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Proceedings of the Sino-German Symposium on Development of Library and Information Services 2009

Edited by Uwe Rosemann
ZHANG Xiaolin
Nicole Petri

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Preface

Major research libraries both in China and Germany have fundamentally transformed their functioning from traditional libraries into networked services based upon digital publications. Whilst this transition provides library users with much improved access to information, new challenges have emerged, for example, on how to ensure affordability of digital access through national license schemes; how to efficiently organise home-produced and born-digital materials from research and educational institutions; how to provide long-term preservation for digital information reliably and economically and how to effectively handle non-textual digital materials and link them into the integrated discovery, retrieval and application workflows. Only reliable solutions to these challenges can provide the sustainability needed for a digital scientific information service to support research, discovery and innovation so dearly needed in today's world.

The close co-operation between Chinese and German libraries started in 2004 with a symposium on current developments in scientific libraries, funded by the Sino-German Center for Research Promotion in Beijing. It was held in April 2004 in Chengdu, China, and focused on activities in the fields of digital libraries. Around 50 information specialists from key STM libraries, including 15 participants from Germany, attended the sessions.

This first workshop was followed by a symposium in June 2005 in Hannover, Germany, entitled "Chinese-German Co-operation in Library Information Science". It was funded by the German Research Foundation (DFG). This follow-up event was attended by around 40 colleagues, 17 of whom were from China. It picked up on several subjects that had been raised in the first workshop and analysed them in even greater depth.

Both events were co-ordinated by Professor Ye Jianzhong from the National Science Library (NSL) in China and Director Uwe Rosemann from the German National Library (TIB) in Hannover.

Based on these achievements, led by NSL and TIB, a group of Chinese and German libraries applied successfully to, and were funded by, the Sino-German Center for Research Promotion and the German Research Foundation from 2007–2009 to form the Sino-German Digital Information Provision Partner Group for the exchange, research and development of new services. Among the parties were the National Library of China, NSTL, Shanghai Library, Tsinghua University Library, Peking University Library, Library of Chinese Academy of Agricultural Sciences and, on the German side, the German National Library, Bavarian State Library, State and University Library Goettingen, University Library of Constance, the German National Library of Medicine as well as subito.

The tasks of the group concentrated on four main issues:

(1) Cross-Domain Information Services, with sub-tasks such as Document Delivery Services, Primary Data and Portals and Internet Resources
(2) Retro-Digitization and Digital Curation, with sub-tasks such as Retro-Digitization and Digital Curation
(3) Information Literacy
(4) Institutional Repositories & Open Access, with sub-tasks such as Institutional Repositories, Open Access and National Licensing.

Working together, partners exchanged information and produced research reports on document delivery, integrated portal construction, digitization standards and workflows, distributed co-operative digitization, digital preservation, open access, national licenses, information literacy, etc. The libraries have developed operational systems such as subito China Direct, Sino-German Agricultural Info Portal, Sino-German portal on Asian Studies or the Open Access Promotion Portal. Main events for discussions and co-ordination were the workshops 2007 in Beijing, China and 2008 in Hannover, Germany.

This volume documents the Chinese and German contributions to the 2009 workshop in Kunming, China, which focused on the above-mentioned topics. Some of them – especially issues on non-textual multimedia materials and national license standards framework respectively – will be the subjects of a new application to continue the successful partnership with the help of German and Chinese sponsoring institutions. This new project aims to establish standards, policies, guidelines and experimental mechanisms, serving to promote development in the related fields in China, Germany and also other countries.

In recent years, the project has been led by the leading partners and organising institutions NSL, Professor Xiaolin Zhang (China), and Uwe Rosemann (Germany).

Many Chinese and German colleagues have been able to attend the project from the beginning and are proud to be a part of this faithful and fruitful co-operation.

We thank all funding parties and all Chinese and German colleagues for their input and commitment to this undertaking. We are looking forward to meeting the future challenges of scientific libraries together.

Uwe Rosemann · ZHANG Xiaolin

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Cross-Domain Information Services

Session 1 – Document Delivery Servives

China Direct: Successful Practice of Cross-Domain Information Service between China and Germany

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Abstract This article describes the background of the Sino-German co-operation in document delivery, necessity and possibility of co-operation, and the objectives, content, and the task of the collaboration, as well as the characteristics of China Direct system. It also introduces the co-operation mechanism of cross-domain information service and the significance of co-operation in document delivery services and future development.

Keywords China Direct, cross-domain information service, subito

1. Introduction

The rapidly changing information environment and user requirements have created significant challenges for library and information services. The traditional single library services model or local co-operation services model could not satisfy the needs of users completely. We must break the barrier of language and region, and conduct cross-domain information services, in order to adapt the increasingly diversified customer needs in a digital environment.

In recent years, the colleagues around the world actively explore the ways to promote cross-domain information services. The "Sino-German collaboration in library and information services" project is a successful example of them.

The "Sino-German collaboration in library and information services" project is supported by the National Natural Science Foundation of China (NSFC) and the German Science Center. Since the inception of the project in 2007, under the support from the Sino-German Science Center, the achievements in scientific and technological information services in China and Germany have been widely disseminated and significantly promoted the developing of the libraryship both in China and Germany.

Sino-German co-operation in document delivery (China Direct) is a sub-project of "Sino-German Cross-Domain Information Service" project. The sub-project has made substantial progress through the joint efforts, continuous research and in-depth discussion of both partners in China and Germany.

