IAP Programme on Digital Knowledge Resources and Infrastructure in Developing Countries

Second meeting of the Steering Committee and
First meeting of the Task Groups

Report of the Meeting on Promoting Access to and Use of Digital Knowledge Resources in Countries with Developing and Transitional Economies

Department of Science and Technology Building, Pretoria, South Africa
May 11 – 12, 2009

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IAP Programme on Digital Knowledge Resources and Infrastructure in Developing Countries

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Dates: 11–12 May 2009
Venue: Department of Science and Technology Building, Pretoria, South Africa
Time: Day 1, 11 May 2009 (09:00–18:00)
Day 2, 12 May 2009 (08:45–16:30)

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Executive Summary

Second Meeting of the Steering Committee for the IAP Program on Digital Knowledge Resources and Infrastructure in Developing Countries

The second meeting of the Steering Committee for this IAP Program was held in Pretoria, South Africa on 11-12 May 2009, and was hosted by the Academy of Science of South Africa (ASSAf). The National Academy of Sciences, U.S. is the lead academy for this Program.

The overarching goal of the Program is to promote greater access to and use of digital scientific data and information resources and of digital infrastructure for research and education, with particular attention to capacity building of IAP member Academies and the research and education communities in developing and transitional economy countries.

In pursuit of this goal, the Program is to perform the following tasks:

- To convene a series of international workshops and meetings on a regional basis to develop supporting information resources and other outputs specified by each Task Group in its work plan and to publish the results in the IAP portal and on the websites of the participating Academies. All products will be released under the auspices of the IAP.

- To work with other IAP programs as well as other organizations already engaged on these issues to avoid duplication of effort and to leverage existing expertise and resources.

The objectives of this second meeting of the Steering Committee were to:

- Review activities of the first year of the Program, primarily by discussing the plans developed for the two task groups and the sub-projects of each of them;

and

- Plan activities for second year, including:
  - Elaboration of detailed work plans for each project.
  - Confirmation of project principals and teams.
  - Identification of funding requirements and sources.
  - Prioritisation of work, including taking advantage of the opportunity for collaboration with organizations doing similar work.

The participants heard presentations reporting on progress since the previous meeting, and then the two Task Groups (Digital Knowledge Infrastructure and Digital Knowledge Resources) met in break-out sessions to review and refine or revise their respective draft work plans. The remainder of this Summary presents the actions that each Task Group agreed to undertake.

Task Group on Digital Knowledge Infrastructure

Co-Chair: Prof. Don Riley, University of Maryland, USA (the other co-chair Prof. XIAO Yun of the Chinese Academy of Sciences, was unable to attend)

Three main tasks have been identified for the Task Group on Digital Knowledge Infrastructure:

1. Create a policy advisory council, in each region, that can help reduce barriers at national levels (for example, deregulation, privatisation and competition in the telecom market space), recognising that: (a) universities and research institutions have different
requirements than companies that simply want to connect to the network; (b) educational and research institutions are directly related to economic development; (c) in some fields of research participation requires a real-time, advanced capability, network connectivity; and (d) infrastructure is the basic enabling component of digital access.

2. Draft a white paper to summarize and promote the policy objectives.

3. Draft a policy statement for formal adoption by the IAP and/or Academies local to the regions.

The Task Group developed the following statement on advisory functions:

*The Task Group on Digital Knowledge Infrastructure will establish two regional Advisory Councils. Their purpose is to provide policy advice in the regions to promote better understating regarding the establishment, management, and applications of high-speed research and education networks (RENs).*

The regional Advisory Councils will play an active advisory role to:

- Appropriate Ministries (ICT, Telecommunication, Science and Technology, Education, etc.) and national and regional regulating bodies on the promotion, implementation and support of RENs; and
- Intergovernmental and international agencies that fund large infrastructure projects (e.g. oil pipelines, power lines, railways and telecommunications networks) regarding infrastructure needs of RENs.

The Task Group will develop opportunity scanning mechanisms to learn about these projects well in advance so that such advice can be effective.

In addition to an advisory role, this body can also provide a point of contact and source of information for the media, so as to raise awareness and increase visibility of the issues addressed through the IAP Program. The Task Group identified the following tasks for the Advisory Councils:

- Examine funding models that support affordable access to ICT infrastructure by educational and research organisations.
- Identify policy and regulatory barriers to ICT infrastructure needs.

The Advisory Council in each region also will be a resource to other organizations to leverage capabilities, expertise, and resources in a coordinated and synergistic approach to help influence policy making and funding in this area. The advisory activity will further raise awareness and capacity of the science academies and other scientific organisations on these topics. Additional issues identified included the following:

- High costs of connectivity, network and equipment costs;
- Uneven development of technological infrastructure related to the different sectors;
- Insufficient governmental and administrative support for access by the research and education community to ICT infrastructure;
- Limited regional collaboration experience;
- Lack of skilled human resources and knowledge for its implementation and maintenance; and
- Language barriers in diverse regions such as the Caribbean and Africa.

Successful approaches have included:

- The experience in the establishment and operation of several successful RENs;
- Creation of regional organisations to facilitate the sharing of experience in creation of regional ICT infrastructure, such as the Ubuntunet, Cooperación Latino Americana de Redes
Avanzadas (CLARA) (Latin American Cooperation of Advanced Networks), the Caribbean Knowledge and Learning Network (CKLN), and C@ribNET; and
- Sharing of ICT investment costs among different countries or institutions.

**Task Group on Digital Knowledge Resources**  
*(Co-Chairs: Ms. Susan Veldsman, ASSAf, South Africa, and Dr. William Anderson, Praxis101, USA)*

The work plan for the Task Group on Digital Knowledge Resources includes the following four projects:

1. **Digitisation of analogue resources:**
   A South African National Research Foundation (NRF) project is currently under way. The Ugandan National Academy of Science (UNAS) is planning a similar digitisation initiative in the area of health data and information.

2. **Open institutional repositories (OIRs):**
   The Network of African Science Academies (NASAC) will coordinate a project in sub-Saharan Africa and develop a portal. Project proposals in this area also were presented by Cuba, Nicaragua, and Jamaica. The Caribbean Science Union and the Academy of Sciences of Cuba (ACC) developed the most detailed proposal in this area for the Central American and Caribbean region, which proposed the following actions:
   - Determine the status of OIRs and OA journals in each country, and the existing policy of the science and education ministries with regard to these OA mechanisms;
   - Develop a plan for implementing and using OIRs effectively within the national research and education sectors;
   - Carry out a technical training meeting for Central America and the Caribbean Region; and
   - Create a regional OIR network with robust connections to the global network

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<th>Action</th>
<th>Goal</th>
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<td>Prepare an introductory document</td>
<td>To give a brief overview of OIRs. The document will be presented in a simple format, with clear and concise information, in order to be easily understood by the research, education, and science policy communities.</td>
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| Develop contacts and collect background information | To establish and develop:  
  - Contacts with policy and technical representatives from science and education ministries and with Instituto Brasileiro de Informação em Ciência e Tecnologia (IBICT) (Brazilian Institute of Information Science and Technology)  
  - A wide range of contacts within the research and education communities in each country.  
  A fact-finding survey should be prepared to determine their coordination and their interests in the creation of OIR national networks that may be linked to other regional OIRs and to gather as much information as possible from both sides as to their perception of implementation issues (willingness, expected benefits, economic, technical, communication infrastructure issues, etc.) |
| Form a National Advisory Group that will also be a part of the regional Advisory Council | To examine all collected background information and to identify requirements and actions to move forward  
  - To prepare a draft report and present it for approval. This document will provide a brief overview. A work plan will be drafted to include specific information regarding its extent and location, proposed actions and responsibilities, resource requirements and proposed timescales and |
The Open Institutional Repositories infrastructure network will initially involve the countries represented at the 2008 Havana workshop, namely, Nicaragua, Guatemala, Cuba, Jamaica, and the Dominican Republic. Other countries may also be interested in becoming involved, depending on the availability of funding. The first phase should be completed before the next Steering Committee meeting in 2010, including discussions at the national levels, collection of background information, the initial draft report, and the formation of national groups.

Thereafter, a technical training meeting for Central America and the Caribbean Region is proposed in the second quarter of 2010 (perhaps in conjunction with the next Steering Committee meeting of the IAP Program) in order to explore more deeply the requirements and ways to implement OIRs. The first repository is expected to be operational in 2011, provided that funding is available.

The expected potential impact of the project is:

- To strengthen S&T capacity in all countries by enhancing access to and use of digital knowledge resources;
- To enhance the quantity and quality of information on issues of science and society that is being exchanged among Academies of this region;
- To build the policy advisory capacity of the individual Academies; and
- To improve the cooperation activities in science and technology between Central American and the Caribbean Academies/S&T associations, as well as other organisations with similar objectives.

This proposal will be refined further and enhanced to better fit the acceptance criteria of funding agencies, and possibly used as a model for proposals to be used for projects in other regions.

### 3. Open knowledge environments (OKEs):

This project entails experimenting with new interactive capabilities and open access publishing on the web. The 2006 ASSAf report on scholarly publishing will be used as a pilot project.

### 4. Advisory council on open knowledge resources in developing countries:

The Advisory Councils in each region should address the importance of open access in the context of science and development, as well as provide policy makers with the information about such mechanisms. It was agreed that the Advisory Councils created under the Task Group on Infrastructure would also include these issues to avoid the formation of too many groups.

Paul Uhlir and Dan Cohen have identified institutions involved in the type of work covered in the four projects. Dr. Anderson volunteered to create a social network map for this project (see below), linking with other organisations. This will help in visualising the kind of socio-technical network we are developing and the relationships between institutions.

### 5. Data integration demonstration projects:

Action on this project was deferred until sometime in 2010.
Full Report

DAY 1 (11 MAY 2009)

1. SESSION 1: OVERVIEW OF IAP PROGRAMME AND PRESENTATION OF ACTIVITIES IN YEAR ONE  
   Chair: Prof. Michael Clegg (US NAS)

1.1 Welcoming remarks and introductions (Prof. Roseanne Diab, ASSAf)

Prof. Roseanne Diab (Executive Officer of the Academy of Science of South Africa) welcomed everyone to the meeting. She particularly thanked Mr Uhlik of the US National Academies of Science (NAS) for driving the initiative and getting funding from the InterAcademy Panel (IAP). She noted that the Academy of Science of South Africa (ASSAf) strongly supports the initiative, which accords closely with the goals of the ASSAf Scholarly Publishing Programme, which had published a report on strategic scholarly publishing in 2006. One of objectives of the report had been to promote an open access platform for South African scholarly journals. During the next few weeks, ASSAf would launch a pilot project to publish the South African Journal of Science in open access.

This was the second meeting of the Steering Committee; the first meeting had been held in Shanghai, China in 2008. The two task groups – the Task Group on Digital Knowledge Infrastructure and the Task Group on Digital Knowledge Resources – met for the first time.

Prof. Diab particularly thanked Ms Susan Veldsman (Director; ASSAf Scholarly Publishing Unit, ASSAf) for organising the workshop. Prof. Diab apologised that conflicting commitments would prevent her from being able to attend the full meeting.

1.2 Review of the background of the IAP programme (Prof. Michael Clegg, US NAS)

The US National Academies of Science is a private organisation and is not part of the US government, although it conducts many policy studies on issues of major national and international concern and publishes about 200 full-length reports a year. The US NAS strongly believes in making content available to people in the developing world. The reports are freely available electronically online to people from 143 developing countries around the world. The scientific journal published by the NAS, Proceedings of the NAS, is also freely available online. The NAS is committed to ‘knowledge equity’, which has two dimensions: (1) access to knowledge resources themselves and (2) infrastructure that would enable access.

This meeting is partly an outgrowth of a programme of the InterAcademy Panel on International Issues (IAP), a global network of science academies in 120 countries based in Trieste, Italy. The IAP was established about 15 years ago because many of the science academies of the world were concerned about global population growth and its impact on the future of humanity. A number of academies (including India, the Royal Society and the US NAS) collaborated in writing a white paper on issues of population growth. One of the novel messages of the white paper (which remains very relevant today) is that a key to managing global population growth is the empowerment of women. The successful experience of working together on the white paper led to the creation of a global network of science academies, the IAP.

Since its inception, the primary goal of the IAP has been the empowerment of science communities by strengthening and improving the capabilities of science academies especially in the developing world. The IAP is based in Trieste, Italy, and the Italian government provides €800 000 per year, which is used to underwrite a series of programmes, one of which is the IAP
programme on Digital Knowledge Resources and Infrastructure in Developing Countries, under the auspices of which the current meeting is being held.

The IAP believes that building the capabilities of science communities in the developing world is key to managing many of the major global issues that will confront the world over the next 30 to 45 years, including economic development, global warming, water resource shortages, food security and biodiversity loss. Addressing these issues depends on making the best use in the science policy context of existing global scientific knowledge. The IAP has programmes to support this objective.

The IAP programme on Digital Knowledge Resources and Infrastructure in Developing Countries was initiated six years ago and is led by the US NAS. Paul Uhlir implemented and continues to lead the programme together with partner academies around the world, namely ASSAf, the Ugandan Academy of Sciences, the Network of African Academies of Sciences (NASAC), the Chinese Academy of Sciences, the Indian National Academy of Sciences, the Academy of Sciences of Cuba, and the Caribbean Scientific Union (CSU).

1.3 IAP Programme on Digital Knowledge Resources and Infrastructure in Developing Countries: Summary of Year One activities and objectives of this meeting (Paul Uhlir, US NAS)

Mr Uhlir reported on the activities during the first year of the Programme on Digital Knowledge Resources and Infrastructure in Developing Countries. The programme had been funded and initiated at the beginning of 2008 and an organisational meeting of the steering committee had been held in Shanghai, China, in May 2008. At that meeting, areas of interest had been identified, as well as the people that would work on the various aspects: (1) infrastructure and (2) information resources. Two task groups had been formed. Most of the delegates at the present meeting belong to one or the other of these. A report of the Shanghai meeting had been issued and was available on the IAP website.

The other major activity had been a two-day international workshop on open access to scientific literature and other digital scientific information resources in the Central American and Caribbean region in September 2008. A report of the workshop was available. The meeting had involved steering committee members from Latin America as well as participants from the US and Europe. The meeting had been used as an organising meeting for the subregion. Areas of interest and organisations/people were identified. Presentations were made on behalf of RedCLARA (the high-speed research and education network in Latin America), IBICT, eIFL, e-SDDC (an organisation on scientific data in developing countries which is one of the communities of interest of the UN Global Alliance on ICT for Development (UNGAID), an outgrowth of the World Summit on the Information Society, the executive committee of which Paul Uhlir co-chairs. A number of organisations were represented, with common purposes and interests, with which the IAP wishes to partner in the programme in order to leverage resources, avoid duplication and promote common effort.

Proposals for action were made by Cuba, Nicaragua and Jamaica. Other projects proposed in Latin America include the InterAmerican Development Bank (IDB) proposals for Nicaragua and Chile on the Knowledge Economy, as well as the proposal on Nicaraguan Hydrometeorological Data, which is pending funding.

An IAP programme home page had been created on the IAP website and Dan Cohen had recently created an IAP programme wiki, which would be used for communication and uploading of documents of common interest. Delegates were invited to add personal contact information and home page websites. This would be used as a vehicle for further interaction between meetings.
Staffing at the NAS to support the programme had not become available until the start of 2009. Dan Cohen had been seconded from the Library of Congress for a year from January 2009, and continued staff support for the programme thereafter was planned. During the US winter, a research fellow assisted by working on the workplans for the task groups and conducting research. Another research fellow was expected during the summer. The staffing at the NAS was now considered sufficient to support the various projects.

Draft work plans had been developed for the task groups; these had been distributed to steering committee members and are available on the wiki. Detailed project workplans would be discussed in the breakaway groups at the present meeting. Numerous site meetings had been held with project organisation representatives and funders, particularly the inter-American Bank for the Latin American activities. A resource document for open institutional repositories had been completed and is available on the wiki. The present meeting had been jointly organised with ASSAf as the second meeting of the steering committee and the first joint meeting of the two task groups. There had thus been considerable activity over the last four months in particular, but there was still much to do, for which commitment was required from those that would help implement the projects agreed upon at the present meeting.

The objectives of this meeting were thus to:

- Review activities of Year One, primarily by discussing the plans developed for the two task groups and the sub-projects of each
- Plan activities for Year Two, including:
  - Detailed work plans for each project (further elaboration of who, what, where, when, why, and how)
  - Confirmation of project principals and teams
  - Identification of funding requirements and sources. Some funding proposals had already been submitted.
  - Prioritisation of work, including taking advantage of the opportunity for collaboration with organisations doing similar work.

Delegates were urged to take advantage of the opportunity of being together at the present meeting to discuss the details of projects and move forward on common objectives.

### 1.4 Report from IAP workshop and planning meeting in Havana, Cuba (Alejandro Caballero Rivero, Academy of Sciences of Cuba)

At the first steering committee meeting in Shanghai, China, one of the agreed actions was to hold an International Workshop on Open Availability to Digital Scientific Information Resources in Central America and the Caribbean. The workshop took place in Havana Cuba from 3–5 September 2008. The main subjects were open access to scientific literature, research and educational networks and institutional repositories. The main organiser was the Academy of Sciences of Cuba (ACC), and the main sponsors were the IAP, InterAmerican Network of Academies of Sciences (IANAS), Open Society Institute (OSI) and Science Commons (SC). The event included a two-day workshop and a one-day IAP coordinating meeting for Central America and the Caribbean region. There were 61 participants, 21 of whom were from countries other than Cuba, mostly from the academies of sciences and scientific and technical organisations in Central America and the Caribbean including CLARA, BIREME (Latin American and Caribbean Centre on Health Sciences Information), the Open Society Institute (OSI), the Electronic Information for Libraries Foundation (eIFL) and SC. There were 40 national participants from the Academy of Sciences of Cuba, ministries, universities, research centres and libraries). The report had been sent to members of the steering committee.

The workshop agreed on the following main actions:

**Action A1: Latin American Collaboration of Advanced Networks (CLARA)**
**What:** The Central America and the Caribbean Academies of Sciences and Scientific and Technical Associations at the IAP Coordinating Meeting will develop or enhance research and education coordination and advisory groups to work with CLARA community at the National and regional levels, and to promote open access mechanisms and applications;

**Why:** It is quite important to improve the support, policy, and utilization of Red CLARA by the research and education communities in each country and at a regional level.

