised that UbuntuNet Alliance as the regional network has progressed faster to achieve objectives, compared to the majority of member NRENs. Notable infrastructure achievements include gateway access to global R&E networks like GEANT and DANTE, IP addressing of NRENs and the realization of increasingly affordable bandwidth with typical prices at USD 500 per Mbps, among member institutions.

The challenge is how to accelerate NREN progress levels to be able to utilize the available regional resources that are now largely redundant and under utilized.

The acceleration should target a high impact, quick win using readily available resources.

It should be noted that rolling out the regional infrastructure assumes a functioning NREN infrastructure, supporting institutional ICT policies, skilled technical people at the NRENs and awareness amongst potential content providers and users of the availability and potential of increased connectivity.

The acceleration should target a high impact, quick win in R&E using readily available resources.

2. Objective

In this paper, we propose a development approach to create a national/regional research index for information sharing model integrated with key tenets of a functioning and viable NREN and, replicable in varying institutional e-readiness contexts. It was anticipated that the Research and Education network of Uganda (RENU) would develop and pilot this model supported by the proposed development approach in four universities. The key output would be a nascent aggregated NREN research information sharing index that would emerge from an iterative process of user testing and refinement and derive lessons and challenges for further improvement

An approach is commonly understood to be a coherent set of activities, guidelines and techniques that can structure, guide and improve a process.

A simple definition for an Index is a system used to make finding information easier. *Index* may also refer to: Bibliographic *index*, a regularly updated print periodical publication.

2.1 Development Approach

The development approach for the NREN information index, is user centred focusing on the researcher's needs with technology to support access to improve researchers ease and accuracy of information requests.

This development approach for the Information sharing Index was developed in consultation with

Library staff in charge of e- resources, archiving at Makerere university library and the information systems and Network management professionals at the Directorate for ICT support (DICTS). The approach draws from Library information management and systems development principals and best practices

Development of the NREN/regional research index resource will:

- Automate the collection of metadata from various academic and research resources identified by NRENS.
- Develop, host and maintain a national/regional repository index for this metadata
- Devise innovative tools/mechanisms that allow researchers/users to interact with this metadata to identify information pertinent to their needs
- Provide support for groups and their collaborations around this metadata to promote interest/research groups within the region

2.2 Outputs

Following this development approach the expected out puts are:

- Documented institutional research profile that updated
- A nascent aggregation of Institutional research metadata
- Policies, Process and procedural guidelines on information access including copyright obligations for individual, group publishing
- Index with links, pointers and contacts that identifies sources for full access of aggregated key institutional research repositories, scaled up to NREN
- Monitoring and evaluation instruments on usage of the Index including availability, ease of access and accuracy of searches to research information

2.3 Outcomes

As such the following are the expected outcomes:

- Wider access to, improved ease and accuracy of access to local institutional research repositories
- Accurate definition and documentation of dynamic local research needs
- Adding value to ordinary biblical indexes
- Inbuilt motoring and evaluation mechanism of research trends
- Quality assurance mechanisms

3. The Rationale - Key message

UbuntuNet NRENS have vast research information/resources (in both electronic and physical form), which are not well known even within respective national borders. The goal is not to strive to collect all this information in one place, a task that would never end given the continuous process of knowledge creation.

We propose to develop a national/regional research index supported by a replicable approach. The national/ regional index can act as a gateway to access this rich information across borders by providing searchable metadata that can enable researchers to identify information relevant to their needs. Researchers can then leverage the additional contact information provided to get in touch with people, institutions or other entities so as to access the actual information.

If successfully deployed, such a central resource can fast track information sharing and trigger content development at the NREN level as well as nurture the development of new research interest /groups at the national and regional level.

4. Information Sharing and Content Creation

The national/ regional research index model will avail a collection of research metadata (Title, Name, institution, abstract) in one e-location leading to easy access to institutional

information repositories of usefully packaged information through pointers (like urls, abstracts, research contacts). Priority of collection and access will be given to highly ranked research interest. The effectiveness of the Index is highly dependant on the lessons and challenges at the institutional level and thereafter can be scaled up to NREN and REN levels. The model addresses the following questions:

- What are the key research interest requirements of NREN researchers?
- What research information/data is available to serve this interest?
- Where are the information repositories located and who is in charge?
- What are the information access and availability challenges encountered by researchers?
- What are the challenges faced by libraries in archiving and storage of high demand/essential collections?
- What information/data format and tools would facilitate and sustain collection, easy access and availability at institutional, NREN and regional levels?