This article describes the needs, the possibility and objectives of co-operation, and explores the co-operation content, co-operation mechanism, and tasks of two sides, and analyzes the significance of co-operation and development in future, which aims to provide some thoughts to spark your study and discussion in cross-domain information services.

2. Requirements and Basis for Co-Operation of "China Direct"

China Direct is a joint document delivery service project between Subito and some Chinese libraries, currently including National Science Library of Chinese Academy of Sciences, Beijing University Library and Shanghai Library. It is a co-operative project proposed by Chinese libraries and Subito based on the characteristics and the needs of their users. Both sides can conduct document access and full-text providing services directly via Subito service system. The project will effectively promote library's information resources sharing between Chinese and German.

2.1 The Necessity of Co-Operation

Subito is an international library document delivery system which was built up by German Ministry of Education and Research in order to speed up the document providing. There are currently 35 supplier libraries from Germany, Austria, Switzerland and other countries that have created an important base for literature information providing on nature science, social science and economic fields [1]. However, as an international document supply system, Subito's lack of Chinese resources turned out to be the fly in the ointment.

In addition, China's current development has attracted worldwide attention, more and more Westerners want to understand and study Chinese culture, history and development; While China needs to open to the world and seeks opportunities for international co-operation, and needs to introduce foreign information resources and services into China, in order to provide services for domestic users faster and better, Therefore, the co-operation is quickly promoted after proposed. To a great extent, such co-operation is not only co-operation between the libraries, but also between two countries and two different cultures.

2.2 The Possibility of Co-Operation

2.2.1 Subito Overview

Subito is a web-based and crossing-border document delivery service system, which integrates access, user requests and libraries service in one system, users can search holdings of supplier libraries and send requests to obtain the articles or borrow books via Subito system. Namely, Subito can provide a remote document delivery and book loan service [2].

All users can enjoy the fast and efficient library resource sharing services by requesting and obtaining documents at home or office directly [1]. Such service mechanism provides a basis for the two sides to co-operate.

2.2.2 Overview of Three Chinese Libraries

The three Chinese participating libraries, National Science Library of Chinese Academy of Sciences, Shanghai Library, and Beijing University Library, belong to three different types: academic libraries, public libraries and university libraries. The three libraries have a great influence in the domestic library community, especially for their document delivery services.

National Science Library (NSL) is the largest science and technology based specialized library, after decades of development, creating a complete holding system on the feature of basic sciences area of natural science and high-tech information resources. Document de-

livery services have been carried out more than ten years and have more practical experiences, NSL has established document delivery services co-operation with more than 100 libraries at home and abroad. NSL has organized and managed the "Chinese Academy of Sciences document delivery and interlibrary loan services" (CSDL Document Delivery system). It is also an important member of national platforms – National Science Technology Library (NSTL). NSL has plenty experience of document delivery and interlibrary loan services, and accumulates much more services running, coordinating, managing experience [3].

Beijing University Library is the oldest university library in China. It is famous for its huge collections, especially for its rare books and rubbings. The library also is the management center of two national resources sharing projects: "China Academic Library Information System (CALIS)" and "China Academic Humanities and Social Sciences Library (CASHL)", funded by Ministry of Education, and has set up co-operative relations with more than 100 domestic and foreign libraries in document delivery and interlibrary loan service [4].

Shanghai Library is a large, comprehensive academic-based public library. Document Supply Center was established in 2003. The Service has been developed rapidly and formed some features. Now Shanghai library has established co-operative relations with more than 80 libraries and has accumulated amount of experiences in the process of document deliver services. Shanghai Library is a member of OCLC of document resource sharing system [5].

The co-operative team is the basis and condition for the co-operative project. In the process of co-operation, the three Chinese libraries have co-operated and supported each other friendly. Based on the hard working of three Chinese libraries and Subito, the co-operation has gotten satisfied results.

3. The Objectives and Content of Co-Operative Project

3.1 Co-Operative Objectives

China Direct, Sino-German co-operation project of document delivery services loads Chinese resources data into the Subito system, and delivery documents for Subito users, Services based on one platform bring Chinese libraries into the Subito service system, and introduce Subito services into the Chinese library services, and establish a very smooth workflow for resource sharing.

3.2 Details of the Co-Operation

Based on the three Chinese libraries' data of Chinese periodicals (see Table 1), Subito creates a portal, China Direct, that includes information access interface, users request interface, the request processing operating system of supplier library and so on. Both sides could request and obtain documents directly via Subito document delivery system according to the agreement reached by two sides, which covers the service time and period, document delivery type, service fees, accounting and intellectual property protection issues, etc.

Library	Number	Subject	Coverage
National Science Library	6.652	Natural science/ Society science	1909–now
Beijing University Library	16.163	Natural science/ Society science	1834–now
Shanghai Library	13.701	Natural science/ Society science	1915–now
Total	36.516	Natural science/ Society science	1834–now

Table 1: Data from three Chinese libraries

3.3 Tasks for Both Sides

3.3.1 Chinese side is responsible for providing data about Chinese Periodicals

According to the features of Subito retrieval system, the data element of Chinese journals list should include: ISSN, Chinese title, English title, pinyin title, the beginning and ending years of publication and holdings information, the three libraries export basic data from their library systems and provide them to Subito after making some appropriate changes, corrections and additions, which includes:

- To add missing ISSN
- To merge duplicate journals by comparing ISSN
- To unify the Pinyin format of journal title
- To review and correct the errors in holding information, and add journal publication beginning year and ending year in records.