**How:** In order to pursue this, it was agreed that the existing RedCLARA groups in each country would be contacted to gather baseline information about their coordination with the research and education communities. It was further agreed that national groups should be formed to develop a plan for implementing and using RedCLARA effectively within the national research and education sectors.

**Where:** It was proposed that initially, these activities would involve only those countries that were represented at the IAP meeting in Havana, but other countries might be added later.

**Who:** The participants and the IAP Meeting in Havana and others as determined.

**When:** It was agreed that the first phase should be completed by March 2009, including discussions at national level, the collection of background information, the initial draft report and the formation of national groups.

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**Action A2:** Development of a recommendation guide on how to link CLARA for countries in Central America and the Caribbean that were not yet Members.

**Action A3:** Funding of new activities that could be done at national, regional and international levels, specifically for Cuba and Nicaragua through the Alice 2 Project, through the Inter-American Development Bank, but additional funding sources need to be identified for other Caribbean countries.

**Action B1:** Open Institutional Repositories Infrastructure Network Latin American Collaboration of Advanced Networks (CLARA)

**What:** The Central America and the Caribbean Academies of Sciences and Scientific and Technical Associations at the IAP Coordinating Meeting will develop or enhance research and education coordination and advisory groups in their respective countries to create an Open Institutional Infrastructure Network in this region;

**Why:** OIRs have proved to be a fundamental component of the research infrastructure in many countries and it is important for the Academies and S&T Associations of this region to support and to improve the use of OIRs by the scientific and educational communities in each country and at a regional level.

**How:** In order to pursue this, each Academy/S&T Association national representative at the IAP Coordinating Meeting would determine the status of OIRs and OA journals in each country, and determine the existing policy of the science and education ministries with regard to these OA mechanisms. Once the baseline information is gathered National Groups will be formed. These National Groups will develop a plan in order to implement and to use OIRs effectively within the National Research and education sectors. Finally these repositories will be implemented using the platform developed by IBICT.

**Where:** It was proposed that initially, these activities would involve only those countries that were represented at the IAP meeting in Havana, but other countries might be added later.

**Who:** The participants and the IAP Meeting in Havana and others as determined.
When: It was agreed that the first phase should be completed by March 2009, including discussions at national level, the collection of background information, the initial draft report and the formation of national groups.

Action B2. Carrying out a technical training meeting for Central America and the Caribbean region to explore in greater depth the requirements and ways to implement the OIRs.

Action B3. The Funding of new activities could be done at national, regional and international levels, and in collaboration with the existing OIRs programs and funding programs. Additionally, Electronic Information for Libraries may be able to help. Other funding sources need to be identified.

Discussion (including other related activities)

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<th>Remarks by the various participants in the discussion are unattributed.</th>
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<td>→ The project provides a good overview of the kind of work we want to do in this programme and some of the challenges and institutional issues involved.</td>
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<td>→ I have been involved with the IAP for almost four years. Since 2007, I have noticed that in most science and technology discussions, young scholars are absent. I have started actively addressing this situation with various S&amp;T organisations included the IAP, eSDDC and CODATA.</td>
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| → The main challenges include:  
  Encouraging senior scientists and policy makers to involve young people in their conferences and meetings in order to learn and take future initiatives.  
  Making young scientists confident enough to do so. |
| I am involved in three parallel activities:  
  Within IAP, trying to involve more young scientists in the meetings by creating social networks and online presence for discussion and collaboration  
  Chairing the Young Scientists Forum of eSDDC, for which funding is required to take the initiative further. |
| At the 2008 international CODATA conference in Kiev, there was an interesting session for young scientists. Since then, I have been successful in putting together funding and efforts. CODATA has approved a young scientists working group. The challenge for the 2010 CODATA conference in Cape Town is to create a network of young scientists in Africa. I would like to prepare to initiate such a network at the CODATA conference and then extend that experience to other world regions. |
| IAP represents crosscutting themes and activities, which I would like all to see coordinated under one umbrella. Suggestions for funding or moving forward would be welcome  |
| → This is an important issue. The question of young scientists relates to a much broader scenario. I have dealt in depth with one institution and battled to change mindsets in South Africa. It is good to have technology infrastructures and repositories, but these will not succeed unless we engage in acts of change management to change the global power structures with respect to the ways in which knowledge is managed and to unseat the old hierarchies. |
In South Africa, the Department of Science and Technology (DST) and national policy have targeted a ten-fold growth in PhDs as a key strategic goal, but there do not seem to be any efforts to create a higher education research environment in which young scholars would wish to work. In this respect, the IAP and CODATA have considerable potential and power to bring a perspective not only from within, but are able to take an outside view of the higher education sector and advise from a safe area as trusted partners in the enterprise. We should motivate for that type of change management and growth of young scholars to be placed high on the agenda in our discussions.

I am pleased that CODATA has launched a programme for young scientists. This is the first time that such a working group has been approved and it will be given funds. By the time of the 2010 conference, we need a proposal for a task group. The next international CODATA conference is to be held in South Africa, and I would like South Africa to use the opportunity to motivate and involve more young people.

The CODATA strategic plan includes the global information commons with a focus on removing the digital divide. This is particularly relevant for Africa. A major strategy is to provide open access.

I have been involved in several IAP meetings. With respect to knowledge sharing, there is much convergence in building infrastructure using common tools, software and processes. In doing so, the same kinds of institutional issues are encountered, namely the lack of change within institutions and clashes with the new systems we are trying to introduce. We need to give more attention to how to address the behavioural changes that are needed in order for new practices to be institutionalised. We cannot import new ways of doing things into old systems. In terms of knowledge sharing, such issues are important.

Through the Oasis (Open Access Scholarly Information Sourcebook) project, an international team is developing an electronic portal in order to share knowledge resources and case studies. I invite you to be part of the project by contributing your local experience of implementing open access and learning from other partners what works and what does not. We also invite assistance with translation of the material we receive to make it more widely accessible, or to translate into English the material that we could borrow from other sources. The website is www.openoasis.org.

From my background in industry and bringing digital libraries into the world, I would like to support what Prof. Chan said about the importance of writing down what we learn as we learn it. On project completion, the successes are all too readily recorded, but it would be useful for others to record the ways in which the challenges were overcome and what was done when expectations were not met or assumptions were contradicted by the facts on the ground. Such information might allow those that feel overwhelmed to get started. We are all on new ground with the ‘social web’, using social media tools to change the way in which we communicate. For example, the National Academy press is on Twitter. Although such tools may initially appear to be an energy drain on the ability to pay attention, there is large value in cutting down the boundaries between organisations. There is another generation of people that will have different relationships with technologies, and it would help us to learn enough to be able to use them and be able to communicate with people using social media portals such as Facebook and uTube, for example. We could then communicate with young people through their preferred media of communication. Many of them have ingenious ideas and are as eager as we are to solve the problems we confront.

In our work, we should do a retrospective overview of the project at the end and record what we learned about ourselves, what we initially expected, and difficulties that we encountered but were not expecting. This would provide authentic information that would
help empower others. Wiki and blogs could be used to keep project notes during the
course of the project. It is good to have a narrative at the end, but more intense internal
discussion is needed about road blocks.

→ eIFL is working on evaluation report on Open Repository Development in Developing and
Transition Countries based on a survey of digital repositories activities (which was
launched in May 2009 as a part of a cooperative program between eIFL.net, the
University of Kansas, the DRIVER project and Key Perspectives Ltd., UK) and case
studies from repository managers addressing basic questions to pilot groups about the
key challenges they faced, how addressed these and key unresolved issues. We hope
that these case studies and survey results (the survey questionnaire included more than
60 questions on topics including content, open availability (and what is still closed),
software, cost and benefit, whether it is outsourced, and whether technical support is
available within the institution, etc., which we hope to make publicly available in
September 2009) will be practical and useful.

→ When the case studies are published, will there be a structured way for people to make
comment. We should focus on gathering unfiltered, authentic comment from the wider
community to help with the next generation of documents. This approach pushes against
hierarchical delegation of authority and increases participation.

→ Perhaps we should consider an open wiki.

→ There is a need for a pilot project.

→ In the African context, we should consider using mobile, and not necessarily internet or
wireless

→ In conducted a similar survey among 42 science academies, posing similar questions,
will be reporting on the results later during the meeting.

2. SESSION 2: PRESENTATION OF TASK GROUP WORK PLANS
Chair: Susan Veldsman, ASSAf

2.1 Review of draft work plan for Task Group on Digital Knowledge Infrastructure
(Prof. Don Riley, University of Maryland)

As a relative newcomer to the IAP programme, several observations can be made from
the infrastructure perspective. Mobility and cell phones have their place, but if we are to promote
the development of science and technology and global knowledge sharing, we need to be clear about
what infrastructure is required. I come from the global internet 2 community. Internet 2 was the
name of the initial initiative as well as the organisation that was set up later to pursue it; I
therefore hesitate to advocate in favour of internet 2. However, advanced high performance
internet infrastructure is needed, rather than simply internet access (although this is an important
step forward for many countries and universities), in order to participate in evolving research. We
need to create national and regional research and education networks that interconnect the
research and education institutions within each country. This would reduce reliance on satellite
connections that have to go via Europe, for example. High performance connection to the global
NREN community is also necessary. This type of capacity is generally lacking in developing
regions.

Over the last few years, I have been involved in considering ways to help sub-Saharan Africa in
this regard. The initial efforts were in respect of West Africa. Although there is a submarine cable,
the telecom monopolies limit access and keep prices at about 100 times those in the rest of the
world. The development of connectivity and associated terrestrial infrastructure is therefore very
limited.
In East Africa, there have been no submarine cables, so everything goes through satellite. This means that the capacity for video conferencing as a simple collaboration tool that is regularly used with other parts of the world is not available.

Several years ago I helped organise a National Science Foundation (NSF) workshop on collaboration on environment and biology in sub-Saharan Africa. We kept hearing that the data that were being collected on the environment, flora and fauna were hosted elsewhere, because if the data had been hosted on servers in Africa, it would not have been possible to access from the US. However, when hosted in the US, African researchers were unable to access the data they had helped generate because of connectivity issues. We kept hearing about the need to address access and infrastructure.

The focus is therefore on the infrastructure that is uniquely needed for research and education and the ability to conduct high performance computing, multimedia collaboration beyond video conferencing and access to online resources.

Access through mobile devices can be addressed later, but is not at the core of the infrastructural issues. If developing regions had to rely on accessing data via cell phones, they would always lag behind. There is a hierarchy of access to data, but the focus has to be on the means to bring the community into global collaboration on at least some level of parity. This requires a core of high-speed international connectivity, fibre submarine cable and high-speed fibre terrestrial networks.

There are two main tasks for the task team addressing digital infrastructure:

- Creating a policy advisory council that can help influence barriers at national levels (for example, deregulation, privatisation and competition in the telecom market space), recognising that:

  We ought to see universities and research institutions differently from companies that want to connect to the network

S&T education and research relate to economic and development.

There are some fields of research that one cannot participate in without being in a real-time advanced capability connectivity environment that goes beyond social networking (which can come later once the core aspects are in place). Infrastructure is the basic component of digital access.

- Drafting a white paper to address this and capture the key points.

### Discussion

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<th>Remarks by the various participants in the discussion are unattributed.</th>
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→ African universities are making an entirely reasonable appeal for the same connectivity with global research networks and the internet that is enjoyed by universities on every other continent.

In the past, connectivity has been difficult because it depended on satellites. The coming of cell phones, as well as growth rates in cell phone usage in Africa that have been at least twice the predictions, has convinced certain parties there can be an economic driver at play. The first submarine cable is therefore being installed down the east coast of Africa, and more submarine cables are planned. This will allow connectivity to eastern board sea ports and capitals. At the same time, it has been recognised that the submarine cable will not help landlocked areas or countries. There have been plans for regional terrestrial fibre backbones from the submarine cable landing stations through the
other capitals to connect landlocked countries. Within each country there are new plans for distribution via fibre backbones to the rest of the country. There are plans for extending the network via high performance wireless technologies. These form part of multiyear plans but are very significant. The coming of the submarine cable has motivated plans for the development of terrestrial infrastructure. Many of the initiatives are being built with Chinese funding. This capacity will create a new wave of development and a new set of opportunities that many parties are gearing up to take advantage of. The Seacom cable has recently reached Mombasa.

Within a year, the submarine cable is expected to reach the eastern seaboard capital cities. In countries where there is a telecommunications monopoly, as in Ethiopia, prices may nevertheless remain high. There has been considerable lobbying against this in countries that have been associated for some time with the UbuntuNet Alliance.

2.2 Review of draft work plan for Task Group on Digital Knowledge Resources (Dr Bill Anderson, USA)

Interoperability is related partly to the electronic infrastructure. Another aspect, however, is that documents exist in different formats in different places, and we have to consider how we can use them to get our work done. According to anthropologists, the concept of ‘interoperability’ has many meanings. I have been working on this since 1993, and there are incremental steps to delivering interoperability.

The draft work plan for the task group includes the following four projects:

- **Digitisation of analogue resources:**
  The South African National Research Foundation (NRF) project is under way. Once the material has been captured, it must be made openly available. The Ugandan National Academy of Science is planning an initiative.

- **Open institutional repositories (OIRs):**
  NASAC will coordinate a project in sub-Saharan Africa project and develop a portal. As already reported, Central America and the Caribbean have well-established capacity to operate systems, and there is an opportunity for the IAP programme to leverage this.

- **Open knowledge environments (OKEs):**
  This would entail experimenting with new interactive capabilities with respect to two-way communication on what is published on the web. The ASSAf report on scholarly publishing would be used as a pilot for interactive follow up. An interactive platform would be used as a model for connectivity for a self-selected audience of people with ideas.

- **Advisory council on open knowledge resources in developing countries:**
  The advisory council would keep educating the parties in each country that have the power to take policy decisions.

Paul Uhlir and Dan Cohen identified institutions involved in the type of work covered in the four projects. It would be useful to create a social network map for this project, linking with other organisations. This would help in visualising the kind of socio-technical network we are developing towards and the relationships between institutions. The identified institutions include:

- Million Book Project (Carnegie Mellon)
- US Library of Congress
- World Digital Library Programme (UNESCO)
- Library of Alexandria
- eIFL
Discussion

Remarks by the various participants in the discussion are unattributed.

There is one more project, making a total of five, rather than four, for the task group. This project has recently been included in the larger task group workplan document, which is available on the wiki. It had initially been intended to include it in the workplan of the Task Group on Digital Knowledge Infrastructure, but in order to balance the number of projects between the two task groups, it is now included in the work of the Task Group on Digital Knowledge Resources. The project relates to data integration demonstration projects. South Africa, Uganda and Nicaragua will be discussants.

Publishing dynamic databases, datasets and collections is a complex matter, for example, in fields such as crystallography and bioinformatics. There has been a push on the internet on the topic of linked data. Scientists that are trying to build a network of datasets with links to their own provenance (where they came from) are getting much visibility and research attention.

The task group could consider partnership in an experimental grid project. I would be interested in collaborating on digital conservation ‘gridifying’.

The University of Texas Advanced Computing Center (http://www.tacc.utexas.edu/) recently hired a digital archivist.

The list of organisations presented represent only those that are known to be interested in collaborating in projects. There is a longer list of relevant organisations in the workplan of each task group, identifying which institutions might be interested in each project. There is already a list of about 40 institutions for each task group, with some overlap between them. An important function of the steering group is not only to identify possible partner organisations but also individuals in the categories of sponsors, expertise and audience (whom we would seek to influence).

Brazil has experienced problems in building open institutional repositories. To be successful, academies need to have a mandate when they establish repositories in order to get the associates of the academy to invest in the repository. A repository should not be built without making deposit mandatory, otherwise it will not get much content.

Coercion does not work well. In the African context, the wrong things are rewarded. Reward and recognition would work better than a mandate by valuing the work that researchers do and its dissemination when the research has a vital impact in the national and regional context. The concept of a mandate on its own is coercive and negative.

A ‘carrot and stick’ approach is probably necessary. It has repeatedly been shown all over the world that the ‘carrot’ approach alone does not work. We need consensus from funding or research institutions to require the deposit of material that is produced under the auspices of the institutions because of funding or employment. This would thus become another element of responsibility for the institution and community to do something that is in their own interest. We need to better explain ‘own interest’ in terms of
the benefits of OIRs for the researcher and the wider research community. The advisory council would hopefully do that. Different institutions in different countries have dealt with this matter in different ways. Many have reached the conclusion that a volunteer approach consistently yields less than 5% compliance.

→ On the issue of coercion versus incentives and motivation, there is the problem that the word ‘mandate’ means different things in different cultures. The word ‘mandate’ is commonly used in China, but in Germany the word has a threatening meaning. In North America, where people are used to have a large degree of autonomy, they object in principle to being told what to do. Why are we doing research? If the purpose is to benefit the public good, there should be no objection to open access, and we need to make the connection. People have to understand that depositing their research in open access repositories is in the best interest of themselves and their institutions. It should form part of the job of a researcher. The language used should not imply coercion but establish a framework for valuation that is consistent with the missions of universities and professional associations.

→ Concerning the use of terminology ‘mandate’ (institutional mandate for OA) that many people are not comfortable with, in India also with regard to requesting Universities to deposit ETD in an open institutional archive, the word mandate was not preferred. The general consensus was that we can only advise universities with respect to open access repositories. We should rather create a regulatory framework than make deposit mandatory. In this regard the advisory council could work out and consider different options.

→ At the CSIR, there is a monthly report on the 20 most-viewed papers in the institutional repository, which creates an incentive.

→ Perhaps we need to spend time on advocacy. Institutions may choose to mandate deposit in OIRs, but the mandate of the IAP programme should be based on advocacy.

→ The IAP programme cannot coerce anyone.

2.3 Integration of the high-speed regional networks and the open access content initiatives

2.3.1 Research and education networking in Africa: challenges, achievements and opportunities (Dr Barry Boubakar, Research and Education Networking Unit, Association of African Universities)

The Association of African Universities (AAU) was established in November 1967 in Rabat, Morocco and is based in Accra, Ghana. It comprises more than 200 member institutions in all African sub-regions. The AAU convenes a general conference once every four years at which the board is elected. A conference of rectors, vice-chancellors and presidents takes place every two years.