5. Opportunity and Justification

The library is the core of any academic and research institution with a long networking experience within associations and with Patrons. It is a high impact place to start in terms of quick wins for information sharing by an already available critical mass of researchers and potential content developers. Library resource sharing remains high on the agenda and justifies the development of a central Index for increased sharing, and ease of access to scarce research information and local institutional repositories with internally generated publications.

5.1 Why library resource sharing remains on the global LIS Agenda

Library resource sharing is a priority due to:

- the ever growing cost of literature without corresponding raise in the institutional budgets
- Information explosion coupled with growing demands from users.

The poor ICT infrastructure in most Sub-Saharan Africa academic and research institutions still remains an obstacle but trends indicate falling rates of bandwidth costs to around \$500 per Megabyte.

As evidenced by Makerere University Library (Maklib) research information sharing is essential, already exists and has the potential to grow if facilitated by electronic means. Maklib has build capacity among its professional staff, who share the knowledge and skills by training library Consortium members staff. Maklib staff expertise is also exported to other libraries outside Makerere/Uganda – Southern Sudan – 3 universities, Nigeria – 6 universities using VTLib sys, Sokoine University, National University of Rwanda, etc.

The information sharing index will leverage library consortium sharing potential and improved bandwidth connectivity to increase sharing of NREN member library resources and especially local institutional repositories.

5.2 Current Research Challenges and Potential for Sharing Research Information

5.2.1 Information Sharing Experience - Makerere University library

Library users who fail to access full-text articles online can request for the specific article(s) through the Document Delivery Service (DDS) in the Library Documents supplied from Maklib in '05-'07 to the 4 major universities showing a decline in the numbers due to the *slowly improving ICT infrastructure and the increase in full-text journal articles.*(see Table 1)

Institution	2005	2006	2007
Gulu -	26	15	11
Mbarara	29	20	15
Mukono	21	11	10
Nkozi	17	16	12
Total	93	62	48

Table 1 Institutional Document Delivery

However, although the individual requests are decreasing, note that lecturers reproduce articles further for their growing student numbers. (*Maria Musoke, University librarian Maklib*).

5.2.2 Available e-Resources for Research & Education Networking at Makerere University library

- Online Journals –over 20,000 full text journal titles now - country access to all Perii members
- DATAD –A database of African theses and dissertations from selected African Universities
- AIM – African Index Medicus (Uganda Health Literature database).
- Electronic Books - Maklib subscribes to 271 online books in science and gender. However, there are a number of free online bks in other subjects.
- ELIN System – providing a single interface for searching multiple journal databases.
- USDL – is Makerere University’s institutional repository launched in 2006 to digitise research output.
- PERii (AJOL, Ebscohost, etc)
- AGORA/HINARI, AORE = Research4Life
- ELIN, e-books, MakULA, DDS, USDL – for Mak Univ

The library sharing of e- resources are divided into 3 categories:

- Internet based external resources
- Institutional repositories
- Local resources

The sharing experience has focused on the fist category with ELIN and Peri which present a already made opportunity for improved information sharing.

- PERii = “Programme for the Enhancement of Research Information – now in 2nd phase.
 - It aims at supporting capacity building in the research sector in developing countries through strengthening the production, access, & dissemination of info resources.

- Uganda, Tanzania, Ethiopia (and other African countries listed on the INASP site: <http://www.inasp.info/peri/countries.html>) have been receiving some of the electronic resources since 2000/1.

b) ELIN (Electronic Library Information Navigator)

This is a service developed in 2001 by Lund University Libraries, Head Office in Sweden. It has been availed to and used by the Makerere University library through the Swedish International Development Agency (SIDA). ELIN is hosted locally and accessible via the Makerere network. It provides access to all electronic resources licensed/recommended by the library through one single interface which is designed to be simple and self-instructive. The system makes it possible to search among different types of resources like articles, journals, databases and ebooks.