3.3.2 Subito is responsible for creating document delivery service portal-China Direct

China Direct portal is embedded into Subito system, According to Chinese journal data provided by Chinese libraries, several access points are set up in the retrieval system, including Chinese titles, English titles, Chinese Pinyin titles and ISSN. The information of libraries' holdings will be shown in the search results, if the holding libraries are more than one, the libraries' name will be juxtaposed in the search results, users can choose supplier library they want. Search results can be further refined by publication year, in order to locate resource efficiently. User's requests can be sent directly to the supplier library via email. There are two links in email, one is for upload documents, the other is the link to explain why the request could not be full filled. Also, the librarian could login to the tracking system to check the requests. The portal is a flexible, user-friendly and ease-of-use system and provides users and librarians convenience.

4. Co-Operation Mechanisms

4.1 Cross-Domain Mechanism for Joint Service

According to the objectives and content of co-operation, Sino-German co-operation project team established the workflow, rules and mechanisms of cross-domain co-operation services that include: basic format of Chinese journal data, data update frequency and mode, portal system function, document delivery type, user group and service fee, accounting,

copyright fees, service time, service response speed, and service after delivery, etc. After discussion, two sides reached the agreement as below:

1. User groups: Based on Subito user category and its service policy and Chinese special policy, document delivery service is offered only for user's study and research needs, both side decided that: "China Direct" only supply services to non-commercial users of Subito and other areas in the world. Namely, users are group 1, 3, 4, 8 of Subito
2. Search/Browse: The system supports the search and browse of Chinese journal title.
3. Type of delivery: The main delivery type is in PDF format, supplier library scans the article into PDF file and upload it. It is not allowed to use any e-journals for document delivery via Subito. It is not allowed to print out first and than to scan. So the service is to prepare PDF file only from print material.
4. Service time: According to the policy of Subito, The available service time of China Direct is from Monday to Friday in weekdays, services are closed on national holidays of China and weekends. For normal service: user's requests will be handled in 72 hours (working day), for Express service in 24 hours (working day), currently we offer normal service only.
5. Service fees: For different user groups, the service fee is different (see Table 2).

Service price	**User type**	**Description**	**Service type**
5 EUR	User group 1	Student and researcher in university and research institute in Germany, Austria, Switzerland	Normal service
	User group 4	Libraries in Germany, Austria, Switzerland	
7.5 EUR	User group 3	Personal users in Germany, Austria, Switzerland	
6 EUR	User group 8	Libraries in other areas of the world	
Not offered currently; we might add it in the future, it depends			Express service
Subito handling fee	1 EUR handling fee to Subito Office. First 6 months it will be free handling. The handling charge will be collected from 7th month after the system is running.		

Table 2: Service fee for different user group

6. Accounting: we have discussed and decided to adopt Central Regulation – Subito Office takes charges of central invoicing, monitors incoming payments, sends reminders and credits liabilities to the supplier libraries. In order to reduce the difficulty of payment, Subito retains the monthly credit notes on a separate account until settlement is made with the supplier libraries. Settlement is made on an annual basis.
7. Service after delivery: Another important thing is service after delivery. For example, sometimes users ask re-delivering documents because of some impersonal reasons. How to handle user's request? Now, we have a uniform regulation: The supplier library should re-deliver the document free of charge due to any quality problems such as the copies are not clear or pages are missing.

8. Considerations for Updates: The data updating is very important for service. We have considered that the stock data is updated yearly. For this purpose the Chinese libraries will receive a list of current data from Subito, which can be corrected, extended and returned to Subito. The list is provided prior to 1st September of each year.
9. Service agreement: Both sides will sign an agreement which include all the content above to ensure the service and co-operation going smoothly. Both sides should take the responsibilities and rights defined in the agreement. The agreement will be in two versions: Chinese and German.

4.2 Inter-System Co-Operation Mechanism

Three Chinese libraries belong to different library types, locate in different regions, and have different service policies, rules and users. These bring some difficulties in communicating and co-operating. However, after various efforts, the Chinese side reached consensus in the data format, service fees, service time, and co-operation mechanisms, they work together as one unit to co-operate with Germany side. This creates a new co-operation model.

Inter-library system co-operation deepened mutual understanding, and accumulated cross-regional and cross-system services experience in working for the future services, as well as more extensive and in-depth co-operation has been laid a good foundation.

4.3 The Significance of Co-Operation

China-Direct is a Cross-Domain Information Services based on multilateral co-operation in China. This is the pioneer of Cross-Domain Information Services in China.

It is a reciprocal co-operation between China and Germany. Chinese libraries join the Subito as an associate. We have obligation to supply service and have right to use services in meantime. China Direct enriches the Chinese resources in Subito and broadens the service content of Subito. Users can search and obtain Chinese documents in foreign document delivery system directly. It explores a new approach to share resources across different areas, especially for non-local and other country's documents in different language. It has achieved cross-domain resource sharing, a cross-domain information services and co-operation mechanisms, which is the real practice of cross-domain information services.