The AAU has several programmes and services – including quality assurance, mobility, leadership and management, HIV/AIDS, the Database of African Theses and Dissertations (DATAD), gender, and research and education networking. The programmes change every four to eight years depending on new issues that emerge.

A four-year AAU core programme on Research and Education (R&E) Networking was approved with a mandate of the 11th General Conference in Cape Town in February 2005. Among other foci, the programme includes support for the development of ICT for higher education in Africa. There has been a strong mandate to the AAU Secretariat to assume a focal point role for ICT.
initiatives for African higher education institutions, followed by attempts at synergy. The focus is on R&E networking for collaboration and improvement of access to information and knowledge.

The REN Unit was established in the AAU Secretariat in 2006 with the support of the Partnership for Higher Education in Africa (PHEA) (a group of US foundations) and the International Development Research Centre (IDRC).

Activities are also funded by the African Capacity Building Foundation (ACBF), based in Harare, Zimbabwe. The activities include:

- The establishment of strategic partnerships with relevant organisations throughout the continent and aboard
- Participation in relevant events and advocacy
- Organisation of workshops (awareness raising, policy dialogue at national and regional levels and capacity building; Leadership Development Workshop (LEDEV) series for vice-chancellors and deputy vice-chancellors of African higher education institutions; activities in various fields including ICT policy development
- Development of policy guides for higher education institutions
- Clearinghouse on R&E networking and ICT policy; putting together resources that are relevant to members and the community in general.

Some facts about Africa:

- Africa has a total population of about 955 million, which is 14% of the world population.
- Telephone penetration: 3.8% (mobile: 27.5%)
- Sub-Saharan Africa: 1.6% (18.3%)
- World average: 19% (49%)
- 51 million Internet users (5.3% penetration)
- World average: 22%; North America: 73%
- 2% of Internet Protocol (version 4) address space
- 0.2% of world’s total internet capacity

Why is REN crucial for Africa?

- Bandwidth in Africa is the most expensive in the world (at an average of US$4 000 per Mbps/month)
- The main reasons are the lack of competition, the use of costly technologies as well as inadequate regulatory environments.
- There is a need to build bargaining power (a good example is the PHEA-supported bandwidth consortium)
- There is also a need to sensitise policy- and decision-makers.
- African scientists and researchers are isolated and generally lack critical mass for successful research activities. There is thus a need to network and collaborate (at national, regional, continental and international levels).
- We need to reduce the brain drain that results from frustration.
- We should tap the potential of the African Diaspora to contribute to African development. See the 2007 COREVIP (Conference of Rectors and Vice chancellors of Institutions and Universities) report
- Blended learning is part of the solution to access and massification.
- Scarce resources must be shared (not only information, knowledge and pedagogical resources, but also human resources).
Figure 1: NRENs in Africa

In the next year, there will be three major fibre infrastructures in east Africa that will push prices down: SEACOM (East Africa to London), TEAMS (Mombasa to Fujairah) and EASSy (East Africa to Port Sudan).

On the west coast of Africa, WACS (Cape Town to London) and MalIN OnE (West Africa to Portugal) are due to be installed by 2010.

NRENs in Africa can be categorised into three groups (Figure 1):

- **Established (functioning) NRENs:** Active RENs essentially established in Northern, Southern and Eastern Africa. Well established NRENs include:
  - TENET (South Africa)
  - KENET (Kenya)
  - MAREN (Malawi)
  - EUN (Egypt)
  - MARWAN (Morocco)
  - RNU (Tunisia)
  - CERIST (Algeria)

- **New NRENs:** There are several initiatives in all African regions for the formation of NRENs. Most of the initiatives form part of the Southern/Eastern Africa (UbuntuNet momentum):
  - Eb@le (DRC)
  - MoRENet (Mozambique)
  - RENU (Uganda)
  - RwNet (Rwanda)
  - SUIN (Sudan) – now well established
  - TERNET (Tanzania)

- **Emerging NRENS (NRENs in formation):** Advanced initiatives include:
  - ZAMREN (Zambia)
  - NAMREN (Namibia)
NgREN (Nigeria): Ten vice-chancellors committed themselves to establish NgREN (February 2008).
GARNET (Ghana): Policy dialogue is ongoing; two working groups have been formed on policy and architecture; there have been recent developments (March 2009).
Cameroonian REN (embryo exists with RIC): Government has made a commitment to establish it.
Senegal (RENER): Policy dialogue is ongoing; a meeting of decision-makers is in preparation.
Côte d'Ivoire: Policy dialogue is ongoing, despite the difficult political situation.

Regional RENs

The first regional initiative in Africa was the EUMEDConnect project, which was funded by the European Union. It links Mediterranean African countries with Europe through GEANT. The next step will be direct links from individual countries to GEANT as well as direct interconnection between the countries.

Another major initiative has been the UbuntuNet Alliance among several Southern/Eastern African NRENs to interconnect and share bandwidth. There has been strong commitment by members under difficult regulatory environments. The UbuntuNet Alliance has been connected to GEANT since January 2008.

There an initiative to establish a regional REN in West/Central Africa.

There has been progress, despite challenges, in the following areas:
- Awareness raising at the highest level (among vice-chancellors, ministers and heads of state) on the importance of R&E networking for African development
- Development of clear and coherent national ICT policies taking into account both regional issues and R&E specific needs
- Regulatory environment
- Disparity of market environment throughout the continent; need for harmonisation within regional economic communities (RECs)
- Human capacity development
- Institutional Internet Protocol resources.

Enabling role players present opportunities, for example, the many enablers and supporters of the African REN community:

Continental bodies: African Union Commission (AUC) and European Commission (EC) (The AfricaConnect project aims to consolidate and connect the African research and education network to GEANT; a feasibility study has been done and the report is due to be released in October). Other continental bodies that support the African REN community include the AAU, African Network Operators Group (AfNOG) and AfriNIC, the registry that allocates IP resources for the African region

Governments

Regional and national bodies: regional economic communities (RECs) and regional regulatory associations (RRAs) (for example, SADC, ECOWAS, WATRA, CRASA), national regulatory authorities
Development partners, including IDRC, PHEA, SIDA, ACBF, Andrew W Mellon Foundation
Various other organisations, including NSRC, IEEAF, OSI, KTH
Private sector (mainly through some of the above-mentioned organisations)
The international REN community (GEANT/DBANTE, DFN, GARR, Internet2, RENATER and many others) is an important asset to build on.
The presentation gives a global overview of what is happening in Africa

**Discussion**

Remarks by the various participants in the discussion are unattributed.

→ The idea of capitalising on Diaspora Africans is always suggested, but we but tend to forget the friends of Africa, who are not Africans but work for Africa.

→ The issues of connectivity and e-learning content are closely connected. We need an opportunity to identify the linkages.

→ We have been infrastructures and can expect significant improvements in connectivity in the next 12 months. The next major issue to address will be what to use the infrastructure for.

3. **SESSION 3: TASK GROUP BREAKAWAY SESSIONS**

3.1 *Breakaway Session A: Task Group on Digital Knowledge Infrastructure*  
Chair: Prof. Don Riley (University of Maryland)  
Rapporteur: Dan Cohen (US NAS)

3.2 *Breakaway Session B: Task Group on Digital Knowledge Resources*  
Chair: Prof. Ms Susan Veldsman (ASSAf)  
Rapporteur: Paul Uhliir (US NAS)

**DAY 2 (12 MAY 2009)**

4. **SESSION FOUR: COMBINED TASK GROUP SESSIONS**  
Chair: Dr Bill Anderson (Praxis101)

4.1 *Open institutional repositories*

The chairperson explained that the primary task of the session was to reach consensus on how to move forward with the open repository component of the IAP programme. The session would comprise presentations on example of open repositories, recommendations and general discussion on how to move forward, including best options for concrete proposals, actions and outcomes.

4.1.1 Sub-Saharan Africa (Jackie Olang, NASAC)

The Network of African Science Academies (NASAC) was founded in Nairobi, Kenya in December 2001 as an independent forum for African science academies to:  
Provide (individually or jointly) independent evidence-based advice to African governments on scientific issues of critical importance to development within Africa  
Prepare and issue common statements on major issues relevant to Africa.

NASAC members are institutionally based. NASAC strives to be relevant with respect to policy advocacy on the African continent.

There are 16 established science academies in Africa, only 14 of which are NASAC members. Academies exist in Cameroon, Egypt, Ghana, Kenya, Madagascar, Mauritius, Morocco, Mozambique, Nigeria, Senegal, Sudan, South Africa, Tanzania, Uganda, Zambia and Zimbabwe. Academies are in the process of being established in Botswana, Ethiopia, Rwanda and Tunisia.

NASAC has a mandate for the following:

Proceedings: 2nd Meeting of the Steering Committee; 1st Meeting of the Task Groups (11–12 May 2009)
To establish academies where none exist  
To empower existing academies by strengthening their secretariats, strengthening their influence on government policy and voice in participating in discussion of scientific matters within both national and international forums  
To serve as an independent platform for credible advice  
To be the voice of science in Africa.

The challenges facing NASAC include the fact that academies in Africa are generally:  
- Limited in resources, and the majority of them need strengthening and transforming from static ‘private men’s clubs’ to dynamic ‘organisations’  
- Not open to membership of younger scientists of academic merit  
- Act locally and in isolation even on common critical problems, with a limited sense of collective action.

The opportunities for NASAC include:  
- Regional and international bodies that are committed to science already exist, including SADC, ECOWAS, ICSU, AU, NEPAD and ASADI.  
- African governments acknowledge the need to support science from GDP. They are committed to investing 1% of GDP in science, but this has not yet been realised.  
- The Millennium Development Goals (MDGs) provide a framework for addressing development needs, through science, that are relevant in Africa and globally.  
- There has been an increased global focus on and interest in Africa, particularly from the USA with its new African American president. The last AU meeting proposed the formation of a United States of Africa.

NASAC pursues its opportunities by, among other things, making joint statements, which target policy-makers. NASAC has the following joint statements on record:  
- Joint statement by G8 countries and NASAC on science and technology for African development, made to the G8 Summit in Scotland in 2005  
- NASAC statement on science and technology for Africa to AU Summit in Addis Ababa, Ethiopia, in January 2007  
- NASAC statement on sustainable energy, efficiency and climate change in relation to Africa to G8 summit in Germany in June 2007  
- NASAC statement on sustainable development to G8 summit in Japan in June 2008  
- A forthcoming statement is to be made on chronic brain drain to G8+5 Summit in La Maddalena, Italy, on 15 June 2009.

Most of these statements have resulted in international recognition for NASAC, but there have been few African statements to foster policy awareness on the African continent. This is an area that NASAC is beginning to address.

The NASAC strategic action agenda for the period 2008–2010 includes the following activities:  
- Provide strategic support young academies and inclusion of potential members (universities)  
- Encourage best practices for science academies (benchmarking)  
- Develop and share expertise on funding opportunities  
- Organise scientific conferences and Ministerial roundtables, making a point of involving young and Diaspora scientists  
- Become the science adviser and partner (Africa)  
- Support the creation of national science foundations. Only South Africa has so far been able to do so.

NASAC has built strategic partnerships with the following, which provide various forms of support:  
- IAP for capacity building support (especially small grants to struggling academies to enhance infrastructure in academies), science education programme. A proposal is being developed for a regional water programme.
• African Science Academies Development Initiative (ASADI), which supports annual conferences. The 2009 conference is scheduled for November 2009 in Ghana.
• Royal Society and Pfizer, which support mentoring, training and institutional support.
• Dutch Ministry, which supports optimal functioning of secretariats and increased membership of academies for critical mass on the continent.

NASAC undertakes the following actions in pursuing its strategic action agenda:
• Assists in strengthening established merit-based science academies
• Facilitates the establishment of new academies where none exist in a regionally coordinated fashion
• Improves the NASAC web presence by establishing an independent NASAC website. The NASAC website is currently hosted on the African Academy of Sciences website.
• Supports NASAC’s collaborative projects (including ASADI, RS/Pfizer and IAP)
• Supports exchange programmes among NASAC members as well as between them and other academies worldwide
• Strengthens links with major intergovernmental organisations such as AU, NEPAD, ADB, ECA, G8
• Issues statements when appropriate.
Discussion
Remarks by the various participants in the discussion are unattributed.

→ Inputs of the meeting were invited on what a NASAC organisational institutional repository workplan should include.

→ There were discussions after the Shanghai meeting about whether it would be worth establishing a small institutional repository at each academy as opposed to having a central institutional repository at NASAC with a chapter for each member academy. Once an academy is sufficiently mature, with its own capacity, it could establish its own institutional repository. A NASAC institutional repository could thus be considered as an incubator for a period of three to five years. It would not be feasible to establish an institutional repository at each academy unless there is enough content and publicity, and it is sufficiently utilised. A central location would allow efforts to be focused and enhance training.

→ A central academy is to be recommended as long as it is endogenous, arising from the willingness of the people in the country, and providing only support and funds in a situation in which the willingness to establish such an institution already exists. It should not be forced on people.

→ Another recommendation is to work with academies that are not merit-based and assist them in moving towards being merit-based.

→ Where will the information on the OIR be generated? Will each academy generate sufficient information, or will there be reliance on universities to generate the information. If so, it would perhaps be better to distribute to OIRs among universities than academies.

→ In the experience of South Africa, institutional repositories are driven by universities. The content is the work of universities, but institutions such as the NRF and ASSAf play a supporting role and provide advice on policy to ensure that initiatives move forward. There is thus a role for academies to identify the gaps in the system and assist institutions that are battling to set up institutional repositories to consider linkages between pockets of institutions so that the content is accessible to everyone.

→ It would seem that if an open repository is to be located at NASAC, it should support the roles of the organisation which are advisory, capacity building and strategic planning. If NASAC were to have a repository, the content should be organised according to the themes or objectives of NASAC, rather than according to member contributions. Such a repository might include reports from other organisations that are relevant to NASAC’s stated goals. In that way, the repository would be coherent, supporting the objectives both of NASAC and its members. Member institutions should not be obliged to submit material unless they wish to do so, in order to overcome sensitivities with respect to transferring information. The NASAC OIR could thus become a group effort.

→ It is very important to bear in mind that any repository has to support the institutional mission. In the case of NASAC, this would include showcasing African science. The themes might include, for example, sustainable development and renewable energy research from members from different parts of Africa. These themes could serve as a model to show other members the use to which the OIR could be put.

Continuation of presentation (Jackie Olang)

It is proposed that the workplan for the NASAC OIR focus on thematic areas:
Based on programmes, for example, science education and water
• Based on priorities, for example, the MDGs, existing academy and other institutions' work (regional or national).

The following draft work plan is proposed:

• NASAC website online: June 2009
• Focus on at least one theme: July 2009/10
• Link to Ugandan and South African portal in due course.

The portal should support networks in thematic areas critical to sustainable well-being in Africa in order to share best practices, develop joint projects and provide training for young scientists.

**Discussion**

| Remarks by the various participants in the discussion are unattributed. |

> From a strategic planning and operational perspective, bear in mind when writing the proposal that it will be implemented in phases. NGOs as well as universities should be involved in the third phase.

4.1.2 Open institutional repositories in Sub-Saharan Africa (Eve Gray, ASSAf Committee on Scholarly Publishing)

The presentation looks at broad strategic issues that one needs to take into account with respect with open institutional repositories.

**The global scholarly knowledge divide**

Source: www.worldmapper.org © Copyright 2006 SASI Group (University of Sheffield) and Mark Newman (University of Michigan)

**Figure 2: Science research**
Figure 2 illustrates scientific publications. Africa publishes very little and exports the knowledge it has to be published in the North. South African policy actively contributes to this situation, and this is largely true of other African countries. The generation of scientific results and the publication thereof is driven by ageing men. In South Africa, the system is dominated by white men in their late 50s and 60s that are about to retire. This system is anathema to young scientists, because it denies the collaborative, interactive, lateral, open world in which internet-driven science operates. There are hidden problems that we do not always acknowledge. This is a world of publishing journal articles, in indexed journals in the North. It is a world of the knowledge economy, of greed and money, in which the drivers are largely commercial companies as well as some science societies. Figure 3 illustrates the reality we face in terms of world poverty.

![Map of World Poverty](image)

**Source:** www.worldmapper.org © Copyright 2006 SASI Group (University of Sheffield) and Mark Newman (University of Michigan)

**Figure 3: World poverty**

**What is the potential of institutional and subject repositories to deal with these realities?**

OpenDOAR lists 24 African digital repositories. Of these, 20 are in sub-Saharan Africa, and 16 are in South Africa. These include institutional repositories, electronic theses and dissertation (ETD) databases, and a few subject or departmental repositories, the latter at the University of Cape Town (UCT) UCT, which many in many indexes ranks as the leading research university on the continent, does not have a university repository. Some individual departments have therefore established their own. In places where it is not possible to have a big repository, we could consider the potential to establish repository spaces using meta-tagging and standards that allow those to be interoperable. In this way, Africa would be able to harness all the research that it produces.

The institutions that have repositories include the following:

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University of Pretoria (UPSpace), which has succeeded as a result of high-level championing from the top echelons of the university, investment, dedicated people, and collaboration between the library and academics.

- CSIR (CSIR Research Space), which produces a huge amount of knowledge and could be very powerful.

**The potential impact**

Knowledge must be marketed, promoted and broadcasted rather than simply putting it in a repository.

The Human Sciences Research Council (HSRC) Press, which was established in about 2002, is a local example of a successful scholarly publishing press. Its South African books and reports are downloaded in every country of the world except Greenland. Its impact factors have massively increased. There are at least 1 500 downloads per month for most of their books. They have become the first call for policy-makers, politicians, journalists and academics that want to know about social science research in southern Africa. This has attracted the government to the HSRC, improved its funding potential and ability to attract contract research. The means to track such connections should be found. The message is: ‘Do it well, do it professionally and advertise.’

Publish what is needed, whether it is books, reports, or policy papers.

**Grey literature**

I do not like the term ‘grey literature’ (a body of materials that cannot be found easily through conventional channels such as publishers), since socially focused research is often denigrated as grey literature.