The system is open and transparent, based on non-proprietary software, and adapted to demands from both patrons and librarians.

- Currently the system is only available at Makerere University but could be expanded to the 4 Public Universities. Each institution could access it either from their network or Makerere would grant access through proxy server but the issue of bandwidth should be taken into consideration in all the institutions.
- Currently the metadata for a few databases was added into the system but to access all the journal databases subscribed to by the 5 public universities would mean that all the data for all the databases should be added into the ELIN system and this could be done after consultations with the developers of the system.
- Access to grey literature of each institution would be made possible by creating links to these or using the Inter Library Loan system. The 5 Public universities involved will discuss this option.

ICT Infrastructure readiness is the single most important item hindering the sharing of EELIN resources.

c) ELIN@PERI

ELIN@PERI is a special setup of ELIN. It is a collaboration between International Network for the Availability of Scientific Publications (INASP)/Programme for the Enhancement of Research Information (PERI) and Lund University Libraries, Head Office.

One of the PERI objectives is to help developing countries (partners of INASP) get access more easily to scientific information. For this purpose they are introduced to ELIN to allow the user to search resources from multiple sources using one single user-friendly interface.

5.2.3 Institutional Repository

Makerere University library is the only one with an institutional repository among consortium members. Makerere's experience in terms of publication and access to local research output shows that most researchers are ignorant of the copyright publishers' guidelines. *Most academic staff regard academic papers as a requirement for promotion and jealously guard their output.* There is reluctance to submit research into institutional repositories. Rigid publishing and access guidelines are interpreted by library professionals to a research

audience that is are not fully aware of how to exploit publishing guidelines to access and pick information from other sources. Examples of such guidelines include lack of access to online journal articles unless if the publishers have allowed inclusion of post -prints and pre-prints putting alot of information is under restricted access.

There are *open Metadata protocols* that would enable Institutions and groups to share this information. There is a need to train and create awareness among researchers about the subtle differences regarding intellectual property issues and how to exploit them to enable increased publication and access to local research output. (see <http://www.sherpa.ac.uk/romeo/> - publisher copyright policies & self -archiving

DSPACE – Makerere uses DSPACE as the institutional repository for internal research publications. DSPACE is an Open Archive Initiative (OAI) - compliant open-source software released by MIT for archiving eprints and other kinds of academic content.

The uploading of academic research to this platform has been met with a lot of reluctance from researchers.

According to Faith Akiteng Makerere librarian in-charge of e-resources, publishing and sharing of local Research Output is hindered by:

- Ownership
- Copyright
- Quality control

It is evident from the Maklib sharing experience that INASP and the Lund University have promoted the sharing of external library e-resources (ELIN @PERI) at the national and regional levels. The ELIN service can be provided to any academic library on a subscription basis. Lund University Libraries takes care of the import and processing of metadata, and each library can, via an administration tool, tailor their own services based on licenses, subscriptions etc. Students and staff need an authentication to access. Currently ELIN is used by a number of libraries in different countries.

Local research output of institutional publications from the DSPACE institutional repository is not easily accessible within Makerere and hardly accessible externally. This practice is replicated in the majority of NREN institutions and should be the focus of widening availability scope to other institutions with ease of access.

6. Development Approach for the NREN Research Index

An approach is commonly understood to be a coherent set of activities, guidelines and techniques that can structure, guide and improve a process (Sol 1990). In this case, the development approach for creating an NREN/REN research index will include as a first guideline the pre requisite of the mandatory minimum requirements for a functioning NREN including the right policy environment, a functioning Network Operating Centre (NOC) with the infrastructure and skilled technical people.

This development approach for the Information sharing Index was developed in consultation with

the library staff in charge of e- resources, archiving at Makerere university library, the information systems and Network management professionals at the Directorate for ICT support (DICTS) and RENU CEO and Chief technical officer. The approach draws from Library information management, systems development and network management principals and best practices

The development of this approach was led by ;
iii) *Directorate for ICT support (DICTS) Makerere University*
Director – Nora Mulira
EndUser Support Manager – Mr Ali Ndiwalana
in consultation with:
ii) *Makerere University Librarians*
The University librarian – Dr Maria Musoke
Librarian in charge of e-resources- Ms Faith Akiteng
Librarian in charge of Archives- Ms Miriam Kakai
iii) *RENU*
CEO – Dr Patrick Mangheni
CTO- Mr Joseph Kimaili

In this section, the conceptual model of the development approach for the NREN/REN index for information sharing is prescribed. The rationale for sharing library resources has been established and the challenges identified justifying the need for guidelines to support the development of central NREN index that improves information sharing through creating wider, easy and accurate access.