5. Further Development

China Direct system has been running up, it is a result of the co-operation project in documents delivery. Regarding how to develop the co-operation in future, we have some discussions as below.

5.1 To Market Services

It is very necessary to let more and more people know the service and use it correctly. For this purpose, it is very important for us to market service in various ways after the system running.

5.2 To Improve Mechanisms for Data Update

Currently, the way of data updating is batch mode, it is low efficiency and time-consuming. After the system running stably, we expect to switch it from batch updates to real-time. It would greatly enhance the data quality. Development of technology has provided a possibility for data real-time update of union catalog, it will be an important point of the project in future.

5.3 Making the Co-Operation Regulations More Perfect

Sino-German co-operation in document delivery is a cross-domain information service as a new model of exploration. All of the content and processes of services, services mechanism is an attempt. It needs to continuously improve and refine through the actual operation and practices.

Maybe we need to enlarge the co-operation to other types of materials, such as books. We also think about to increase the participating libraries or broaden the user groups (eg. “How to offer services to commercial users”).

As long as the two sides make joint efforts to promote co-operation, China Direct will burst out with splendor.

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Sino-German "Digital Information Provision", subito China Direct: Cross-Domain Information Services

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Abstract Before the opening of the China direct document delivery service today, I would like to introduce the portal to you.

Keywords China direct, document delivery, journal lists, participants, range of services, research, supplier portal, user portal

1. Introduction

November 9, 2009 was the day of the opening of the China direct document delivery service. I will recapitulate the development of the project and then explain the delivery portal itself in more detail. Emphasis is placed upon the concrete processes of research, ordering and delivery.

2. Project Development

First of all, however, I would like to remind you of the most important stages of the project.

We had a restart of the project in October 2007 in Beijing. From this moment on, we were able to fix the framework:

1. The participants
2. The definition of the journal lists
3. The definition of possible sources, namely original Chinese journal titles.

The next steps for the development of the project were:

1. Delivery of the journal lists
2. Creation of the prototype of China direct
3. Definition of the range of services
4. Implementation of the portal into the test system
5. Presentation of the beta-version in Beijing 2009
6. Definition of the complete workflow in August 2009.

The following totals of journal titles have been delivered for China direct by our partner libraries:

13,701 titles came from Shanghai Library, 6,652 titles were delivered by the National Science Library and from the Beijing University Library we received 16,163 titles.

Every single holding of a title had been presented as an individual item in the alpha version of China direct. After the first test runs, we decided to merge the titles that were deliv-

ered by the three participating libraries and to list the different holdings below their common title. The model for this procedure was, of course, the German serials database.

For the merging of titles, the ISSN was used with the following result:

Out of 36,516 individual items resulted 26,424 individual titles, of which 11,226 titles can be found in more than one holding, while 15,198 titles remain with only one holding. For 4,736 of the 26,424 titles an additional holding could be identified within the subito catalogue.

3. The China Direct Portal

3.1 User Portal

China direct is available to all non-commercial users of subito as well as to the libraries participating in the Library Service.

After login, China direct is offered to this client group.

For this purpose, China direct has been added as a button to the left menu bar of the user portal.

By clicking the China direct button, you reach the first page of China direct which is also its search page. When entering China direct for the first time (and after that depending on choice), there appears a short explanatory text about China direct.

3.1.1 Search Functions

The search page of China direct offers the following search options:

Search for key words within the Pinyin title or the English title if given.

The search for ISSN is also possible.

The search can always be limited to the holdings of one library.

Searching via the alphabetical index is another option. Here the user chooses a title directly from the list of journals.

Finally, there is the possibility to search for the Chinese title. For this a unicode index has been created.

3.1.2 Hit List

After a successful search, results are displayed as a hit list.

The desired title is chosen from this list. By clicking on the title one reaches the detailed view of the title item.

3.1.3 Detailed View

The detailed view of the title item presents

- the journal title in Chinese
- the Pinyin title
- the English title (if given)
- the ISSN
- the beginning of publication
- the end of publication (if the case).

These details are completed by information about the different holdings of our partner libraries.

In cases where the article can be ordered from subito collections, there is an additional link.

A check of the publication year has to be performed before proceeding to the order form.

With this action, the system checks the holdings for the actual existence of the desired year.

Then either the ORDER-link or the information "volume not available" is added to the detailed view.

3.1.4 Order Form

The following details are automatically adopted by the order form

- year of publication
- journal information
- supplier library
- user details (like address and so on).

It is the user's job to add the information about the desired article in the provided input boxes, these are

- author of the article
- title of the article
- volume, issue
- pages.

In addition, the user has the opportunity to send a message about the order to the library.

The mode and type of delivery are fixed, so that after accepting the general terms and conditions the order can be sent off. The system then gives a confirmation message.

3.2 Document Delivery

3.2.1 Order Email

Now an order email is created and sent to the supplier library.

The order email contains all the information needed for the supplying library to fulfil the order.

The order email for China direct differs from the usual subito order email by containing two additional links. These links serve as a workaround. Usually subito member libraries use the so-called DOD-System to manage the workflow in their institutions. The implementation of the DOD-system would have been too costly for the Chinese partner libraries and therefore it was a knock-out criterion. Thus we had to find a different solution for organising the possible responses to an order. The two links lead to new functions: "Fulfill order" or "Unfulfill order". Let me begin with "Unfulfill order".