The UCT Institute for Infectious Disease and Molecular Medicine works with a community focus. Their high-level basic research on the origins of disease enables an understanding of human disease for the development of new drugs. They then translate their work from the laboratory to the bedside in order to improve people’s lives. In a survey of research at UCT, this translation cycle was found to be very important. African researchers are very good at field work (far more so than their counterparts in the North), and the interaction between basic research and social engagement is very important.

UCT has 58 accredited research units, all of which place their publications online, but it is very difficult to find them. When we consider repositories for academies in Africa, we have to address issues such as what happens to material that is not being curated.

The role of librarians is not often addressed. We do not acknowledge that librarians are treated very differently in the US and British traditions. In South Africa, librarians report to the administrative structures of the university. They are regarded as service providers rather than as part of the academic community. If we are to successfully run open access and institutional repositories, it will be necessary to change that mindset and possibly to address the issue of librarian training. Part of the advocacy programme would be to address ways of bringing curation and dissemination together with academic effort.

In a paper entitled ‘The relationship between OA repositories and Open Educational Resources’, Cheryl Hodgkinson Williams (Centre for Educational Technology, UCT) has written a critical paper on degrees of openness, challenging the idea that things can be open or closed. She challenges the notion that there is an academic divide between academic materials and teaching and learning materials. She says that these are usually seen as distinct – open access referring to scholarly journals in particular and open educational resources (OER) referring to lecturer and student-generated teaching and learning materials. She believes that the boundaries between research materials and teaching/learning materials begin to blur, particularly at the postgraduate level. Teaching and learning materials tend to be scattered around websites at a university and
tend to be lost. They could be better curated if they were re-conceived as a spectrum of ‘knowledge-sharing’ along several dimensions, involving not only research but also other materials.

This approach would seem relevant to the educational ambitions of academies. ASSAf, for example, has a strong mandate to popularise science. The population of a repository also has to be considered, whether it can be translated into educational and popular material, and whether such translation becomes part of the academy’s repository or is done outside it.

South Africa is considering a project that takes research resources in a repository and links them to educational publishers and science popularisers, in terms of fostering donor-funded product development as well as the potential to license and sell the resources so that they can be very broadly available.

4.1.3 Central America and Caribbean (Prof. Robert Lancashire, Secretary, Caribbean Academy of Sciences)

The Caribbean covers a huge area. To put the size into perspective, it takes a full day to travel by air from Jamaica to Trinidad, which are several thousand miles apart. There is great difficulty in moving around the area, and in order to travel between certain of the islands, it may be necessary to go via Miami, particularly now that the global economic recession has forced several airlines to close down. Communication between islands is not good, even by phone, although e-mail makes it easier.

The proposed Caribbean Educational Knowledge and Research Network is due to come on line early in 2010. The University of the West Indies is spread out between the main campuses in Jamaica, Barbados and Trinidad. There is also an open campus that does distance teaching. The university is funded by 17 different governments. The main campus started in Jamaica in 1948 and currently has about 20,000 students. The Trinidad campus is the next largest.

When the university was first established, faculties were distributed between the different campuses, for example, agriculture went to Trinidad, law went to Barbados and medicine to Jamaica. Since then, some of the disciplines are offered on more than one campus, for example, Trinidad started offering medicine more than five years ago.

Caribbean Community (CARICOM)

The Caribbean Academy was established from Trinidad in 1988. The president was traditionally based in Trinidad, but about four years ago, the president was appointed in Jamaica and it was decided that the secretary should be close at hand. Prof. Lancashire is the current secretary. There are chapters throughout the region, and a general meeting every two years. The last one was held in Granada in October 2008 and attended by about 200 people.

The academy started in the English-speaking region but there are now chapters in other regions and no restriction in membership in this regard.

In response to a question, it was explained that there are, in addition to the Caribbean Academy, also Carriscience and the Caribbean Scientific Union (the latter includes Central America and is an association of academies).

The Caribbean Academy is not in a strong position to actively maintain repositories. Their role would be more advisory.

At the university campus in Jamaica, it was fortunate that the head of the medical library motivated the establishment of institutional repositories for about the last six years and has set up demonstration models with students. The first repository officially opened six weeks ago. It has
been mandatory for the last two years for all theses to be submitted electronically as well as in hard copy. The next step would be to move those into the repositories.

In addition, there had been a request that all research publications be submitted electronically. Loading publications has been a slow process, made more difficult because of the need for changes in mindset as well as problems with large publishing houses related to copyright.

A problem that DSpace and the repositories could solve relates to scientific data over and above the subset of the data that are published in any thesis. I have been motivating that not only should the thesis be submitted, but also the data from the research. Initially, it was thought that theses would be stored on the repository per department, but there are now so many cross-disciplinary research projects that there will just be a single area for storing all theses.

4.1.4 Caribbean Scientific Union proposal for an open institutional repositories infrastructure network for Central America and the Caribbean (Alejandro Caballero Rivero, Academy of Sciences of Cuba)

The strategic objectives of the proposal is that the Central American and Caribbean Academies and S&T Associations will develop or enhance research and education coordination and advisory groups in their respective countries to create an open institutional repository infrastructure network in this region and will improve this cooperation by identifying priorities and enhancing the quality, the quantity and visibility of further cooperation actions.

The goals of the project are:
- To engage the IAP and member academies of the region to strengthen S&T capacity in all countries by enhancing access to and use of digital knowledge resources
- To promote the goal of the IAP to enhance the quantity and quality of information on issues of science and society that are being exchanged among member academies.

The proposal is built directly upon the results of the International Workshop on Open Availability to Digital Scientific Information Resources in Central America and the Caribbean that took place in Havana, Cuba in September 2008 as well as on the previous IAP initiative between 2004 and 2006.

The following actions are proposed:
- Determine the status of OIRs and OA journals in each country, and the existing policy of the science and education ministries with regard to these OA mechanisms
- Develop a plan for implementing and using OIRs effectively within the national research and education sectors
- Carry out a technical training meeting for Central America and the Caribbean Region
- Create an OIR infrastructure network.

The actions are described in more detail in the following table:

<table>
<thead>
<tr>
<th>Action</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>To prepare an introductory document</td>
<td>To give a brief overview of OIRs. The document should be presented in as simple a format as possible, with clear and concise information, in order to be easily understood by the research and education communities.</td>
</tr>
</tbody>
</table>
| To develop contacts and collect background information | To establish and develop:
- Contacts with policy and technical representatives from science and education ministries and with IIBCT
- A wide range of contacts within the research and education communities in each country.
A fact-finding survey should be prepared to determine their coordination and their interests in the creation of an OIR national network that may be linked to other regional OIRs and to gather as much information as possible from both |

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### Action | Goal
--- | ---
To form a National Advisory Group | sides as to their perception of implementation issues (willingness, expected benefits, economic, technical, communication infrastructure issues, etc.)

- To examine all collected background information and to identify requirements and actions to move forward
- To prepare a draft report and present it for approval. This document will provide a brief overview. A work plan will be drafted to include specific information regarding its extent and location, proposed actions and responsibilities, resource requirements and proposed timescales and outcomes
- To implement the work plan and create the OIRs using the IBICT platform
- To prepare a strategy document that will identify the evaluation criteria, timing and process, and that will suggest some potential actions in case of undesired outcomes
- To publish all of the documents pertaining to the results of the project.

The Open Institutional Repositories infrastructure network will initially involve the countries represented at the Havana workshop, namely, Nicaragua, Guatemala, Cuba and the Dominican Republic. Other countries may also be interested in becoming involved, depending on the availability of funding. The first phase should be completed by December 2009, including discussions at national level, collection of background information, the initial draft report and the formation of national groups.

Thereafter, a technical training meeting for Central America and the Caribbean Region is proposed in the second quarter of 2010 in order to explore more deeply the requirements and ways to implement OIRs. The first repository is expected to be operational by the first quarter of 2011, provided that funding is available.

The expected potential impact of the project is:
- To strengthen S&T capacity in all countries by enhancing access to and use of digital knowledge resources
- To enhance the quantity and quality of information on issues of science and society that is being exchanged among academies of this region
- To build the policy advisory capacity of the individual academies
- To improve the cooperation activities in science and technology between Central American and the Caribbean Academies/S&T associations.

This proposal requests funding from the IAP in the amount of US$20 000 per year for a two-year period; eIFL.net may be able to help. Other funding sources need to be identified

### Discussion

Remarks by the various participants in the discussion are unattributed.

→ We need a more detailed budget for support, training and travel.
→ How is it envisaged that the network would be sustained over time.
→ The Caribbean Scientific Union will coordinate the initiative.
→ The thesis and dissertation proposal presented by Prof. Robert Lancashire could possibly be merged with this initiative.
→ One of the difficulties is to raise awareness and to address the misperceptions of people that are hesitant to input material. Workshops and training are needed to allay
misperceptions. There are still colleagues that will not even send an electronic reprint because of fears that their ideas will be stolen.

4.1.5 Open Access: the Brazilian case (Hélio Kuramoto, General Coordinator of Research and Support to Consolidated Service, IBICT)

In Brazil, initiatives for open access are driven by the Ministry of Science and Technology taking a top-down approach and establishing the Brazilian Institute of Information on Science and Technology (IBICT) with the mission to promote the registration and dissemination of scientific production.

There are two kinds of initiatives in Brazil:
- Centralised model: SciELO, an electronic library of journals, with all the journals in the same server. About 600 journals in Brazil use the open journal system.
- Distributed model: A service provider harvests the metadata from journals.

The following open access initiatives have been adopted in Brazil:
- Policy: PL 1120/2007 in order to negotiate submission
- Political: Advocacy of the importance of open access initiatives with all segments of science, including meetings with universities, the minister education, and S&T and funding agencies
- Training: Developing competence to use and develop OA model
- Technological: Identify software; transfer software to the data providers to develop OIR; develop interoperable model open archives initiative (OAI)
- Funding: Distribute technological resources to the universities; develop a pilot project with five universities.

The advantages of using open access include:
- Rapid dissemination of scholarly information self-archived in the repositories
- Improving the visibility of papers self-archived in the repositories, which maximises the visibility of a researcher’s results
- Improving the impact factor: open access leads to quick dissemination, better visibility and the possibility of a high impact factor

The results that have been achieved include:
- The Brazilian Digital Library of Theses and Dissertations integrates 82 Brazilian universities and has more than 85 000 full text electronic theses and dissertations
- The Open Journal System (OJS) is used to manage more than 650 Brazilian journals.
- The Brazilian Manifesto Supporting Open Access could be a guideline for national policies elsewhere to open access to scholarly information.
- Today, Brazil has many institutional repositories managed by DSpace or EPrints.
- The model is very flexible, because data providers do not need to use the same software. The only requisite is to use OAI-PMH. Technical competence is being built in Brazil to use tools for open archives.

The following conclusions can be drawn:
- Open access is an opportunity to improve the visibility of our research.
- All initiatives undertaken by IBICT towards open access contribute to designing a national policy for the registration and dissemination of scientific production.
- To achieve the goal of open access to information, we need to strengthen human interoperability;
- It is necessary to convince all segments of the scientific community of the importance of open access to the development of the country.
Because the approach is top down, researchers do not always appreciate how important open access is.

Discussion
Remarks by the various participants in the discussion are unattributed.

ASSAf has partnered with SciELO in Brazil and is creating a platform for open access to South African journals.

4.1.6 CLARA: Formation of a federated network of institutional repositories for scientific documentation in Latin America (Martha Giraldo, Executive Director, RENATA, Colombia)

RedCLARA received valuable assistance from the EU for establishing the network among 12 countries in Latin America. RedCLARA has connections with GEANT in Europe and Internet2 in the US. The following countries are already connected: Chile (September 2004), Argentina (October 2004), Brazil (October 2004), Mexico (November 2004), Peru (April 2005), Uruguay (June 2005), Panama (June 2005), Venezuela (November 2005), Guatemala (December 2005), El Salvador (December 2005), Ecuador (January 2006) and Colombia (March 2006).

The following six countries are still to be connected: Bolivia, Costa Rica, Paraguay, Honduras, Cuba and Nicaragua. We are expecting them to connect in the second phase during the next four years.

Meetings of the coordinators are held twice a year to share experiences and work.

Formation of a Federated Network of Institutional Repositories for Scientific Documentation in Latin America

The Formation of a Federated Network of Institutional Repositories for Scientific Documentation in Latin America is a CLARA project. The initial beneficiary countries are Brazil, Chile, Colombia and Mexico. The project is intended to be extended to the other member countries. This is an initiative of the Inter-American Development Bank (IDB).

CLARA is the Executing Agency. The budget totals $US986 465. The execution time is two years. This is a Regional Public Good type of project because: It is in the public interest.

The public sector/government is responsible for public policy in each partner country and is part of the production.

The Regional Public Good will be a federated network of institutional repositories of scientific publications for the purposes of storing, sharing, and giving visibility to scientific production, thus supporting the scientific and technological development of the region, under a framework agreement in terms of interoperability and information management.

This initiative will be publicly available and thus contribute to the recording and dissemination of scientific knowledge, understanding it as a public good, which is a crucial input for the scientific and technological development of each country and the region as a whole.

The project requires that the related public agencies of each NREN country participate in the development and the governance of the Regional Public Good. The participation of a national science and technology organisation (ONCYT) or a Ministry of Education is therefore required for the country to be eligible.

The project comprises the following components:
• **Establishment of common agreements, strategies and policies:** Common strategies and policies at regional level, derived from best practices identified in terms of storage, retrieval, federated access collections, services available, standards for interoperability, tools for recording documents, safety and quality, intellectual property and copyrights, connectivity to the advanced networks. The activities are expected to extend over six months and entail the following:
  
  National pre-diagnosis
  Workshop with project partners and experts for criteria alignment and definition of a preliminary list of agreements (three days)
  Consultation process to establish agreements (three months)
  Validation of agreements (three days). Project partners and experts.
  Final document.

• **Development and establishment of a pilot project:** The activities entail the following:
  
  Due to agreements, definition of standards, metadata, thesaurus, indexing
  Adaptation of the software infrastructure necessary for a federated network
  Development and implementation of uniform access interfaces
  Implementation of institutional repositories to be federated
  Pilot trial.

• **Training for professionals in charge of repository management at the institutions:**
  
  Consultancy for identifying training needs, training design and content development. The envisaged activities entail the following:
  
  o Detection of training needs
  o Design a strategy for human resources training
  o Development of the content that will be part of the training
  o Implementation of web content.

• **Sustainability:** Defining the basis for making the regional public good (RPG) sustainable over time, ensuring its viability and growth over time. The work methodology would involve consultancy for strategy definition, plan design and dissemination, as well as a cycle of meetings. The envisaged activities entail the following:
  
  o Defining a strategy for financial, technological, organisational and social policy sustainability
  o Designing a plan for disseminating
  o Cycle of meetings in with academic, scientific and policy-makers in Latin America to disseminate and promote open access.

The project has been pre-selected by the IDB for possible funding. There have been two meetings with the bank. Components and activities are being adjusted. An additional two countries were invited to join as recommended by the bank.

**Colombian Digital Library**

RENTA with the assistance of the Ministry invites submissions from projects that wish to make use of the network, and the best proposals are funded. One such project was the federated repository which is to be launched in June 2009. The objective is to design, develop and implement a model to create the Colombian Digital Library, integrating repositories or digital libraries to enable access and visibility to the contents of the Colombian academic and scientific production, using the high-speed network RENATA. Thirteen institutions are working together on this project. This is an open access initiative related to the free distribution of content, which should be of interest not only for the institution but for others.

**Discussion**

Remarks by the various participants in the discussion are unattributed.
This example from Latin America might be a good model for Central American and the Caribbean region. The IDB might be interested in funding something similar for that region.

In that case, I would be interested in collaboration.

The Caribbean Knowledge and Learning Network (CKLN) seems to be pursuing a similar path with IDB funding with a broader focus that just CARIBNET, which is a necessary enabler for the initiative related to distance learning and shared resources. I am not certain whether that proposal is building open repositories.

CKLN is very involved with distance education. The University of the West Indies and the open campus are major contributors. The initiatives consider both infrastructure and content.

That seems like a different focus. That project is building infrastructure in terms of networks and doing distance education, which is not the same as open access.

First one needs a network, and then open access can be added. The model could thus be leveraged for open institutional repositories.

It would support the cause of the project in its application to the IDB to have a letter of support from the IAP.

In dealings with the IDB, they have indicated that they only fund individual countries.

The IDB also has a programme for funding Regional Public Good initiatives.

4.1.7 eIFL-OA and IAP Program on Digital Knowledge Resources and Infrastructure In Developing Countries (Iryna Kuchma, eIFL Open Access program manager, eIFL.net)

eIFL.net is an independent foundation that negotiates and advocates for the wide availability of electronic resources by library users in transitional and developing countries. The membership of the network includes about 4 000 libraries in 46 countries.

eIFL.net operates the following six programmes:

- Open access: the programme seeks to enhance access to research thereby accelerating innovation and economic development in the countries. It relates to open repositories, open access journals, open educational sources, open data, open access policies, and trainings and consultations. The activities involve advocacy and capacity building
- Advocacy for access to knowledge with respect to copyright and libraries
- Promoting free and open source software for libraries
- The benefits of library consortia
- Promoting a culture of cooperation: knowledge and information sharing
- Advocating for affordable and fair access to commercially produced scholarly resources.

The types of things that scientists want of their research environment include (from Dr Peter Murray-Rust, researcher in molecular informatics, who created Chemical Markup Language, investigating how the chemical literature can be text-and data-mined to discover new science from heterogeneous data sources):

- Quality peer review
- Immediate seamless access and search to all published information (in electronic format, not photocopies)
- Interdisciplinarity, rather than subject libraries. There should be no arbitrary disciplines boundaries
- Access to experimental data and its re-use
Writing papers and grant applications as efficiently as possible
Building a personal collection of relevant papers
Collecting, versioning, annotating and preserving (at least in the medium term) experimental data, perhaps through a society or publisher
Recognition for their work, papers, data, software, services and methods.