The emerging development issues for the index shows a need for support requirements outlined by the questions in section 3 in the following areas:

- Development methodologies that would focus on user/researcher requirements (*includes research interests , information availability and ease of access, challenges*)
- Network formation and coordination (*location of repositories, access policies ,process and procedural guidelines and in-charge contacts*)
- Adequate technical skills to:
 - develop innovative search tools and instruments that would facilitate and sustain aggregation of selected institutional research information, easy access and availability at NREN/REN levels
 - User training, and support in developing an institutional research profile, using, trouble shooting,
 - Monitoring and evaluation of Index service
- A robust technology infrastructure with resources and BW to deliver reliable services *is a minimum requirement*

6.1 Researcher-Centered Implementation

The user in this case is the researcher. Literature on creativity and improvisation indicates that user-centered implementation can be supported by a variety of other contextual elements and techniques. One such element that is relevant to this research is participative approaches, using techniques for group working and end-user involvement (Cooper, 2000). It is recommended that to guide the trade off between the network and the service formula, the implementation process must start with understanding user requirements and monitoring changes in user appreciation to elicit feed back. The user contribution compliments the creativity of the developers who must have innovative ideas and designs.

The researcher as targeted user should participate in all phases of the implementation process.

Guideline 1 Develop the institutional research profile by investigating research context and needs

- a) *Conduct a researcher survey based on predetermined core research interest groups in the institution.*
- b) *Document profile and general challenges by research group*
- c) *Train and teach researchers about intellectual property issues, publishing and information access policies, process and procedures*
- d) *Develop and populate an Institutional repository through a link with the Institutional library and Graduate School.*

6.2 Agreement on Intention to Collaborate

It is important to note that most of the difficult fundamental work to develop and implement the information sharing index is done at the institutional level and this is the focus of the approach.

Guideline 2: Institutions must agree to commit in writing the intention to participate in the general capacities decided for each partner in the library consortium at both the national and regional levels

.Letters of intention can fulfil this requirement. At the end of the preparation stage the following deliverables are expected in line with the three elements that constitute service systems:

- a) *Letters of intention outlining motivation for collaboration to develop and implement the information sharing Index as members of the library consortium, implementation methodology and work plan and formation of the network.*
- b) *Enabling technology: Minimum infrastructure requirements. Overview of institutional technology status and gaps for the implementation project.*
- c) *Document a summary of core research information access collaboration areas and requirements by Institution.*

6.3 Technical skill requirements

After the institutional agreements, documentation of requirements and preliminary training, the NREN should convene a dissemination workshop and take over to develop the Information sharing Index, with full participation of the member institutions. The availability of technical skills of professional librarians and ICT developers is fundamental to the successful development and use of the Index and eventual scale up to the NREN and regional levels. The shortage of expert skills and technology to execute the project must consider the development of an inter-skill pool and resource centre as mandatory. The library team champion should be identified primarily based on built capacity among professional library and ICT staff to share the knowledge and skills by training library Consortium members' staff and export expertise to other libraries outside.

Guideline 3: The NREN should use the library consortium (library) champion(s) existing skill pool to share technical best practice and facilities, in the short term but aim at gradual development of necessary technical skills through short term training, in the long term.

Constitute institutional project teams made up of library, ICT professionals and selected researchers to work with the NREN team. The team leader is a library /information system professional at all levels.

6.4 Analyse existing services and available and usable technologies

Initiating the development of the NREN research index service requires innovative tools that add value to existing web search tools/engines and standard research information searches. The development of these tools should start with investigating the existing functionality in the library systems and reviewing potential FOSS applications that are relevant to developing the new service. Selection and analysis requires an exhaustive search from internal existing resources and systems as well as the Internet.