3.2.2 Unfulfill Order

Every librarian knows the problem when, according to the catalogue, the desired copy of an article should be possible to make. Reality, however, often looks different. The reasons why a copy of an article cannot be made are manifold. That means the copy cannot be delivered.

In this case, the librarian can choose the option to not fulfil the order. The corresponding link is used for this. The library has the opportunity to give an individual message about the order to the user, or else the library can choose the reason for not being able to fulfil the order from a list.

3.2.3 Fulfill Order

The "Fulfill order" function offers the opportunity to upload a copy of an article as a PDF file into the delivery system of subito and into the tracking system. This works via the "Search" function which leads directly to the "open file" frame on one´s own PC where one chooses the path for the document. The sending-off of the file to the subito delivery server is then triggered by clicking on the "Release and send fulfilled order" button.

3.2.4 subito Server

After the document has been submitted by the supplier library, the subito delivery server begins its job;

- Every page of the document is watermarked
- A delivery note and a copyright notice are added
- An email to the user is created and delivered
- At the same time, the download function is activated within the tracking system.

3.2.5 Delivery Email

Only minutes after the upload, the article copy is thus delivered to the user via email.

The email contains the PDF as an attachment and, in addition, a link for downloading the document from the tracking system.

Opening the PDF occurs via the Acrobat Reader. The file consists, as described above, of

- the delivery note
- the copyright notice
- the copy of the article watermarked on every single page.

With this step, the process of research, ordering, dealing with the order and delivery is complete.

3.3 Supplier Portal

Implementing the China direct portal includes the integration of this service into all parts of our subito system.

The supplier libraries do of course need their own access to the system. A special supplier portal is offered. After login, the main use is the tracking system and here the dealing with orders.

3.3.1 Tracking

The new functions of China direct, whether upload of a document or changing the status of an order, have also been integrated into the tracking system.

This makes it possible for the Chinese partner libraries to carry out a renewed upload even after delivery which is important for dealing with complaints.

4. Conclusion

I hope that, with this short presentation, I have been able to explain the new developments of China direct and the subsequent enlargements of subito to you.

For subito users, China direct means a wider range of services.

Let me repeat the important points of China direct for users:

4.1 Range of Services

- China direct is a service for all non-commercial users and the libraries
- Delivery takes place in form of a PDF file via email with normal service
- The copy is watermarked
- Complaints and cancellations are possible
- Prices are similar to subito prices
- Accounting is done by central regulation.

After a project phase, China direct will be converted into a routine operation.

5. The China Direct Opening Ceremony

Dear Colleagues,

Before we hit the "open China direct" button, I would like to warmly thank the colleagues of the partner libraries for their great commitment and excellent work. Especially the Beijing meeting brought us closer to today's goal.

As the countdown is running, may I now ask Professor Zhang as director of the National Science Library and Mr Berndt Dugall as First Chairman of subito to activate China direct. Please proceed, dear Sirs!

After a short ceremonial and celebratory address, Professor Zhang and Mister Dugall opened the portal of the China direct document delivery service.

Session 2 – Internet Resources

A Simple Search Engine Based on Agricultural Ontology

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Abstract In order to improve and enrich the functions of the traditional information retrieval system, this paper designs and realizes a simple search engine based on agricultural ontology that converted from the China Agricultural Thesaurus (CAT). This prototype system can do some simple reasoning based on agricultural ontology in OWL format, so that the synonym and their English terms of the keyword will be included automatically in the query string while retrieving. Furthermore, this system can also provide more friendly and contextual sensitive navigations, such as the keyword's synonym, hypernym, hyponym, and other terms that have close semantic relationship with it, and their English translation as well to support multilingual search.

Keywords Agricultural ontology, intelligent retrieval, ontology reasoning, OWL

1. Introduction

Nowadays, all kinds of retrieval systems and search engines, such as Google, Yahoo and Baidu (the most famous Chinese search engine) play more and more important role to help people to find what they want on the internet. However, these systems still have many weaknesses to overcome. Firstly, too much information will be returned as the search results, but most of them are not closely related and the really related information won't be returned, such as the synonym of the keyword. Secondly, even if some search engine provide related term suggestions as navigation, but they are not so friendly and contextual sensitive. What's more, as globalization and internationalization step further, people become more and more interested in information both from home and abroad, but these engines don't support cross-language search. One reason to result in these problems is that the retrieval process mainly and simply based on keyword rather concepts. An ontology is an explicit specification of a conceptualization [1]. Ontology is a model of organized knowledge in a given domain and it may be a good solution to resolve the above problems. In this paper, we design a simple search engine based on agricultural ontology and finally develop a prototype system.

2. The Construction of Agricultural Ontology

Ontologies consist of five components called "concepts, functions, relations, axioms and instances". With these elements we can build domain ontology. The construction of domain ontology is a fundamental but also time-consuming and onerous work. There maybe a shortcut to take because we have traditional thesaurus to use. There are a lot of similarities between thesaurus and ontology. They are both very useful to describe and organize knowledge in particular domain, and both contain terms (concepts or classes) and relationships among them [2]. It is a good choice to construct ontology with thesaurus as the concepts and semantic relationship materials, and it not only accelerating the building process but

also ensuring the ontology more scientific and rational [3]. Accordingly, we build the Agricultural Ontology based on Chinese Agricultural Thesaurus (also known as CAT).