The world (through the web) is moving in that type of direction anyway, characterised by features such as (continued from Dr Peter Murray-Rust Dr Peter Murray-Rust):

- All information will be free and online.
- Everyone will be pervasively connected.
- The system will develop through evolution rather than planning.
- Major players are entering rapidly (including Google, Yahoo and Microsoft)
- Personal information collections will appear online.
- Clouds and Communities
- The Semantic Web
- Micropayments???

From Clouds to Communities is an example of a free online library, describing water supply systems, both publicly or corporately owned. The starting point is a built-in problem about which authors write.

The Semantic Web is the extension of the World Wide Web that enables people to share content beyond the boundaries of applications and websites.

In this environment, the capacity for making micropayments for data and information could possibly continue to develop.  

**Recommendations** on how to move forward with the open repository component of the IAP programme

We should first define the content. The core content would be peer-reviewed articles.

In sub-Saharan Africa, we should consider a place for open access journals in this project, since most of the OA scientific content would comprise articles that had already appeared in peer-reviewed local African journals. It is recommended that African Journals on Line should be open access. In South Africa, ASSAf is already working with SciELO towards open access journals.

There is also a place for other types of content, including conference presentations, books, course packs, annotated images, audio and video clips and research data as well as gray literature (the latter comprising preprints, working materials, theses and dissertations, reports, conference materials, bulletins, grant applications, reports to donors, memorandums, statistical reports, technical documentation and questionnaires).

In the planning stage, we should consider how the repository will be used and build in the necessary capability from the start, for example:

- Generation of usage statistics
- Generation of a bibliography
- Publication of personalised researcher information
- Setting up of a mailing list
- Automatic updating of research group web pages
- Submission of information to administrators and managers
- Update teaching pages.

**Why open repositories?**
Academic and research institutions, as well as research funders, find open repositories valuable in generating management information and reports on their research programmes, enabling better research assessment, and raising awareness of their research profile and transparency. The benefits of open repositories include:

- Opening up the outputs of the institution to the world
- Maximising the visibility and impact of these outputs
- Showcasing the quality of the research in the institution
- Collecting and curating the digital outputs of the institution
- Managing and measuring research and teaching activities
- Providing a workspace for work-in-progress and for collaborative and large-scale projects
- Enabling and encouraging interdisciplinary approaches to research
- Facilitating the development and sharing of digital teaching materials and aids
- Supporting student endeavours, providing access to theses and dissertations and a location for the development of e-portfolios
- Institutional and national level research assessment and research management, bringing together research expertise across the institution and country
- Information rich collaboration, effective decision-making and successful research activity
- Improved governmental policy and public health care outcomes

**OA and libraries**

Open access has changed the profile of academic and research libraries – more and more they have become partners in research, data curation and education, ensuring that the quality of digital resources is maintained, and openly sharing these resources with their users.

Academic and research libraries set up and maintain open access institutional or subject repositories, become partners in open access publishing, and help to create open educational resources.

Academic and research libraries also develop advanced and enhanced metrics, a new range of standardised indicators based on reader (rather than author-facing) metrics

They are also involved in advocacy to promote open access.

**Next steps for researcher managers**

- Introducing OA polices. Developing open access policy options for the Network of African Science Academies (NASAC) and individual African science academies would entail addressing issues in the scope of the policy such as whether to request or require OA, whether to follow the Green route (self-archiving) or the Gold route (open access publishing in an open access journal), which type of repository to create, what type of content to deposit, whether there will be any embargos or exceptions, as well as managing rights for OA content.
- Transforming journals into OA journals
- Setting up open repositories. Setting up a shared repository. E.g. Setting up a shared NASAC repository and a harvester entails establishing a repository steering group (or project board, management committee, working group, etc.) to undertake the high level management of a repository on behalf of the network of academies and individual institutions; involving key stakeholders (including senior management and policy makers, academic staff, library staff, technical support staff and other support staff); conducting a needs analysis and drafting a report; preparing a shared repository and harvester proposals to be approved by the management for implementation; setting up a server to host the repository; identifying a repository manager (project leader), who will have to do most of the work initially; identifying between one and four champions to work with initially; and knowledge sharing and training. Perhaps a shared repository could be hosted by NASAC. NASAC might also host a harvester
to harvest content from African repositories and OA journals. Perhaps a harvester could even be set up to harvest Africa-related publications from other repositories worldwide. Other value-added services could be considered. There is a need for both individual institutional repositories as well as a network of repositories. A shared repository will be needed for researchers that do not have access to a repository for their institution or research community. A harvester would harvest metadata from existing journals in the region and further afield. There is perhaps a need for a harvester in the Caribbean and another in Africa. The harvester could be used to showcase high quality research from the region.

- Spreading the word about OA.

### Planning checklists

The following set of questions to ask when setting up an open institutional repository has been adapted from the Repository Support Project, UK (http://www.rsp.ac.uk/):

- What is an institutional repository and what does it mean to you?
- Have you outlined and documented the purpose and drivers for institutional repository establishment in your institution?
- Have you defined your vision and initial goals?
- Have you decided how to position your institutional repository within your wider information environment?
- What is the target content of the repository?
- Do you have an institution wide intellectual property rights policy?
- Do any of your Departments already have other digital stores of publications? How will you manage duplication, transfer of resources and metadata, etc.?
- Does your institution have an information management strategy?
- Have you defined roles and responsibilities for your institutional repository development?
- What sort of statistics and management reports will you want from your institutional repository?
- Have you decided if and how you will collect usage and item download statistics for your repository?
- Have you defined your metadata requirements and set up an appropriate schema?
- Have you considered the workflows within your institutional repository and set up appropriate mechanisms to deal with incoming content?

A planning checklist for resourcing repositories for sustainability would include the following questions adapted from the Repository Support Project, UK (http://www.rsp.ac.uk/):

- Have you properly and fully specified the requirements of your repository?
- What is the anticipated growth of your repository?
- Are you running a pilot project or a production service? If the former, who, when, if and how will it transfer to a production service?
- Who will answer support/help desk queries relating to the repository?
- Have you considered how your repository may grow over the next year, three years, five years, ten years?
- Which digital formats can the repository commit to preserve in the longer-term? Is the repository collecting author source formats? Is there a viable action plan for monitoring the formats stored in the repository and the preservation risks associated with those formats?

The International Centre for Theoretical Physics (ICTP) will be holding an open access workshop from 12–16 October 2009 in Trieste, Italy. This will be a training and capacity building opportunity. eIFL is one the advisors to this workshop. If the people that will be managing the proposed repositories in Cuba and Kenya have been identified by July 2009, they could use the opportunity to attend the workshop for capacity building and training.

The week of 19–23 October 2009 will be Open Access Week; perhaps initiatives could be prepared for announcement or launching at that time.
4.1.8 OIRs inventory of resources and IAP member academies survey and summary analysis documents: an overview (Raed Sharif, PhD Candidate in Information Science and Technology, School of Information Studies, Syracuse University, USA; Research Fellow, Intellectual Capital Unit, Development Bank of Southern Africa)

The presentation gives an overview of two background docs on the wiki IAP Member Academies Survey of Their ICT Infrastructure and Institutional Repository Capabilities
An inventory of resources on planning, creating and managing open institutional repositories.

IAP member academies survey of their ICT infrastructure and institutional repository capabilities

The survey was conducted between 31 July and 19 October 2007. The main goal was to investigate the capabilities of science academies around the world in two main areas, namely: ICT Infrastructure and digital networks
Institutional repository and information sharing aspects.

Thirty-nine of the 96 academies in the OIP participated: 25 from developed countries and 14 from developing countries.

Only the findings with respect to significant difference are summarised here. The first area of significant difference between academies in different countries related to access to a personal desktop computer for every professional staff member; personal laptops; wireless network; voice over IP (VoIP) and online meeting/collaboration technologies.

Note: As used below, the term OECD refers to the fully industrialized economies, TE refers to transitional economies, and DC refers to developing countries. The term “OECD/TE” refers to a grouping that includes both the OECD and TE categories, and is used where there were minimal meaningful differences between these two categories, but there were significant differences between this combined category and the DC category.

Other areas of significant difference included:
- **Having an ICT (or an equivalent) department**: While more than half (16 out of 23) of the responding academies in the OECD/ transitional economy (TE) countries have an ICT department, only 1 out of 12 of the DC academies have such a department. The main reason for not having an ICT department reported by the responding developing country (DC) academies was the lack of financial resources (7 out of 10 academies).
- **Access to ICT specialists**: DC academies do not have enough specialists and human resources in the areas of networking, Web design and publishing, Personal computer support and maintenance and database development and administration.
- **Obtaining ICT Support Services**: While the majority of OECD/TE countries’ academies rely on internal support staff and regular external services in terms of obtaining ICT services, most of the DC academies rely on external support service on an as-needed basis.
- **Annual Budgets**: A large majority (20 out of 22) OECD/TE countries’ academies have annual budgets for ICT equipment and management, while only a few (4 out 12) DC academies have any such budget available. Among the important areas that were reported by the DC academies where the ICT budget falls short are training, bandwidth access, and software and content development.
- **Internet Access**: Most of the responding DC academies (8 out of 12) still use dial up modem and/or leased lines to get Internet access. More than half (15 out of 25) of the OECD/TE countries’ academies use a broadband connection, however.
- **Website Update**: While a substantial majority (19 out of 22) of the OECD/TE countries’ academies update their website on a regularly scheduled basis, only about half (6 out of 11)
of the DCs academies do that. The rest of the DC academies update their website infrequently, or not on a regular basis.

- **Availability of information online**: There were no significant differences between the responding OECD/TE countries and the DC academies in terms of what kind of information is on their website in areas such as general information, news and press releases, organisational structure, directories and contact information of staff and members, and current reports and publications of the academy. There was a substantial difference, however, in the open availability of previous academy reports and publications between the OECD/TE countries’ academies (18 out of 22) and the DCs academies (4 out of 11).

- **Having digital institutional repositories (IRs)**: Almost half (10 out of 22) of the responding OECD/TE countries’ academies have their own digital repositories online. All of these repositories are open. Only two out of 10 of the responding DC academies have a digital repository.  (It was not clear from the survey whether these two repositories are open or not.)

- **Main reasons for not having a digital repository**: The reasons, in terms of importance, can be ranked as follows:
  - There is a need, but no financial resources
  - There is a need, but no experienced staff
  - There is a need, but no technical resources

- **Plans to have IR**: Almost half (4 out of 9) of the OECD/TE academies and (3 out of 8) of the DC academies who do not have digital repositories indicated that there are some plans to establish one soon.

- **Senior Management Support**: The responding academies from both the OECD/TE countries and DCs who do not have digital repositories agreed that there is a relatively high level of top management support and willingness, moderate levels of human and technical resources, and very low levels of financial resources and support to establish a new digital institutional repository.

The responding academies from both the OECD/TE countries and DCs that do not have digital repositories indicated that receiving help and support in only one of these resource areas might not be enough; rather, they need to receive help and support in all these areas, especially financial and technical resources.

The responding academies from both the OECD/TE countries and DCs who do not have digital repositories agreed that their academies would be willing to collaborate with other academies, or with similar institutions to create their own institutional repository.

The following general conclusions can be drawn:

- The current status of the ICT infrastructure, digital networks, and skilled human resources in these areas at most of the responding DC academies is relatively poor and requires attention if those academies are to perform (participate?) more effectively in the digital network environment.
- Because of the technology-related limitations and the clear lack of sufficient financial resources, the current status of information management, sharing, and archiving at the DC academies is also not optimal.
- The survey analysis shows some positive indicators, however, there is a serious lack of willingness and top management support at these academies to establish their own open institutional repositories, if the requisite resources can be made available.
- It is also obvious from the survey analysis that the OECD/TE countries’ academies have a good level of knowledge and experience in the area of open institutional repository development, management, and maintenance that could be transferred to the DC academies to help them create their own open institutional repositories.

**An inventory of resources for creating an open institutional repository**

The initial intention was to develop a toolkit of resources to assist institutions in setting up an OIR. Funding was limited. There were initial efforts to develop a toolkit, but it was discovered that there had already been some work in this regard, for example, MIT has a valuable step-by-step
guideline. It was then decided to form a small library of institutional resources, the main content of which includes the following:

- Introduction: Why establish an IOR online; purpose of the inventory.
- Important definitions and concepts about digitally networked OIRs
- The most common challenges in creating an OIR
- Selected resources relevant to the creation, management, maintenance and preservation of OIRs:
  - OIR Examples: more than 200 examples from developed and developing countries:
    - Open institutional repository examples from Africa
    - Open Institutional Repository examples from Latin America
    - Open institutional repository examples from Asia
    - Open institutional repository examples from the OECD countries
- Other useful resources: the experience of others
  - Links to other useful articles, and reports on OIRs:
    - Benefits, opportunities and challenges of OIRs
    - OIR issues in developing and transitional countries
    - Tools for establishing OIRs
    - Policy guidelines for OIRs
    - Metadata
  - Content recruitment and enlisting users’ participation
  - Important resolutions and statements in favour of open access.
- Glossary

**Discussion**

Remarks by the various participants in the discussion are unattributed.

→ The IAP tried all the URL links listed in the inventory and confirmed that they are functional.

4.1.9 Reshaping the world of scholarly communication: opening locks and using gears (Prof. Usha Mujoo Munshi)

The presentation gives a broad overview of OIR initiatives in India.

It is acknowledged that there is a need to create an environment in which open access will become the norm for distributing research. The concept of openness has been spreading its wings far and wide in many guises. Open source is most popular among academia due to and underlying philosophy based on sharing (which enriches both the giver and the receiver). Open access needs to be nurtured and sustained through a sustained cycle of human resources and efforts to help it continue what it has been able to do so far. The sustainability of initiatives is a challenge in the developing world.

The following are some statistics about R&D infrastructure in India:

- R&D institutions: national organs, state institutions, universities, private sector: 3 000
- National institutions of importance: 54
- Universities: approximately 300
- Deemed universities: 89
- Medical colleges: 164
- Engineering colleges: 880
- Colleges: 6 500
- About 100 billion rupees are spent annually on R&D
- Investment in R&D exceeds 1% of GDP
- India contributes about 3% of the world’s publication output
- The number of S&T personnel has been increasing at about 6% per year.

India is doing well in science publication and in certain areas is above the world average.
Open access journals

- Many leading journals published in India are already open access. NISCAIR (National Institute of Science Communication and Information Resources) journals are to become available in open access.

- Academies showed the way and set the ball rolling. Several other organisations followed.

- India has approximately 100 OA journals. Most of these are hybrid (published in print and online). Print copies are published against subscription. No Indian journal charges a fee from the authors for publishing papers.

- The National Informatics Centre (NIC), the Government of India (GOI) and some private publishers publish OA journals on behalf of about 75 societies.

- Indian open access journals are not yet listed in the Directory of Open Access Journals (DOAJ).

Open courseware

India is making headway at the level of open access courses too. NPTEL (National Programme on Technology Enhanced Learning) programme, jointly mounted by the Indian Institutes of Technology (IITs) and the Indian Institute of Science (IISc) is a world-class open courseware programme. It is funded by the Ministry of Human Resource Development (MHRD) of the government of India. The resources of the programme comprise 110 video courses and 129 web-based courses in six subject areas, focusing on engineering sciences and technology. All the uTube videos can be found on the NPTEL-HRD Channel (http://www.youtube.com/profile?user=nptelhrd). The Indian Institutes of Technology offer 400 more courses across five subjects.

Open access resources

The following are some examples of open access repositories in India:

Digital Library of India: The policy to digitise all material they acquire. Only out of copyright are made publicly available in open access.

Council of Scientific and Industrial Research (CSIR): This is a multi-institutional organisation with about 40 research laboratories and huge R&D output. When that material becomes in open repository, there will be considerable content.

National Science Digital Library: Out-of-copyright curriculum-based books in the sciences are made available in open access. There are about 450 currently books available, and the site is continually edited.

Traditional Knowledge Digital Library: Its function is to prevent misappropriation of traditional knowledge by international patents offices. It was set up by the Council of Scientific and Industrial Research. The data are not freely available but are made available to member patent organisations.

Important data centres, products and services

Some examples of important data centres, products and services in India include:

- National Collection of Industrial Micro-organisms (NCIM) (http://www.ncl-india.org/ncim/): A national facility dedicated to isolation, preservation and distribution of authentic cultures, containing 3 700 cultures.
- Indian Biodiversity informatics (http://www.ncbi.org.in): The National Chemical Laboratory (NCL) Centre for Biodiversity Informatics (NCBI) is an effort to collect, collate, analyse, predict and disseminate knowledge about Indian biota and their environment.
- CSIR Unit for Research and Development for Information Products (URDIP) (http://www.urdip.res.in/): Open access to Indian patents and medicinal plants, pollution technologies, CSIR rural technologies, ETD and research reports.
- Gateway services for open access resources, for example, SciGate Science Information Portal (IISc) (http://www.ncsi.iisc.ernet.in).

Digital learning resources

One of the largest digital learning resources is the Indira Gandhi National Open University, which has 30 464 modules across all disciplines. Some African universities are connected and make use of this resource. For example, 139 MBA modules are available in open access.

The Consortium for Educational Communication has 24 channels, learning objects repositories (LOD) as well as video on demand. The resource has a total of over 6 000 hours of video. The channels operate 24 hours a day.

The Jatan virtual museum technologies is an example of the digitisation of R&D initiatives.

Digitisation

The Indira Gandhi National Centre for the Arts (IGNCA) is involved in the digitisation of monuments. Modern software tools are used to create a knowledge-based information system. The potential of three-dimensional visualization is explored for application in heritage or as input to creating a virtual reality environment. Geometric modelling is used for the reconstruction and regeneration of artifacts.

Support systems: organisational

Most of the projects are funded by the government, particularly the following departments:
- Department of Science and Technology
- Department of Scientific and Industrial Research
- Department of Biotechnology
- Ministry of Information Technology
- Ministry of Human Resource Development

The National Knowledge Commission [NKC] has recommended mandating open access to all publicly funded research, and the recommendation is now with the Prime Minister. The topic was discussed both in the Libraries Working Group and in the Open and Distance Education Working Group of the Commission.

The South Asian Association for Regional Cooperation (SAARC) has a documentation centre.