It is necessary to draw up an overview of functional and technical design decisions. In addition to starting with the targeted user's needs and context, it is necessary to investigate the availability of technologies that are reliable and robust enough to develop and enable the Index. Outsourcing should be also be guided by selection of robust components.

Guideline 4

a) Start the development of tools with analysing existing library system tools and resources for a quick win.

b) Potential technology solutions should be shared with institutional project teams conducted by both the ICT and library team with a representation of researchers.

7. Development

7.1. Define Roles, Tasks and Responsibilities

The roles, responsibilities and tasks for the actual Index development, usage and testing activities, include the researchers as the users, the library expert staff and the ICT team. All the three groups constitute the development team and participate in the design, developing, testing and implementation of the Information sharing index. The procedures for the test of the service that will be executed in the next phase must be clearly understood by all participants. This includes the test scenario, who does what when and how, what guarantees test validity. Workflow models can support this process. To run a usage test, it is necessary to organize willing participants, a prototype available to participants, mechanisms for collecting data and a process for interpreting feedback (Isaacs and Walendowski, 2002).

Practical details that should be planned include:

- user manual, questionnaires and contracts
- Arrangements for conducting the test.
- Developing a test log, potential points of failure and support and escalation procedures for parallel and distributed Help desk

Guideline 5: The development team must identify points of user involvement in the development

7.2 Compliance with User-Centred Design

A simplified view of the user-centred design process is to conduct the user research, set usability goals, design, model and test the user interface, and specify the user interface (Wiklund, 1994). The underlying process of getting a user interface that is usable is user-centred design process; this means that targeted user has to be participate in the entire implementation process (*guideline1*). Access to the NREN central resource, usefulness and ease of use should be part of the quality assurance criteria for the Index, evaluated by the researchers. These attributes should be iteratively tested by researchers to determine whether the designers are still complying with user-requirements. The rationale is that researchers and developers explore the possibilities and constraints of the technology using hands-on experience and providing feedback for modifications. This session is a participative evaluation process that enables researchers to evaluate the service and define usability problems. The aspects can be technical like slow speeds, or functional like functionality that is perceived as not useful or with minimal usefulness.

Guideline 6: Models and tools for elicitation of feedback should be articulated and quality assurance instruments to collect user suggestions for revision and incorporation into the refined version should be determined.

- a) Create an NREN central information resource by collecting and host Metadata in an e-location including research title, names, contacts institutions and abstracts based on requirements.*
- b) Design corresponding tools for information access like links, pointers and contact information to full texts.*
- c) Different methodologies for usability evaluation can be practiced including surveys, expert evaluation/usability focus groups and prototyping to get hands-on experience.*

7.3 Testing the NREN Research Index

The testing of the NERN research index follows set standards in systems development. It makes sense to predetermine representative group of researchers (target end user), assisted by library staff (application managers) and supported by the ICT staff (technical support) for testing the Index. The test-log is used as a checklist. General parameters like ease of use, accuracy and availability of research information must be predetermined as the starting point.

Depending on the number of users in the test group this might be a labour intensive activity. Equipment pre-installed, and instruction manual written.

Guideline 7: Test NREN (Consortium), Institutional and research group levels separately to be able to capture specific system queries and issues for each research group.

- b) Quality assurance tests for users should request user evaluation based on satisfaction, effectiveness and efficiency criteria.*

c) *The librarians supported by the technical team should note all and solve problems that crop up during the test.*

d) *Use opportunity to have informal discussions with the researchers and get a better understanding of usage.*

7.4 Monitor Usage and Evaluation

The usage of the network, platform and applications has to be logged. The operators can test the load and peak load of the network. The service providers can use the log files to scale the necessary capacity on the servers. At the same time, the usage designers can log files to evaluate usage. Observation is also an important evaluation method. Pertinent key questions for the Information sharing Index performance are stated in section 4. The mandatory technology goals from these questions can be interpreted as reliability, flexibility, scalability and easy maintenance (Cooper 2000). User feedback should be incorporated in the next versions and iteratively tested towards the final draft.

Guideline 8: NREN members should agree on common and Institutional performance indicators for the short and long term M&E

b) Develop common M& E reporting instruments

7.5 Realization

7.5.1 Review Business Case

The consortium members should analyze and evaluate their benefits from participating in the implementation project to decide if the Information sharing Index serves institutional internal research agendas and if they are willing to continue with the pilot. This activity requires reports by the project management committee report on implementation activities, system projections and challenges. This should be compared with the original network objectives to decide the network continuity into the exploitation phase.