CAT was the fruit and wisdom crystal of nearly 100 agricultural and information specialists' efforts from more than 40 research institutes across China in early 1990s, which took them almost six years. So far, CAT contains more than 60,000 Chinese terms, with an appropriate English translation for every Chinese term, as well as Latin names for species terms. After ten years' practices, CAT has been recommended as a national standard for the information management in agricultural sector in China [4]. The details of construction of Agricultural Ontology based on thesaurus were explained in another article, where we found a way to convert the CAT to light-weight ontology in OWL format [5]. This paper focuses on the search engine, so we just share the converting result here.

```
<owl:Class rdf:ID="大豆_ Soybean">
  <rdfs:label xml:lang="en"> Soybean </rdfs:label>
  <rdfs:label xml:lang="zh">大豆</rdfs:label>
<owl:equivalentClass>
<owl:Class rdf:ID="青豆_lima-bean"/>
</owl:equivalentClass>
<owl:equivalentClass>
<owl:Class rdf:ID="黄豆_Rhizobium_sojae"/>
</owl:equivalentClass>
<rdfs:subClassOf>
<owl:Class rdf:about="#豆类作物_Legume_crop"/> </rdfs:subClassOf>
<rdfs:subClassOf>
    <owl:Restriction>
      <owl:onProperty>
        <owl:SymmetricProperty rdf:ID="hasCloseRelationWith"/> </owl:onProperty>
      <owl:someValuesFrom>
        <owl:Class rdf:ID="豆油_Soyabean_Oil"/>
      </owl:someValuesFrom>
    </owl:Restriction>
  </rdfs:subClassOf>
</owl:Class>
```

3. The Search Engine

3.1 The Main Functions

The simple search engine provides two main functions: intelligent retrieval and navigation based on agricultural ontology. Intelligent retrieval means that the system could automatically reconstruct the query string and expand the search scope, including in the synonym of the keywords and their English translations as well. This way could improve the retrieval results and more closely related information would be returned. Intelligent navigation focuses on supporting contextual sensitive guidance of the synonym, hypernym, hyponym and related concepts that have close semantic relationships with the keywords in the query expression. To fulfill these functions, the system has the following important modules as shown in Figure 1.

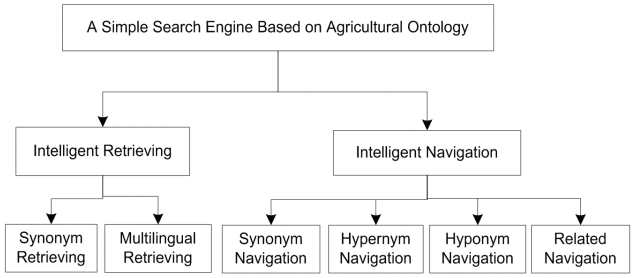

Figure 1: The main modules of the search engine

3.2 The Architecture

The simple search engine has the several core components as shown in Figure 2.

Ontology reasoning is very important in this prototype system. So far, there are many famous reasoning tools for ontology, such as Jena, Racer, Pellet, and OWLIM and so on [6]. However, as the inference functionality in this system is not complex, we design and implement an reasoning API based on XML DOM and XPath to finish the inferring work, rather than use special reasoner just mentioned before.

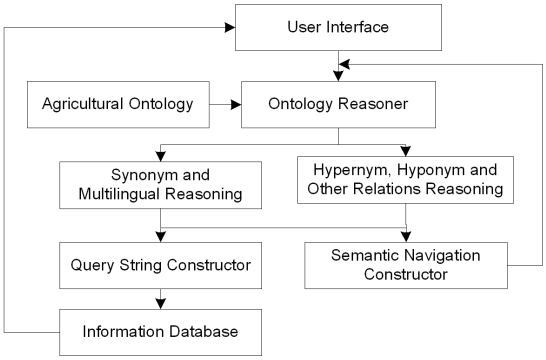

Figure 2: The architecture of the search engine

The system works as: When input a keyword on the user interface, the reasoner will call the inferring API to conduct the reasoning work in the agricultural ontology saved in OWL format. On one hand, with the original keyword and inferring result of synonym and their English translation, the query constructor reconstructs the query string, and then calls the Google Ajax Search API to access Google's database to get the closely related information. On the other hand, the navigation constructor generates hyperlinks of synonym, hypernym, hyponym and other related concepts of the given keyword to form an contextual sensetive navigation list. When one of the hyperlinks clicked, a new search cycle begins, and the reasoning, retrieving and navigating will be conducted once again.

Because of this system is just a experimental system, we do not build up a database especially but use the API "Google Ajax Search API" directly provided by Google [7]. The Google AJAX Search API is a Javascript library that allows developers to embed Google Search in their web pages and other web applications. This API provides simple web objects

that perform inline searches over a number of Google services (Web Search, Local Search, Video Search, Blog Search, News Search, Book Search (experimental), Image Search, and Patent Search). So, it's enough for experiment and a good try to imply this API in our system. What we need to do is just set the query string that reconstructed with the reasoning results of agricultural ontology and Search Type as the API's parameters. After submitting we could get what we want.

3.3 Experimental Results

We take the keyword "大豆" (Soybean in English) as an example to do the experiment on the prototype system. Figure 3 shows the search result as below.