Programmes

The following operate programme
- National Digital Preservation Programme (NDPP) (http://www.ndpp.in/)
- National Mission on Manuscripts
- Digital Library of India
- Digital Library Projects
- INSPIRE-Innovation in Science Pursuit for Inspired Research
- E-governance

Training/Workshops and other forums
A number of training courses on digital preservation and open access have recently been held or are to be presented in the next few months.

National Research & Education Network of India (NREN)

The ERNET National Knowledge Network engages in content-hosting relating to education and research, interconnecting all national research and education institutes, leading national laboratories and colleges and connecting more than 5 000 sites across the country. ERNET serves millions of end-users and e-science projects. ERNET uses a three-tiered architecture, partially subsidised by national funds.

**Reporting: Action plan**

For the digitisation of analogue sources, Carnegie Mellon University (CMU) and IISc have developed best practices for scanning, cropping and quality control and can share this with any group and also offer training. Software has been developed for metadata creation in any language, for web hosting and also for web access. This can also be shared. The scanners being used are Zhuetshef and also Minolta scanners, using Scanfix software for cropping. Other software that is used has been indigenously developed. Regarding the toolkit for OA and for training in OA, IISc can take this up and will give two sessions of training for two weeks for a batch of 20 people.

**Conclusion**

There is a need to educate funding agencies and senior research administration on the value, mechanisms and best practices for building knowledge resources and facilitating access. India’s investment – intellectual, effort and funds – can hope to gain a good return this way in terms of:

- Research visibility, usage and uptake
- Research applications, impact and citation
- Research productivity, progress and funding
- Research manageability and accessibility.

**Discussion**

Remarks by the various participants in the discussion are unattributed.

- Is the learning content that you make available through these systems in open standard format to allow interoperability?

- Most of the material is in open standard format, as it was developed only about a year and a half ago, when standards were already available. The open source software that is used is mostly DSpace using Dublin Core. All the material from the Indira Gandhi University is interoperable. The software is free.

**4.2 Discussion of two proposed open institutional repositories: NASAC and Caribbean projects**

**4.2.1 Discussion of proposal for NASAC project**

Remarks by the various participants in the discussion are unattributed.

- My response to the discussions so far is that we need to work on a project description for NASAC envisioning the roles of all players.
Some of the discussion related to whether to use a distributed or centralised OIR model, and the consideration of thematic organisation.

A repository without a mission is difficult to start and sustain. NASAC has its own mission that could be supported by a repository.

In formulating the mission for the OIR, one should think not only about one’s organisational infrastructure, but in broad architecture terms define the audience and their possible expectations. Too often we build initiatives around corporate structure rather than around what we want to say and what people need to hear.

One of the thematic suggestions made in the proposal was on water. I would suggest looking at academy members and identifying those that have done interesting and important research in that area. NASAC could then start pooling their work on the OIR as a demonstration of a theme-based repository.

If a theme-based approach is used, consider including work outside Africa on Africa (for example, from the National Academies of Science).

Especially consider including work on Africa from other academies.

Outside agencies should be aware of the work done in Africa that until now has been ignored, and the NASAC OIR could play a role in achieving that objective.

Pursuing that objective would form part of the audience and outreach function.

Both institutional and thematic models could be considered. Another type of example is that of a repository in India around an individual that made mark in a particular field and published several seminal papers.

As regards OA policies, the African region could consider adapting policies that have been developed for India.

the Open Access Scholarly Information Sourcebook (OASIS) has been working with eIFL and has developed templates, wording and policy that could be adapted for regional needs.

There is much literature readily available from India, particularly on water, the environment and health in a developing country context.

This raises the issue of educational links. Traditional courses are increasingly thinking in terms of thematic programme areas in areas such as renewable energy and water, drawing on the disciplines of engineering, geography and the social science for multidisciplinary topics. Most of the available resources are from developed countries, and a NASAC repository organised according to themes would therefore be very useful for people in developed countries that study these issues.

If the NASAC OIR were organised thematically, the IAP programme on water, for example, would need to be linked. Focusing on academy output on topics from Africa and beyond would be a useful initial core set of information within the framework of the academies. The initiative could grow from that.

There seem to be many resources that the NASAC project could draw upon. The NASAC project could result in a very focused initiative with much support in organising it.
4.2.2 Discussion of proposal for project for Central America and the Caribbean

→ This project proposal is at a different stage of development from the NASAC proposal.

→ We should first should prepare a more detailed budget and discuss funding possibilities with Dr. Martha Giraldo (RENATA and RedCLARA) and Ms Iryna Kuchma (eIFL). We should also discuss the project with Prof. Robert Lancashire (Secretary, Caribbean Academy of Sciences) as his proposal could possibly be combined.

→ eIFL can help with the project description but is not a funding institution.

→ Would a similar academy-oriented open repository be part of the proposal for the Caribbean Scientific Union, similar to the NASAC proposal for Africa? It seems that the academies and science associations in the region probably do not have the capacity to develop their own repositories, with the exception of Cuba, which has already has done some work in this regard. There could possibly be parallel initiatives in Central America and Africa.

→ The NASAC model with its own mission and thematic approach seems very applicable. It is a more concrete proposal that could leverage funding.

→ We could work together to develop a very similar proposal for the two regions.

→ Most of funders we approach want to do projects in their own territory.

→ There would be different funders for the two regions. We could collaborate in developing the proposal content but submit it to different organisations.

→ From the NASAC point of view, the Ugandan model that has been discussed, of the repository for HIV and malaria, would fit in well with our proposal.

→ These are two different projects.

→ Part of the NASAC mandate is to link with other projects.

→ There could be links, but the Ugandan initiative is a separate project.

→ We should add what ASSAf could contribute in terms of the SciELO South Africa platform. SciELO Brazil prefers to remain regional. ASSAf will attend to its own journals first and upload them to the platform. Possibly a few prominent African or sub-Saharan journals could then be identified for uploading. SciELO imposes stringent selection criteria to allow journals on to its platform. We could try using mentoring and peer review to develop African journal of higher quality.

→ I have discussed with SciELO in Latin America the possibility of mirror sites in other countries. This could form part of the proposal. The Caribbean Scientific Union (CSU) or Caribbean Academy of Sciences (CAS) repository could include that function.

→ It is critical for academies to find their niche so that we do not set up QA repositories simply for the sake of doing so. They have to yield benefit and be part of the programme of the academy. ASSAf has a niche in scholarly publishing with a focus on journals. The NRF has set up a database for theses and dissertations, which is their niche, since they fund research. ASSAf would like to strengthen scholarly publishing in South Africa, with a focus on journals and books, ensuring that they are not only well funded but also accessible. This assists in accounting for funding received.
– We need to make the proposal and the repository responsive to the strategic objectives of the academy. NASAC, for example, has many goals that an OA repository would support.

– We tend to regard journals and repositories as one and the same, with the OA environment simply replicating the print environment. We should not forget the pre-print functionality of open access for publishing papers that are not yet ready for formal publication in order to exchange ideas to refine methodology. The process is well documented and the knowledge has been captured. Many African papers do not make it to the final stage of publication, so pre-print could be valuable for improving the paper.

– That is a function of universities rather thanacademies, which do not have the mission to fulfil that function. We cannot open academy repositories to the extent that they do everything for everyone.

– Universities should perform that role, but we also have to work within the broader context. There may be a scholar working in relative isolation that could tap into what is being done at other centres.

– We should avoid taking on more than we can manage.

– I suggested establishing small subject departmental repositories where resources are lacking to do more than that. That type of approach might help address the needs of the isolated scholar. We have to find ways of getting maximum knowledge with minimum resources.

– The Library of Alexandria could assist NASAC in defining what value-added services could be offered.

– The basic building block is to establish an effective repository for NASAC and the CSU that will assist them in striving to meet their missions as academies of science. In doing so, it will be necessary to undertake capacity building and link with other organisations that already have the experience of setting up an OIR in order to draw up workplans and day-to-day work practices of repository management.

We are at a point of transition in terms of the kinds of items that researchers are producing. Before establishing the mission, it is necessary to establish the mission first. We will have to tap into new paradigms for research with respect to how scholarship is carried out, disseminated, tagged, linked and semantically marked. Prof. Chan’s proposal is complex in terms of the current stage of the programme. We need to be successful with the first piece before considering more complex applications.

4.3 Creation of an open knowledge environment (information item) (Paul Uhlir and Prof. Leslie Chan)

Background (Paul Uhlir)

We need to think through new models of knowledge production and education using web capabilities instead of simply shifting the print paradigm on to the web and replicating it in electronic journals.

The idea is to have a more integrated, interactive, thematic, open knowledge environment that takes data or journals that are thematically linked and integrates them into one platform on an
open access basis, using open source software and interactive capabilities so that they can be used for knowledge production, teaching and scholarship.

We should house such open knowledge environments in institutions that conduct research or universities whose students could both be part of the development of such a knowledge environment as well as users, in the process learning how to build such environments and do scholarly research in a comprehensive integrated way.

There are existing models in various fields, primarily biology, as well as others.

In the US, law schools have law reviews, and the top students produce the journals. We could adopt that model for the sciences and have graduate students doing management and production with assistance from libraries and other departments (for example, Computer Science, Information) that might be interested in interdisciplinary research.

Such an initiative could be undertaken by an inter-university consortium, with different elements assigned to each partner. In this way, over time, we could reintegrate the journal and scholarly communication function into the university rather than outsourcing it to organisations that just want to make money from the endeavour. The idea is to integrate the functions of knowledge production and use into the higher learning community. The current way in which research publishing is outsourced is not healthy to the scholarly community or the university.

Discussion

| Remarks by the various participants in the discussion are unattributed. |
| → The history is different. Scholars banded together and formed scholarly associations that performed the publishing function. It is only in last 25 years that the commercial sector has become a major player in scholarly publishing. The university role has always been quite passive. |
| → The function of scholarly publishing has been commercialised to a large extent, which is not healthy to the principals. The internet is a transformative technology that now allows universities not to be passive players in the process but allows them to actively integrate this function into their research activities and curriculum. This could be done in a thematic way in certain departments in their areas of strength, possibly in collaboration with other departments. It would help in the training of students and the production of knowledge that is closer to the scholarly community and is used by it. However, this programme is not as ambitious as that. |
| → The history of the development of science in the Western world is that it has developed largely in a disciplinary context. While it is true that there are opportunities at the disciplinary boundaries and in the interdisciplinary context, the broad linkages are created by disciplines rather than by universities. I am sceptical what a university such as mine could do that would add much value. The collaborative research networks and relationships of faculty are broader and than their departments or universities. The most that could be done in a university context would be to encourage people to put their work on line so that it could be more broadly accessed. I am sceptical of universities as a change agent. |
| → The project we have been involved in at the University of Cape Town have been looking at that issue. One of the research questions related to the potential for using ICT in a university to disrupt narrow subject categories. We found that there were very productive disruptions in projects where students were knowledge producers and publishers, working well with academics across disciplinary developments. We should consider how |
to create a world that is more attuned to the realities as opposed to the current building blocks that we have made.

→ The functioning of academies from differs country to country. There are 750 fellows in India, for example, and none of them work in the academy full-time, but instead in universities or national laboratories. When we do something for the academy, it does not mean that its rigour is lost, otherwise the academy would lose its standing in society both nationally and internationally. There should be no conflict between universities and academies. In whatever we do, the rigour should not be compromised. Academies like ours do not have a laboratory but are a collection of people.

→ That is generally true

→ This was an introductory comment, not an attempt to foist a model on academies, which are generally not research institutions (with the exception of the Chinese and Russian academies). The issue was therefore framed in the context of universities. This vision is more ambitious than written up in proposal, which had two aspects:

→ The OASIS portal (which Prof. Chan will talk about)

ASSAf in the far more limited context to following up on the ten recommendations of the national scholarly publishing strategy, using the Web for outreach to the community as well as input on each recommendation, using each recommendation as a discussion item. In that way we intend to solicit ideas on how to move forward on them.

I wanted to describe the overall vision, although the two projects that are contemplated in this programme are much more focused, easier to accomplish and consistent with the mission of the academies.

Oasis: trying to develop more interactive environments and how we might make use of them (Prof. Leslie Chan)

Before discussing OASIS, I would like to talk about a project with which I have been involved for years, which is one of the earliest open access projects on the web. The open knowledge environment is the web. What can you do on the web to suit your particular environment, knowledge approach or community?

Bioline International is an example that tries to make use of existing tools that are available in open source and integrate these tools to support publishing from various developing country journals.

For example, the African Health Sciences Journal uses XML markup and the abstract is available in full text. If the topic of Plasmodium falciparum (the malaria mosquito), for example, is selected, it links to a database of external resources via a PubMed Central link, accessing 22 000 papers on this parasite. This allows local researchers also to be linked to research done on the same topic around the world. It is also possible to link to other databases (such as GenBank), as well as other laboratories.

However, this is still very one dimensional, linking out. We should also consider how to link in multiple directions, to researchers, as well as to publications, since researchers are the most valuable resource. The key to linking is the existence of other existing open access material.

The Open Access Scholarly Information Sourcebook (OASIS) (www.Openoasis.org) is a sustainable source of materials used in workshops around the world.

We were presenting workshops around the world, and decided to place our material online so that others could benefit. Researchers are interested in OA primarily in order to maximise their
research impact. Libraries are interested in extending the role of libraries. Policy-makers and administrators have a different set of concerns, needs and ways of expressing open access. We are therefore trying to target different communities, including the public, students and young scientists. (Raed Sharif is helping to develop that component of the website.)

The Administrator section contains topics such as developing an institutional OA policy; business aspects; and how to use a website to do research assessment. There are templates that can be used by following the link.

We also created a number of briefing papers – two-pagers on OA explaining what OA is, concerns and business issues. These can easily be downloaded and printed out. We have several papers on development that will be published on the site by 12 June 2009.

We are hoping that when people start using these materials, they will provide feedback to the system when these materials are adapted for local use. If you adapt the material, we hope that you will feed it back, for example, by uploading presentations in which the material has been used. The editorial team will ensure that material is legitimate and sufficiently clear.

From the author’s perspective, there are concerns about copyright and negotiating with publishers. There is therefore a parallel project on an open access directory, which is a wiki to which one can sign up. The directory is a set of lists related to OA: events, conferences, publications, people involved. There is also a list on author’s addendum to which links can be added, to allow users to find them. The community thus contributes to creating a common resource.

There are a number of factual pages with simple textual information. The topics deal with concerns that have been raised repeatedly, and this section will be expanded over time. An FAQ section tries to answer as many of the questions as possible.

The sections with resources for librarians and administrators are fairly complete. There is still much work to be done on the open access journal publishing section. Partners include those that work on open journal systems, who have written a number of the documents and menus. There is a contribution from SciELO, and those with experience are invited to contribute case studies so as to present a broad range of examples.

We are working specifically also with young scientists. This site is biased from an institutional perspective towards universities. There is no material specifically for academies, but templates for academies could be built.

The question has been raised about how researchers are accommodated in OIR if their institution does not have a repository and they do not belong to an academy. There are websites such as Internet Archive as well as internet portals that allow a researcher to create a personal profile, in the form of a Facebook-type resource for researchers. Such resources are suitable for researchers to upload their papers if they do not have access to an OIR. They are OAI compliant. If the researcher’s institution later establishes a repository, it could harvest material such as this. It is therefore not necessary for researchers to wait until the infrastructure is available.

**Discussion**

| Remarks by the various participants in the discussion are unattributed. |

→ In North America, there is an organisation of independent citizens that do scholarly research but do not belong to any institution. They face similar problems of where to place their research.

Prof. Leslie Chan: Mendeley (www.mendeley.com) is one of the open scholar websites on which one can create a profile.
4.4 Regional advisory councils for both task groups (summary and continuation of breakaway session discussions of these projects from the previous day)

4.4.1 Report on advisory council discussions: Task Group on Digital Knowledge Infrastructure (Rapporteur: Prof. Don Riley)

The Task Group did much clarifying. The revised document will be put on the wiki for the Infrastructure Task Group (go to All Files if you cannot find it). The passwords have been removed to allow open access.

A crisper, simpler statement on advisory functions was developed, and references to the IAP were removed:

*The Task Group on Digital Knowledge Infrastructure will establish two regional Advisory Councils. Their purpose will be to provide policy advice in the regions to promote better understating regarding the establishment, management and applications of high-speed research and education networks (REN).*

**What:** The regional Advisory Councils will pay an active advisory role to:

- *Appropriate Ministries (ICT, Telecommunication, Infrastructure, Science and Technology, Education, etc.) and national and regional regulating bodies on the promotion, implementation and support of RENs;*
- *Intergovernmental and international agencies that fund large infrastructure projects (e.g. oil pipelines, power lines, railways and telecommunications networks) regarding infrastructure needs of RENs.*

The Task Group should develop opportunity scanning mechanisms to learn about these projects well in advance so that such advice can be effective.

*In addition to an advisory role, this body might also provide a point of contact and source of information for the media, so as to raise awareness of the issues addressed by the advisory council. [in order to increase visibility]*

The group had limited time to ponder the questions to be considered by advisory councils, but listed the following:

- *Funding models that support affordable access to ICT infrastructure by educational and research organisations*
- *Identify policy and regulatory barriers to ICT infrastructure needs.*

An UbuntuNet document has been loaded on to the wiki (see Draft 3 on web page) about different countries, showing considerable effort in Africa that can be leveraged so as to learn from the experience of others. The communities in Central America and the Caribbean would probably have a similar set of experiences that could be shared.

The **How** section was not changed much from the original, although it may still require more work. It is concerned with connecting researchers from the academies, and partnering with the ASADI initiative and NASAC to develop the advisory councils and work on white papers. There was some confusion as to who would produce white papers (whether advisory councils or task groups).

Issues related to the formation, as well as the sustainability, of advisory councils (particularly if there is a lot of work) still have to be addressed,

**When:** This is indicated in the section on the Work Plan Schedule and deliverables at the end of the document.
**Why:** The advisory council in each region will be a resource to other organisations to leverage capabilities, expertise and resources in a coordinated and synergistic approach to help influence policy making and funding organisation in this area. The advisory activity also will raise awareness and capacity of the science academies and other scientific organisations on these important topics. (This is important, because sometimes the discipline groups assume that there will be infrastructure in place and do not know what to do if it is not there. Sometimes the infrastructure people do not know how to deal with political issues.)