Guideline 9: Review the technical equipment needs and technical support gaps.

Draw up a pre-implementation checklist which includes all technical and support requirements needed to roll out the service

7.5.2 Launch the Pilot

The relationship with the user fraternity starts with the distribution of the service. The service is now distributed to test parallel and distributed usage, synchronized at the different participating sites. The index should be accessible to all participating institutions and provision of mutual redundancy by/for all partners is critical. The rotation of the service provision in case of failure from a participating site can also be tested. The high cost of bandwidth remains a problem but it is acknowledged as a transient issue given that trends show declining costs. All member institutions must test their technical support. The distributed user support must also be tested at this point. A Common reporting interface for failures and queries by users from all sites instituted under an existing joint collaboration office is

recommended to optimize scarce technical skills. This works on an escalation basis that starts with local network support.

Guideline 10: Implement a pilot of not less than 6 months to evaluate impact and benefit at both institutional and consortium levels.

Document and publish lessons and challenges.

Gather research experience beginning with institutional pilot sites

a) *It is recommended to use a combination of multiple sources to get a good feedback on the usefulness and usability of the service.*

b) *Questionnaires for users should ask whether the service is easy to use and useful for the tasks to be executed.*

c) *After each round of modification resulting from user feedback, the refined service should be distributed to a larger pilot test group.*

7.5.3 Scale up Service - Analyze the business case

An agreed period for piloting has to be agreed by all NREN member institutions and thereafter the consortium should analyse the *business case and whether the pilot has met the research agenda as of the member institutions both collectively and individually. Institutions should report individually on the benefits and gaps from the deployment of the research index.*

This meeting enables partners to define the progress plan and outstanding issues to be addressed before the pilot scale up.

This ends the pilot and launches the service fully for all network partners. Scaling up the use of the Information sharing Index, requires an aggregation, hosting and maintaining of the NRENs resources by the regional REN and access tools enabling access to the full texts. This phase is heavily dependant on the monitoring and logging all technical and operational queries events at the pilot phase and resolving them. At this point research partners can start full exploitation with mutual contractual engagement, as providers and consumers of the Index service.

8. Planned RENU Pilot

The planned pilot using the above guidelines will be led by Makerere University library and DICTS. The Consortium of Uganda libraries will be leveraged to start the collaboration among selected RENU member Institutions. A survey for infrastructure requirements was completed in 2009. The selection of the participating public universities to participate in the pilot, is based on compliance with the minimum requirements.

It was not possible to conduct the RENU pilot from August to Dec 2010 as anticipated but the plans are still underway based on the same proposal.

RENU welcomed the proposal of the pilot for the information sharing index because it was compatible with planned activities of engaging users for content production. This pilot was timely and an appropriate initial engagement of both researchers and librarians.

The following were noted in readiness:

- The pilot would benefit from the infrastructure survey that was conducted in 2009
- It was noted that the pilot required modest e-readiness and infrastructure to enable (server of 500Mb HD and a minimum bandwidth capacity of 5 Mbps of at participant location, network support personnel and information manager
- All participating universities had the minimum readiness requirements apart from 5.
- A time line of 6 months period starting mid November was earmarked to start the pilot
- ELIN/Peri and DSPACE the repository for local research output, were identified by the library staff as a ready fit for free information sharing.
- The Makerere library staff and DICTS agreed to engage the institutional researchers on the issues hindering the sharing and development of institutional repositories
- In addition RENU would develop a methodology to help ICT directors to develop their ICT function and indicators to enable self assessment.

8.1 Implementation

It was noted that the lack of adequate infrastructure is the biggest hindrance to sharing readily available ELIN information resources. The assessment of infrastructure readiness is therefore a necessary pre-cursor to implementation of the research index pilot.