Figure 3: The experimental results of the search engine

We get to know from the retrieval result that as when we put a keyword, the prototype system automatically expand the search scope, both the synonym of the keyword and their English terms are included, which is realized by the agricultural ontology, ontology reasoner and query constructor. The recall ratio to some extend is improved and more closely related results returned. What's more, at the bottom of the page, those concepts that have close semantic relationship with the keyword are also listed separately as Synonym, Hypernym, Hyponym and Related Concepts, which would give us contextual sensitive suggestions to help them to find the information they really need quickly. This may give people a good and friendly searching experience.

4. Discussion

This paper designs and realizes a simple search engine based on agricultural ontology. As the experimental result shows, this prototype system make some improvement, such as more closely related results could be returned, supporting multilingual search, providing friendly and contextual sensitive navigations. However, it is just an experimental system and has also some limitations, including the keywords should be included in the ontology, and the agricultural ontology is light-weighted, the efficiency of reasoning over large ontology is not so good, and the precision ration still not improved.

If we want to put this system into practice in the further, much work need to be done, such as enriching and refining the agricultural ontology, improving the Precision Ratio and developing a strong reasoning engine or importing an third party ontology reasoners. If we want to realize cross Chinese and German search and share the information resources in the two languages, maybe we can firstly mapping the thesaurus from both sides, and then we can develop a multilingual search engine based on the mapping results.

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Fields of Co-Operation between AII/CAAS and ZB MED: Present and Future

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Abstract The Agricultural Information Institute of the Chinese Academy of Agricultural Sciences (AII/CAAS) and the German National Library of Medicine, Health, Nutrition, Environment and Agriculture (ZB MED) cooperate in a wide range of different fields. The co-operation is set to strengthen the libraries' regular activities and to develop new services for their scientific users. In order to demonstrate their partnership the libraries have signed a reciprocal agreement about mutual help in case of catastrophic events. Both partners are dedicated to build-up a strong relationship, now and in the future.

1. Co-Operation at Present

The Agricultural Information Institute of the Chinese Academy of Agricultural Sciences (AII/CAAS) and the German National Library of Medicine, Health, Nutrition, Environment and Agriculture (ZB MED) maintain an active co-operation in different fields of work.

They exchange internet resources which are relevant to their sciences. These quality-tested links are integrated into their special portals. So, the links from the AII/CAAS are displayed as a special collection on the website of the ZB MED as shown in figure 1 and are integrated in GREENPILOT, the ZB MED's virtual library for nutrition, the environment and agriculture.

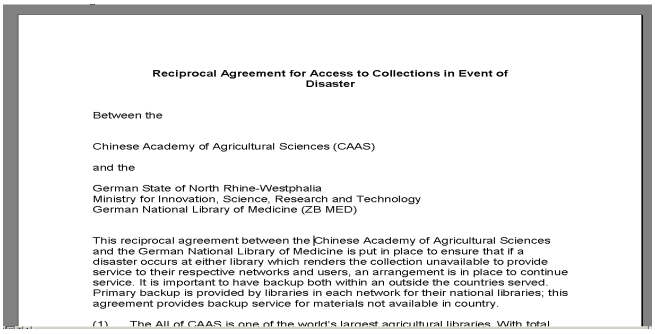
In addition, the two co-operation partners market their special virtual products by linking to them on their websites (e.g. Figure 1).

Figure 1: Internet resources from the AII/CAAS on the ZB MED website

As a classic library co-operation, the AII and the ZB MED exchange relevant scientific journals – this is user friendly and very effective. The AII/CAAS and the ZB MED interact with a mutual information exchange about recent developments in Chinese and German libraries, i.e. in the field of long-term preservation.

Both libraries have signed a reciprocal agreement about mutual help in case of catastrophic events. In this way both libraries have more security and underline their strong co-operation (see Figure 2 and Figure 3).

Figure 2: Mr. Korwitz (ZB MED, Director) and Mr. Meng (AII, Deputy Director General) signing the contract



Reciprocal Agreement for Access to Collections in Event of Disaster

Between the

Chinese Academy of Agricultural Sciences (CAAS)

and the

German State of North Rhine-Westphalia
Ministry for Innovation, Science, Research and Technology
German National Library of Medicine (ZB MED)

This reciprocal agreement between the Chinese Academy of Agricultural Sciences and the German National Library of Medicine is put in place to ensure that if a disaster occurs at either library which renders the collection unavailable to provide service to their respective networks and users, an arrangement is in place to continue service. It is important to have backup both within an outside the countries served. Primary backup is provided by libraries in each network for their national libraries; this agreement provides backup service for materials not available in country.

(1) The AII of CAAS is one of the world's largest agricultural libraries. With total

Figure 3: Reciprocal Agreement between AII/ CAAS and ZB MED

For the ZB MED project, GREENPILOT, the AII has translated the website and the advanced search page for Chinese users. In addition to that, the ZB MED has integrated a special function so that Chinese users can search with Chinese characters in GREENPILOT (see Figure 4). Due to the cross-language search facility the results are found in all integrated languages. Please use a 9-point Times Roman font, or other Roman font with serifs, as close as possible in appearance to Times Roman in which these guidelines have been set. The goal is to have a 9-point text, as you see here. Please use sans-serif or non-proportional fonts only for special purposes, such as distinguishing source code text. If Times Roman is not available, try the font named Computer Modern Roman. On a Macintosh, use the font named Times. Right margins should be justified, not ragged.