Some the issues identified included the following:

- High costs of connectivity, network and equipment costs;
- Inefficient use of established networks and an uneven development of technological infrastructure related to the different sectors;
- Occasionally there is insufficient governmental and administrative support for the development of ICT infrastructure;
- The collaboration among research institutions in the region is not at the required level;
- There is a lack of skilled human resources and knowledge for its implementation;
- (There may be language barriers in diverse regions such as the Caribbean and Africa.)

Successful approaches have included:

- The existing experience in the establishment and operation of several successful NRENs
- Sharing of ICT investment costs among different countries or institutions.

Proposed actions include:

- To contact the existing RedCLARA groups in each country to gather baseline information about their coordination with the research and education communities;
- To form National Groups in order to develop a plan for implementing and using RedCLARA effectively within the national research and education sectors;

In my view, an outstanding question remains how to leverage the Caribbean Knowledge and Learning Network (CKLN). There may already be initiatives to link NRENs about which we are not aware.

**Discussion**

*Remarks by the various participants in the discussion are unattributed.*

→ The Trinidad campus of the University of the West Indies got Internet2 access through a dedicated line recently and thereby jumped ahead of the rest of the region.

→ There may already be as many as half a dozen direct links to the US. The Atlantic Wave, in which I am involved, links international exchange points on the east coast of the US, including Sao Paulo, through an AMPATH international exchange point in Miami, with connectivity to other organisations.

**Continuation of presentation (Prof. Don Riley)**

How to do it: The group did not have time to do this discussion justice, and several questions remain unresolved:

The IAP regional advisory council (selected on the basis of expertise, which bring in advice, additional credibility and perspective to assist the efforts) versus NRENs and regional coordination/collaboration organisations (such as UbuntuNet, CKLN and CLARA). It would appear, however, that both are needed.
It had been proposed that the regional advisory council should comprise one representative from each country. However, this would suggest a blurring of roles, as the advisory council should be selected on the basis of expertise and what they can bring to the function.

Considerable progress was made, especially considering the limited time. More work needs to be done, and tasks need to be assigned. There needs to be more focus on timelines for the completion of these tasks. Another task group meeting is scheduled for the Northern winter.

4.4.2 Report on advisory council discussions: Task Group on Digital Knowledge Resources (Rapporteur: Susan Veldsman)

The role of the advisory council was discussed, and some preliminary thoughts were expressed. However, the time was too limited to fully address the issues, and there was consensus that better understanding and planning are required.

There were not many specific recommendations with respect to the role of the advisory council, except to note that the council advises the Task Group. We did not go into this discussion in as much depth as the other Task Group.

Criteria for information were considered, as well as the role of the advisory council and the mechanisms that could be used.

There was reference to ASADI, which is developing capacity within the various academies. It was noted that NASAC also offers some suggestions of what an advisory council could do.

Dr Anderson added that Mr Sharif had suggested the possibility of using councils to do mentoring or facilitating among themselves.

It was proposed that the councils be considered as the link between policy makers and scientists in the academies, because they need to impress upon policy makers the importance of pursuing open access, as well as providing them with the necessary information in this regard.

Discussion

Remarks by the various participants in the discussion are unattributed.

→ It would be helpful to produce a diagram of the relationships between advisory councils, academies and the IAP in order to visualise a business relationship map.

→ The advisory council could work as a facilitator providing a systematic approach to mentoring between well established academies in OECD countries and the new ones in Africa and Latin America. The council will have the expertise and capacity that could assist in securing funding. It would be useful to start by partnering an OECD academy with an academy in Africa with respect to training, staff development, exchange of capacities and securing funding. The advisory council would serve as the mechanism for facilitating this process and advising on certain issues. In that way, the academy experience could be institutionalised and expanded.

→ This would cost much to fund. However, the proposed mentoring relationship is a positive suggestion, and should be considered from the prism of experience.

→ It is not clear that this would be a role for the advisory council.

→ There were several elements missing from the recommendations, including the mechanisms for multiple levels of influence. It is not clear whether the white papers are just internal planning documents.
There are several different mechanisms for influence, including the advisory councils and the white papers.

Attending meetings of ministers of science and technology and of TWAS, for example, would be another means of influence.

TWAS convenes meetings of the ministries of science and technology for the G77 countries.

If it were possible to get an opportunity to make a plenary presentation at a TWAS MEETING, it would be possible to deliver a message. Meetings of the AAU could be used to reach university presidents and rectors and engage in high level interactions. Other mechanisms include a web presence and YouTube.

In the African context, NEPAD might be a suitable counterpart for NASAC in promoting the message that S&T is important for development.

NASAC is working on an MoU to clarify roles and responsibilities between NASAC and other organisations. NASAC can work through AMCOST, which would be useful entry point. I will ensure that this is stated as part of NASAC’s collaborative role.

In the in American hemisphere, the InterAmerican Network of Academies of Sciences (IANAS) provides good links with member states of the Organisation of American States (OAS), which includes all American states except Cuba (and it is hoped that this situation will change).

NASAC hosts an annual conference for young scientists. The theme for 2009 will be S&T enterprises in Africa. If we consider open source in order to demystify the concept of hard copy journals as a means of earning incomes for institutions, this might be an avenue for a young scientists’ forum to become active. NASAC funding, however, only allows the support of young scientists from sub-Saharan Africa. If CODATA funding were available, it could be used to augment these efforts.

This could be considered for the CODATA 2010 meeting.

We would like young scientists, especially women, to attend.

NASAC has not yet decided on the theme and venue for the 2010 conference for young scientists, and there is thus the possibility of linking it with the CODATA conference in Cape Town. Between 50 and 60 people usually attend.

TWAS might also be able to provide some support.

We should brainstorm how to get resources to implement some of these ideas and to use some of the organisations represented at the present meeting as implementing organisations.

It is important to map the organisations and establish their roles, including the role of RedCLARA. The discussion has focused on initiatives for Africa and the Caribbean, but RedCLARA is a Latin American initiative. We are keen to share our experience with NRENs, but we still have much to do in terms of open access, and it would be important to formalise relationships and work together.
IAP Programme on Digital Knowledge Resources and Infrastructure in Developing Countries

- IAP has a long list of organisations in the full workplans, which have not been discussed. Please look at the list and add, subtract or modify the categories so that we could use the information to map the relationships and identify the organisations we need to work with on the various projects. The long list is undifferentiated and generic. It is important to identify the organisations to interact with as well as those to be influenced.

- I would suggest assigning to someone the task of doing the mapping, since many of the relationships are not clearly defined, leading to some confusion.

- It may be necessary to map the organisations in different groups in terms of their roles, for example, as sponsors, partners or audience.

- We should map in terms of what we want to achieve through a constellation of organisations.

- It would be good to hyperlink to each organisation in the diagram, since there are useful descriptions of each on their websites. This would be a useful tool.

- I will undertake to produce such a diagram.

- We must avoid unfunded mandates.

Another major suggestion is to merge the two Task Groups in the advisory council function in order to avoid having multiple advisory councils. We therefore need to expand the scope of the topic. We are unlikely to have the same level of expertise with the network function as with open access policy function. This somewhat complicates the matter, as there are different types of expertise needed. This may mean that two people are needed from each institution, which might make the advisory council very large. However, we do not want to create separate advisory councils, or to go through the process twice.

- Coordination between the functions for the task groups has to happen at some point.

- Although there are distinct issues and expertise related to the two Task Groups, they are also very related. We want people to talk together and the two perspectives to inform each other. These are substantive reasons for merging in a single advisory council. We would still need expertise in both topics, as such expertise in a single person would be rare.

Another issue to address is academy participation versus outside expert participation on the advisory councils. Presumably we need both.

- We want more expertise than the academies may have, as well as grounding in the academy perspective (in terms of processes and policy that the people working in infrastructure may not be familiar with), so that people work together towards the right approach.

- Would the academies not be able to draw on the right resources?

- Academies often do not know what they do not know. I have the following additional comments:

It may work to merge the advisory councils for open repositories and infrastructure, although there are some distinctly different issues. We should avoid having too many
different issues to discuss at the meetings of an advisory council comprising the two
groups, as this would dilute efforts.

We have talked about infrastructure but not about cyber-infrastructure, which is another
category of infrastructural resources that do not relate specifically to open access,
including computational resources and scientific instrumentation. It may therefore be
necessary to broaden the agenda. Having access to information is positive, but a
scientist that does not have access to the cybertools would still be crippled, and would
not have the means to access the data.

A possible compromise would be to have a large advisory council with two
subcommittees.

The design of the advisory councils needs much more work, although we understand that
we need a mechanism for influence in the two important areas of infrastructure and
content. The IAP will have to give consideration to how to take this forward over the next
few months, as there is not enough time to discuss the issues in more detail at this
meeting.

We also need to cost the advisory council function.

5. SESSION FIVE: SUMMARY REPORTS OF TASK GROUP BREAKAWAY REPORTS
BY TASK GROUP CHAIRS AND RAPPORTEURS
Chair: Prof. Michael Clegg (US NAS)

5.1 Report of Task Group A on Digital Knowledge Infrastructure (Prof. Don Riley)

Most of the ground was covered in Prof. Don Riley’s report, which is posted on in the wiki.

Prof. Riley mentioned the following additional issues:
Who writes the white paper for the Task Group? He assumed the task group (not the advisory
council) should write the white paper, which would imply that this activity should form part of the
work plan.

It was proposed that the head of CKLN should be involved and should participate in the
discussions.

The IAP had asked whether the programmes had led to any statement. In response, the Task
Group had considered a possible statement to the IAP for adoption by the Task Group to the
effect that Mr Uhlir and Mr Cohen would continue expanding on the draft document and place it
on the wiki for discussion and response.

It was noted that the statement should indicate the target audience of the programme.

5.2 Report of Task Group B on Digital Knowledge Resources

Four topics were discussed. The fifth topic was the advisory council.

B.1 Digitisation of Analogue Resources

There had been several presentations on the topic of the digitisation of analogue resources from
which lessons could be learnt:

Henda van der Berg (National Research Foundation)
Henda van der Berg (National Research Foundation) had given a presentation on an NRF Project
on Digitisation and Data Preservation, which had conducted a national audit of different types of
high value information and media that need to be digitised. The experience of that project could be valuable for any other organisation or country that wishes to conduct a similar activity. The presentation had covered the objectives, methodology and outcomes of the audit, which had made use of a five-part questionnaire enquiring about: (1) the management and governance of the institution that houses the data; (2) a description of the collections to be digitised; (3) the available resources in the form of skills, technology and funding; (4) sustainability and preservation; and (5) lessons learnt in digitising the collections. A stakeholder workshop had been convened for all the parties that had contributed to the database. The audit report was under review at the NRF before being submitted to the Carnegie Foundation. The topics in the report included the development of a digitisation framework and policies for prioritisation, the setting up of a digitisation centre (with an emphasis on sustainability) as well as the importance of training (which it was recommended should be done only after the technical infrastructure was available). The audit had covered mostly heritage and cultural material rather than S&T data and information. More detailed information is available at stardata.nrf.ac.za/html/database.html.

Dr Noha Adly (Library of Alexandria)

Dr Noha Adly (Library of Alexandria) had given a presentation on lessons learned with respect to digitisation over the last six years as part of the Million Book project and later with theses and dissertations. The Million Book project had started six years previously with one scanner and two people and currently deployed ten scanners and 120 people working two shifts a day, seven days a week. The recommendations from that experience included starting small and building upon the initial foundation; the need to work with the owners of the print information; using flexible metadata for different types of information; acknowledging that each step along the way may be different for each type of information, necessitating a modular workflow (the format of which is available from the Library in a wiki); the importance of training (which is available from experts at the Library); the need to integrate the digitisation with the repository; and the fact that the management of data sets poses special problems, since they are very different from text and video material.

The models of the Million Book project and the World Digital Library (WDL) had been compared. The Million Book project is decentralised, in that each centre has its own repository, building up a set of images and a set of metadata. This limits the facility and added value; for example, full text searches on the whole collection are not possible.

The Library of Alexandria is assisting with the World Digital Library (an initiative of the US Library of Congress under the UNESCO umbrella), which had been live since 21 April 2009. In contrast to the Million Book project model, the WDL relies on a centralised repository with common standards and unifying metadata that can be replicated in many places. This makes the architecture very complex, and a sustainable model is still being developed. However, there is greater potential for added value with such a model than with a simple portal. These two models have different requirements and architecture design, with different costs and benefits, which any new initiative should weigh up in relation to the needs and target audience it is trying to serve.

Science supercourse lectures (on topics such as health, agriculture, environment and engineering) may represent an opportunity for collaboration with the IAP.

The Task Group is promoting the following projects:

B.1.a Ugandan National Academy of Sciences (UNAS) Project on Digitisation and OIR and Database

What: The proposed project would entail the digitisation of health data and information in Uganda, and the creation of an open access online repository where the digitised information would be deposited and one or more databases that would be created associated with the digitisation.
**Why:** The rationale for the project was motivated by Paul Nampala of UNAS, who had agreed to lead the project. UNAS is focused on S&T data and information and support of evidence-based policy making with NASAC and through the ASADI project. Digitisation of such information that is currently only in print form would be very useful to support research and decision-making objectives. An open access database of the resulting digitised content is needed to avoid duplication of effort and support research and applications. There was a prior project with the US National Institutes of Heath on malaria records, but this encountered problems. Other potential areas of interest are agricultural and socio-economic information.

UNAS also runs a Forum on HIV/AIDS with the Uganda AIDS Commission. UNAS has identified the scientists in the country dealing with all aspects of the disease, and developed a database of these experts. UNAS can build on this success with respect to data on other areas of health. The Academy can work with the Ugandan National Council for S&T. The advantage is that UNAS and the national S&T community can use this information for resource allocation and planning.

Further detail on the project is available at [www.ugandanationalacademy.org](http://www.ugandanationalacademy.org).

**Who:** Paul Nampala (UNAS) agreed to lead this project at UNAS. For the digitisation part, Noha Adly at Alexandria Library, N. Balakrishnan at IIS, Pat Libertrau of DISA and CAS agreed to provide training and advice. Daisy Selemaetsela and Henda van der Berg of NRF can provide some general guidance, especially on the proposal and process questions. Also, the Digital Library Federation (DLF) has relevant information resources in this area. See Project B.2.a. for organisations assisting with the OIR and database functions. NAS staff will assist with the UNAS proposal, as will the others identified in the group above.

**How:** To be developed through the proposal. Link to digitisation resources (for example, at DLF). What are the criteria for digitisation? There is a need to advocate for high value digitisation efforts. See the NRF digitisation project.

**Where:** In Uganda with UNAS lead and support from academies and other organisations with such expertise in South Africa, Egypt, India, China and the US.

**When:** UNAS will develop the proposal over the next three months and get it funded within the next year. The successive drafts of the proposal would be shared with interested parties for comment to inform further refinement of the proposal.

**B2. Open Institutional Repositories (OIRs)**

**B.2.a  Jackie Olang, NASAC**

**What:** OIR for NASAC member academies.

**Why:** NASAC provides a forum for member academies to empower the members, develop evidence-based advice to governments, and issue joint policy statements. It is also trying to improve its web presence and strengthen links with its partners outside the network. An OIR can promote the work product of its members, support the NASAC and member strategic plan and goals, and develop a collection of useful supporting information. The OIR can also showcase African science in NASAC and members’ priority areas, in light of the knowledge divide.

**Where:** NASAC in Nairobi and all member academies in other African nations.

**Who:** NASAC will also develop a proposal with the assistance of eIFL, which will be a valuable consultation, given the expertise of eIFL from similar kinds of projects throughout the world. Other parties will assist in developing the proposal, including IBICT, NAS and ASSAf.

**When:** The project should start by linking to other information when the NASAC portal becomes operational in June 2009. NASAC will develop a proposal in the next three months for funding the
development of an OIR. It will also develop a plan for implementing such an OIR in two or more phases.

How: To be determined, through the funding proposal and implementation plan.

B.2.b Alejandro Caballero Rivero (ACC/Caribbean Scientific Union, CSU) and Prof. Robert Lancashire (Caribbean Academy of Sciences, CAS)

What: OIR Infrastructure Network. It had been agreed to merge the ACC/CSU and CAS proposals for open institutional repositories.

Why: Alejandro Caballero Rivero had drafted a proposal, which would be submitted to the IAP by the deadline of 29 May 2009. A similar proposal would be submitted to NASAC, coordinating with eIFL to develop a proposal for funding by other foundations and development organisations.

Where: Caribbean and Central American region.

Who: ACC, CSU, CAS, member academies, IANAS, NAS, IBICT, RedCLARA, eIFL, and other OIR organisations and experts. The project needs to be coordinated with the CKLN.

When: The initial proposal is to be submitted to the IAP in May. Other proposals are to be submitted later in 2009. The first phase is to be completed by the end of 2009.

How: See the ACC/CSU proposal. Projects B.2.b and B.2.a should coordinate their proposals, but approach different funders.

B.3 Data Integration Demonstration Projects

There are three initiatives at different stages of preparation:

B.3.a A proposal had already been submitted for a Workshop on Developing Digital Knowledge Resources and Infrastructure for Research and Education in Nicaragua. The focus would be on access, management and use of hydro-meteorological and other environmental data (see proposal). The proposals relates to the themes of the IAP programme with respect to data policy, institutional repositories and data integration. The proposal had been submitted to the US National Weather Service in response to its call for regional proposals in this area. There had not yet been a response, but it seemed reasonably optimistic that the project would receive funding.

B.3.b Eve Gray would take the lead with the Southern African Regional Universities Association (SARUA) and ASSAf in organising an IAP workshop or sessions on data policy and education at the October 2010 CODATA Conference in Cape Town. The proposal is due to CODATA by April 2010. Dr Bill Anderson and Paul Uhrl will assist in this.

B.3.c Henda van der Berg had given a briefing on the South African World Data Centre (WDC) on Biodiversity and Human Health hosted at the NRF. There had been preliminary discussions in February 2009 about collaborating on data integration projects, but there had not been enough opportunity to discuss the details. There might be some opportunity to collaborate on a project, pending further discussions between the WDC and IAP programme staff. Paul Uhrl would be meeting with representation of the data centre the following day (13 May) to further explore the possibilities.