- Detailed e-readiness status will be conducted to prioritise the assistance required by the member institutions. Given the time limitation for conducting this pilot, the level of readiness was decided as the basis of participation in the pilot.
- The setting up of a band width consortium as a necessary precursor to this pilot and future R&E collaboration was proposed effective September for an initial period of 4 months, by one of the service providers (Uganda Telecomm). The offer is yet to be effected due to as most institutions cannot review their budgets for a bandwidth (BW) increment. It is still apparent that BW is still not yet affordable to increase current capacity substantially at the same cost. Table 8.1 shows RENU draft work plan

Activity	Objective	Timel ine	Deliverable	Remarks
1. Conduct detailed ICT infrastructure readiness survey. (set spec: 4GB(2 x 2GB) RAM, 300GB SAS HDD x3, DVD-ROM drive, 36/72GB DAT drive, Dual-port Gigabit Ethernet adapter, 2 redundant power supplies @ \$7000	Assess infrastructure readiness for participating institutions. (minimum bandwidth capacity of 5 Mbps)	Nov 2010	E-readiness report highlighting gaps to be addressed for infrastructure readiness.	-A priority list of institution for the pilot implementation is derived from the survey findings. -Priority will be given to institutions with the least requirements for e-readiness
2. Implement infrastructure requirements	Establish minimum requirements for information sharing		Minimum ICT infrastructure for research networking	ELIN is the readily available for sharing
3. Identify and establish core research interests and groups in different institutions	Match research information available in ELIN with		-Institutional research focus areas with high potential	Institutional Access to and availability of ELIN will be based on areas with the

	Institutional research requirements		-Research interests and groups	highest research potential/ interest
4. Define and match tools for info requirements -develop tools for information search including contacts	Determine appropriate tools for identified research needs		Tools and instruments	
5. Publish on Intranet/Internet the tools, key Research areas and bibliography of frequently used information sources	Create awareness among researchers and library staff		Published Internal and external Institutional research profile and instruments	
6. Conduct awareness and training sessions on information access by consortium, institution and interest groups.	Develop information search skills for researchers		Access/ search and information management skills	Training starts with basic research information access skills and will gradually lead to inter-mediate and advanced levels
7. Monitor information (ELIN) use. <i>Include user surveys and online data collection</i>	Derive lessons and gaps for further improvement and scaling up RI model to other institutions /regional level		Usage report -A replicable RI model for NRENS -requirements for scaling up to a regional RI	The lessons drawn from the pilot will inform other NRENS future requirements and cost of scaling up the RI model
8. Analyse and Publish research stats and recommendations at a dissemination workshop followed by small research groups	Publish results and generate further research opinions for sustainable improvements		Published results of the research stats and recommendations	

Table 8.1 RENU draft Work plan

9. Conclusion

The development of the NREN information sharing Index and eventual scale up to the regional (UbuntuNet) level is largely dependant on the institutional e-preparedness and availability of Institutional repositories from which metadata can be centrally aggregated and referenced at the NREN (RENU) level. The NREN information resource is further aggregated at the regional level thereby cascading into a regional searchable metadata. The development of innovative tools and instruments for accessing information, the collection, hosting and maintenance of referenced metadata is done by the NREN and the regional REN.

The planned RENU implementation of the Information sharing index pilot will derive actual lessons, challenges and emerging issues for information sharing in practice. The output will be used to refine the Approach which can be replicated among other NRENS.

There are indicative lessons and challenges drawn in the preparation phase of the anticipated pilot by RENU.

The critical staff shortage of professional library /Information management staff with expertise in e-resource sharing, archive and e-library consortiums continues to deter efforts to improve the sharing of vast information resource in member NREN institutions/countries.

The sharing of local research output in institutional repositories is sustainable and key to the information sharing among Africa NRENS but very few (as in the case of RENU) have developed this capacity. Obligatory, timely submission and institutional publishing of local

research is key to improving IR capacity. Institutionalisation of Quality control measures is also required.

In addition use of this information by researchers requires teaching and training researchers about the fine print of intellectual property issues and how they can be fully exploited for access, not hindrance for information sharing. Understanding and resolving intellectual ownership and quality control before information is included in the IR is necessary before information access/sharing of local research output can be improved.

The setting up of a bandwidth consortium as a necessary precursor to future R&E collaboration is yet to be fully effected even with the substantially reduced bandwidth rates. The current reduction is not yet low enough to gain substantial increment at the same BW subscription budget for growing requirements.

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