B.4 Open Knowledge Environments (OKE)

B.4.a. ASSAf OKE pilot project
**What**: Post-publication follow-up of ASSAf Scholarly Publishing Strategy report. Details are to be discussed with ASSAf and NAS participants.

**Discussion**

Remarks by the various participants in the discussion are unattributed.

→ Could we list all running and future projects with summary and web link?

→ There will be a summary report of the workshop, as well as a full report with links to Power Point presentations, background summaries and project workplans.

6. **SESSION SIX: ASSESSMENTS OF ACTIVITIES IN YEAR ONE AND SUMMARY OF PLANS FOR YEAR TWO**

Chair: Prof. Michael Clegg (US NAS)

Mr Uhllir introduced the session, outlining the current status and what he hoped to accomplish in the project. All delegates would then have a brief opportunity to express their views.

The overarching goal of this programme (on the basis of the proposal) is to promote greater access to and use of digital scientific data and information resources and to digital resources and infrastructure for research and education, particular attention to capacity building of IAP academies and the research and education communities in developing and transitional economy countries.

In pursuit of this goal, the project will perform the following tasks:

To convene a series of international workshops and meetings on a regional basis to develop supporting information resources and other outputs specified by each Task Group in its workplan and publish the results in the IAP portal and on the websites of the participating academies. All products will be released under the auspices of the IAP on international issues.

To work with other IAP programmes as well as other organisations already engaged on these issues to avoid duplication of effort and to leverage existing expertise and resources.

6.1 **Plenary discussion**

All participants then had an opportunity to briefly state their impressions of the workshop as well as progress with the programme:

Remarks by the various participants in the discussion are unattributed.

→ With respect to progress over the last year, I was particularly heartened by the ability of the programme to bring together stakeholders from different regions and disciplines in order to discuss the issues, with a view to moving forward.

→ I appreciated the increased awareness of issues related to digital repositories and open access to knowledge, as well as advocacy in this regard. From the perspective of African academies, this had been remarkable.

→ From the perspective of an outsider, I am glad to see the IAP addressing open access in such a major and serious way.

→ This was my first meeting with the group. It was a great pleasure to attend and very rewarding.
This has been a very rich experience. I look forward to a big advance in African access to knowledge as a result. The approach that combined workshop sessions with relaxation during the evenings worked well.

I will watch the outcome of the initiative in terms of new repositories to which we could facilitate access through worldwidescience.org.

I appreciated the opportunity to be involved. Any initiative that catapults publishing in Africa, particularly open access publishing, can only be good.

From the Caribbean perspective, CKLN is hoping to install infrastructure by mid 2010. We have some champions that are working in this area against all odds and largely in isolation; they could benefit from working together with these initiatives.

It was very inspirational to see such high calibre work going on elsewhere in the world.

It is encouraging to see the growth in the size of the group as well as organisational representation. Those involved are very passionate and focused. More importantly, it is good to see how the programme has evolved from an idea to a plan that is now taking concrete form through actions that can be implemented in our individual capacity as well as jointly.

The Ugandan National Academy of science has now become an active member of the IAP programme and appreciates the opportunity to meet other scientists involved.

It has been a privilege to be part of this group. I am very enthusiastic that the issue of open institutional repositories forms part of programme, since this is something I am very enthusiastic about.

Open repositories are a complex and relatively new development. Best practices are still evolving, and the standards are not well known. Everyone wants OA repositories with all the available features, but we have to be practical and realistic and carefully consider how to address the needs of small institutions with limited resources. Capacity building is important. We could consider building a hierarchy, in which institutions with greater resources and experience assist in training and development for smaller ones, so that eventually all the members of the network can have an open access repository. There was mixed reaction as to whether initiatives would be hosted by NASAC, universities or academies. We have to be practical so that we can show tangible results in Year Two.

It is encouraging to see the growth in the number of stakeholders actively contributing since the first meeting. We should aim for tangible results by next year by developing several open access repositories on the basis of the proposals and populating these to some level.

There has been considerable progress during the first year—the first steering committee meeting, the formation of two task groups, the workshop in Havana, and the identification of the most important areas. However, we need more time for discussion. Now that we have the wiki, we should use it to discuss and analyse all the issues.

The programme has matured since the previous meeting. We have achieved, and we are at a threshold. I would like to underline the following:

There is a need to network more formally with other parties, such as CODATA, NASAC and the Federation of Asian Academies.
There is a great need for horizontal collaboration, South—South. There are many agencies in India that could sponsor training and thus many possibilities to increase the strength of the programme.

- This has been a very positive experience, which has been beneficial in gaining exposure for the UbuntuNet Alliance and assisting in engendering an understanding of some of the constraints we work under. I wish you all the best with the initiative.

- I appreciate the opportunity, which has opened my eyes to a number of collaborative opportunities.

- People are the real networks. The work has only just begun.

- It is always a pleasure to visit South Africa. This is my third visit, and it is a remarkable place. We have made good progress. We need to learn (although it will be difficult) how to leverage the internet and the tools for communication, so that our conversation is ongoing between meetings, and we can save money for when really need to travel.

- I was surprised to see that I was the only delegate from East Asia. My background is in electrical engineering, and I am not a specialist in this area, although it is a field I am very interested in. I will try to contribute later by putting the programme in touch with many people in Korea with experience in this field. NAS is the leading academy in the world and through its involvement, we will get good results.

- If one looks at the documentation of the previous meetings and considers the outcomes of the present meeting, it is difficult to judge progress. There should be mechanisms in place to regularly report progress, perhaps by asking projects to submit a brief account of progress from time to time.

The projects are very sound and have the potential to evolve, but if the objectives of the IAP with respect to the programme are to be achieved, it is essential for the delegates to the present meeting to take ownership of the projects and the issues and ensure that they become part of their day-to-day line functions. If any of the delegates feel that they are not the most suitable person to take forward the implementation of the project, they should indicate who else in the network should be involved.

- The IAP has created good synergy for OA repositories in Africa, Latin America and the Caribbean. In this way, the IAP has made an important contribution to sharing scientific knowledge in the world. We should perhaps add the facility of service providers harvesting metadata from other repositories in the world to complete this intensive knowledge sharing. This is the send time I am attending a meeting of the steering committee, and I learn more each time I participate.

- I applaud the steps taken so far. This is a well organised group that is working together. The most challenging task now is to get the project running in order to accomplish the big goals that the programme has set itself. One of the significant accomplishments so far is that the advisory committee is close to being established and will then have the role of driving the initiatives.

- A network is made up of people. While there may be a place for video conferencing, it is better to meet in person. I appreciate the work of the IAP in coordinating this transnational initiative. How much time does the IAP have available to commit to making this work, and how can we assist in developing the implementation plans? We are committed to sharing but need coordination in order to be successful.
I have learnt a lot. The wiki has given me ideas of things with my students. My main objective now is to share the information from this workshop with the Academy of Science of Cameroon.

I agree with everything that was said. This seems to have been a particularly useful and rewarding experience for the participants on a personal level. We have done a good job in identifying other people and organisations to be involved and to contribute, and we will have to continue to do so to an even greater extent. We have organised ourselves in terms of specific assignments to develop proposals or detailed workplans to solicit funding and to start working in various areas. The organisation of the website on the IAP as well as the wiki were important threshold actions. We have some staff support at NAS (Dan Cohen, myself and seasonal fellows) and thus we have more capability than we did a year ago, but have to rely on participants either to take responsibility for some of these actions or to involve others within their groups or institutions. It may not always be possible for the activities of the programme to be a priority within different workplaces, and progress is therefore likely to progress unevenly between the various projects. Event though we accomplished less than I had hoped over the last year, I believe that we are now in a better positions to do far more in Year Two. Given that it will take some time to get funding in Year Two, we ought to be particularly well poised for implementation during Year Three. The main goals in the next year are to complete the organisational process, to get funding and to start implementing some of the objectives, which I believe is entirely possible. I appreciate your enthusiasm, support and interest. We need to reach out to our networks and make the programme a network of networks in order to leverage other resources and participants that are interested in the same objectives. Achieving the goals will be difficult, but I am encouraged by the process so far.

I would like to answer a question that is implicit in some of the comments, namely why the IAP is involved in this programme. The IAP is a network of science academies in 120 countries. This means that there is representation in each of the countries that extends to the grassroots level, which is a considerable advantage in trying to push change. In most cases, the science academies include the scientific leadership of the nations in which they are located. However, they often do not have a clear, coherent message. Part of our work here is to use this network to provide a clear message on the potential of electronic access to scientific information as a transforming agent. To put this into context, in the US in the 20th century, more than half of the economic growth was the direct result of advancements in science and technology.

For at least half of my career, my research depended on being able to access the literature in traditional libraries. I was fortunate to be in universities that had a library that enabled me to find almost anything I needed. That situation is not true for most of the world. However, it could be true everywhere if we could build an infrastructure and provide open access to the scientific literature. This approach has enormous transformational and world-changing potential. The IAP is involved in this initiative because it has the ability to reach down to the country level and make inputs, but it needs to partner with the other organisations that are represented around the table. I am pleased at the quality of the interactions and the organisations represented here, which provide a greater range and set of capabilities.

6.2 Closing remarks

On behalf of Prof. Wieland Gewers (head of the Scholarly Publishing Programme in ASSAf), Ms Gray gave the closing remarks:

Prof. Gewers is a distinguished scholar with a long and honourable record as a researcher as well as in university administration. He has skilfully, doggedly and patiently established the ASSAf Scholarly Publishing Programme; with Susan Veldsman recently having joined ASSAf to direct
the programme, it is a model of what can be achieved. I am particularly please about the link between the ASSAf programme and SciELO and the bridges we are building across the ocean in the process. We look forward to forming links with India and more East Asian academies. We have mapped the geographical location of the organisations that are involved, as well as the topics and the levels of input in both a theoretical and practical way.

Thanks are due to the IAP, in particular to Paul Uhlir, Prof. Michael Clegg, Dr Bill Anderson, Prof. Don Riley and Dan Cohen (to the latter, especially for establishing the wiki). The IAP team has put together an initiative that shows remarkable signs of success, and the potential to make progress in a field where it is extraordinarily difficult to do so. Thanks also to all that attended the workshop. The wide range of countries, organisations and subjects represented have been very valuable. We need to take away with us this enrichment that we have received and continue our conversations.

Thanks particularly to Susan Veldsman for hosting the event and for all her organisation.

We look forward to witnessing the roll out of the projects. With this team, I know we are going to see world change.
APPENDIX 1: WORKSHOP PARTICIPANTS

<table>
<thead>
<tr>
<th>Name of Participant</th>
<th>Country/Organisation</th>
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<tbody>
<tr>
<td>Ms Susan Veldsman</td>
<td>ASSAf</td>
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<tr>
<td>Dr Xola Mati</td>
<td>ASSAf</td>
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<tr>
<td>Ms Nthabiseng Taole</td>
<td>ASSAf</td>
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<tr>
<td>Mr Thabo Radebe</td>
<td>ASSAf</td>
</tr>
<tr>
<td>Ms Eve Gray</td>
<td>ASSAf Committee on Scholarly Publishing</td>
</tr>
<tr>
<td>Dr Helio Kuramoto</td>
<td>Brazil</td>
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<tr>
<td>Prof. Leslie Chan</td>
<td>Canada</td>
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<tr>
<td>Prof. Xiao Yun</td>
<td>China</td>
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<tr>
<td>Dr Martha Giraldo</td>
<td>Colombia (Bogota)</td>
</tr>
<tr>
<td>Ms Yvonne Halland</td>
<td>CSIR</td>
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<tr>
<td>Mr Alejandro Caballero Rivero</td>
<td>Cuba (Havana)</td>
</tr>
<tr>
<td>Ms Pat Liebetrau</td>
<td>DISA</td>
</tr>
<tr>
<td>Dr Noha Adly</td>
<td>Egypt</td>
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<tr>
<td>Ms Iryna Kuchma</td>
<td>eIFL</td>
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<tr>
<td>Dr Boubakar Barry</td>
<td>Ghana (Accra)</td>
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<tr>
<td>Dr Krishan Lal</td>
<td>India</td>
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<tr>
<td>Prof. Usha Mujoo Munshi</td>
<td>India (Kolkata)</td>
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<tr>
<td>Prof. Robert Lancashire</td>
<td>Jamaica (Kingston)</td>
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<tr>
<td>Ms Jacqueline Olang</td>
<td>Kenya</td>
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<tr>
<td>Prof. Wook Hyun Kwon</td>
<td>Korea (Seoul)</td>
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<tr>
<td>Prof. Jorge Huete</td>
<td>Nicaragua (Managua)</td>
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<tr>
<td>Ms Henda van der Berg</td>
<td>NRF</td>
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<tr>
<td>Mr Raed Sharif</td>
<td>Palestine</td>
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<tr>
<td>Dr E Tonye</td>
<td>UbuntuNet (Cameroon)</td>
</tr>
<tr>
<td>Ms Margaret Ngwira</td>
<td>UbuntuNet (Malawi)</td>
</tr>
<tr>
<td>Dr Paul Nampilta</td>
<td>Uganda (Kampala)</td>
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<tr>
<td>Mr Paul Uhlir, JD</td>
<td>US NAS</td>
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<tr>
<td>Mr Daniel Cohen, JD</td>
<td>US NAS</td>
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<tr>
<td>Prof. Michael Clegg</td>
<td>US NAS</td>
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<tr>
<td>Dr William L. Anderson</td>
<td>USA Praxis101</td>
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<tr>
<td>Prof. Don Riley</td>
<td>USA (Maryland)</td>
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<tr>
<td>Ms Robyn Arnold</td>
<td>Write Connection (Scribe)</td>
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APPENDIX 2: LIST OF ACRONYMS

AAAS  American Association for the Advancement of Science
AAU  Association of African Universities
ACBF  African Capacity Building Foundation
ACC  Academy of Sciences of Cuba
ADB  African Development Bank
AFNOG  African Network Operators Group
AfnNIC  African Network Information Center
ARL  Association of Research Libraries
ASADI  African Science Academies Development Initiative
ASSAf  Academy of Science of South Africa
AU  African Union
AUC  African Union Commission
BIREME  Latin American and Caribbean Centre on Health Sciences Information
CARICOM  Caribbean Community
CAS  Caribbean Academy of Sciences
CKLN  Caribbean Knowledge and Learning Network
CLARA  Latin American Cooperation of Advanced Networks (Cooperación Latinoamericana de Redes Avanzadas)
CNI  Coalition for Networked Information
CODATA  Committee on Data for Science and Technology
COREVIP  Conference of Rectors and Vice chancellors of Institutions and Universities
CRASA  Communications Regulators' Association of Southern Africa
CSIR  Council of Scientific and Industrial Research (India)
CSIR  Council for Scientific and Industrial Research (South Africa)
CSU  Caribbean Scientific Union
DANTE  Delivery of Advanced Network Technology to Europe
DC  Developing country
DFN  Deutsches Forschungsnetz (German national research and education network)
DISA  Digital Innovation South Africa
DLF  Digital Library Federation
DOAJ  Directory of Open Access Journals
DST  Department of Science and Technology (South Africa)
EC  European Commission
ECA  UN Economic Commission for Africa
ECOWAS  Economic Community of West African States
eiFL  Electronic Information for Libraries
ERNET  Education and Research Network (India)
eSDDC  Scientific Data for Developing Countries project under the UN GAID
ETD  Electronic theses and dissertation database
FAQ  Frequently asked questions
GDP  Gross domestic product
GEANT  Pan European Research and Education Network
HSRC  Human Sciences Research Council (South Africa)
IANAS  InterAmerican Network of Academies of Sciences
IAP  InterAcademy Panel on International Issues
IBICT  Brazilian Institute of Information on Science and Technology
ICCSU  International Council for Science
ICT  Information and communication technology
ICTP  International Centre for Theoretical Physics
IDB  InterAmerican Development Bank
IDRC  International Development Research Centre
IEEAF  Internet Educational Equal Access Foundation.
IISc  Indian Institute of Science
IIT  Indian Institute of Technology
IP  Intellectual property
IR  Institutional repository
KTH  Royal Institute of Technology (Swedish: *Kungliga Tekniska högskolan*)
LEDEV  Leadership Development Workshop
LOD  Learning objects repositories
MBA  Master of business administration
MGD  Millennium Development Goals
MHRD  Ministry of Human Resource Development (India)
MIT  Massachusetts Institute of Technology
MoU  Memorandum of understanding
NAS  National Academies of Science
NASAC  Network of African Academies of Sciences
NCBI  Centre for Biodiversity Informatics (NCBI)
NCIM  National Collection of Industrial Micro-organisms
NCL  National Chemical Laboratory
NEPAD  New Partnership for Africa’s Development
NGO  Non-governmental organisation
NISCAIR  National Institute of Science Communication and Information Resources
NPTEL  National Programme on Technology Enhanced Learning (India)
NREN  National research and education network
NRF  National Science Foundation (South Africa)
NSF  National Science Foundation (US)
NSRC  National Science Resources Center
OA  Open access
OAI  Open archives initiative
OAI-PMH  Open Archives Initiative Protocol for Metadata Harvesting
OAS  Organisation of American States
Oasis  Open Access Scholarly Information Sourcebook
OECD  Organisation for Economic Cooperation and Development
OER  Open educational resources
OIR  Open institutional repositories
OJS  Open Journal System
OKE  Open knowledge environment
ONCYT  National science and technology organisation
OSI  Open Society Initiative
PhD  Doctor of Philosophy
PHEA  Partnership for Higher Education in Africa
R&E  Research and Education
REC  Regional economic community
REN  Research and education network
RENTA  Red Nacional Académica de Tecnología Avanzada
RENATER  Réseau national de télécommunications pour la technologie, l'enseignement et la recherche (French national public high speed computer network dedicated to connecting universities, schools and research centres)
RPG  Regional public good
RRA  Regional regulatory associations
S&T  Science and technology
SADC  South African Development Community
SARUA  Southern African Regional Universities Association
SC  Science Commons
SciELO  Scientific Electronic Library Online
SIDA  Swedish International Development Cooperation Agency
TE  Transitional economy
TWAS  Academy of Sciences for the Developing World
UK  United Kingdom
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<th>UN</th>
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<td>UN Global Alliance on ICT for Development</td>
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<td>Unit for Research and Development for Information Products (CSIR, India)</td>
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