2. More about GREENPILOT

The information in the scientific fields of nutrition, the environment and agriculture is highly scattered. So GREENPILOT indexes the following scientific relevant information resources:

1. Library catalogues, i.e. the Catalogue of the German National Library of Medicine (ZB MED) Nutrition: Environment: Agriculture and the Catalogue of the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV)
2. Bibliographic Databases, i.e. AGRIS, international information system for the agricultural sciences and technology from the FAO (Food and Agriculture Organisation of the United Nations), VITIS-VEA (Viticulture and Enology Abstracts), UFORDAT (Environmental Research Database)
3. Scientifically relevant internet sources (Web); i.e. the quality-tested link collection of the ZB MED Nutrition: Environment: Agriculture, plus full texts of a selection of freely-accessible online journals

GREENPILOT combines all these different information resources and provides one single portal to access this information. Figure 5 shows the English version of the GREENPILOT's homepage.

Figure 4: GREENPILOT website in Chinese

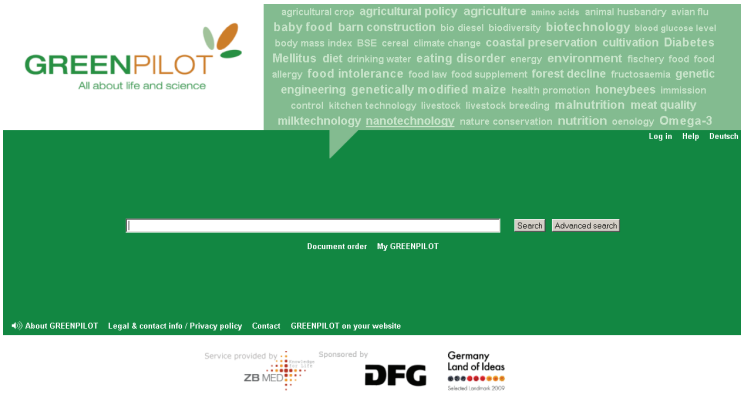


Figure 5: GREENPILOT's homepage in English

The ZB MED provides the researcher in three scientific fields with the most complete collection of scientific literature, high-quality and easy to access.

ZB MED's vision of GREENPILOT is therefore:

- GREENPILOT offers scientific representativeness at every place, at any time – fast, simple and high-quality
- GREENPILOT makes all relevant freely-available digital publications accessible
- GREENPILOT offers comfortable access to the desired documents (by direct clicking or by document ordering)
- GREENPILOT integrates all of its content into the search index and has an effective ranking
- GREENPILOT animates to use, adds value and the user should have fun using it.

GREENPILOT is **targeted** primarily at scientists, but it is also for technology writers as well as the scientifically-interested general public.

The objective of GREENPILOT's **technical realisation** is to integrate the different information resources into such a virtual environment that the information is easily accessible and clearly displayed for the user.

GREENPILOT is a search engine based on intuitive search engine technology. The search engine technology is developed by Averbis Ltd. (www.averbis.de) and uses the Lucene open source software. Figure 6 visualises the structure and operation flow within GREENPILOT.

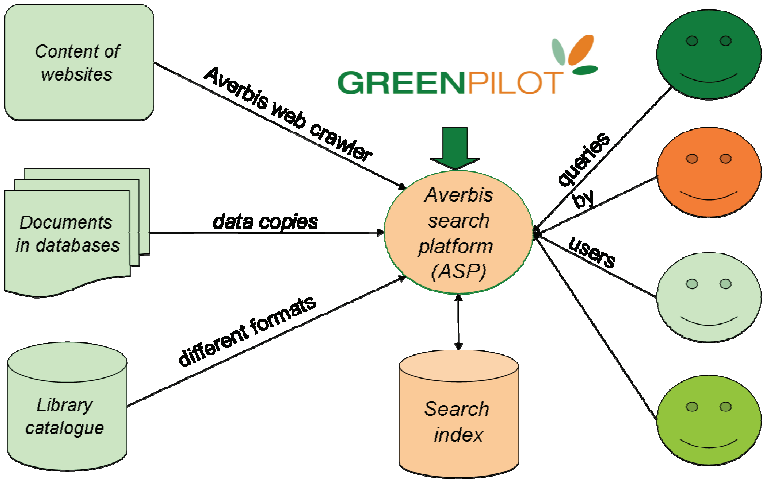


Figure 6: Configuration and information flow inside the GREENPILOT system

The technical process in GREENPILOT starts with the "harvesting" of the various scientifically-relevant information resources. The textual content of these information resources are processed by Averbis search technology (Averbis Search Platform) and its result is added to the GREENPILOT search index. Out of this search index, a list of **results** is generated which are ranked in order of relevance.

The AGROVOC and UMTHES Thesauri are integrated in the search process to provide the user with a cross-language search facility which finds related synonyms in relation to the original search query. AGROVOC is the multilingual thesaurus of the Food and Agri-

cultural Organisation of the United Nations (FAO) and UMTHES is the environmental thesaurus of the German Federal Environmental Agency. For example if the word "swine flu" is searched, GREENPILOT will also find results with "*schweinegrippe*", "*Influenza A/H1N1*" or "*Swine influenza*".

The user can use various refinement tools (filters) to reduce the amount of search results to fewer, more relevant results. The users can filter the results by document type, language or database as shown in Figure 7.

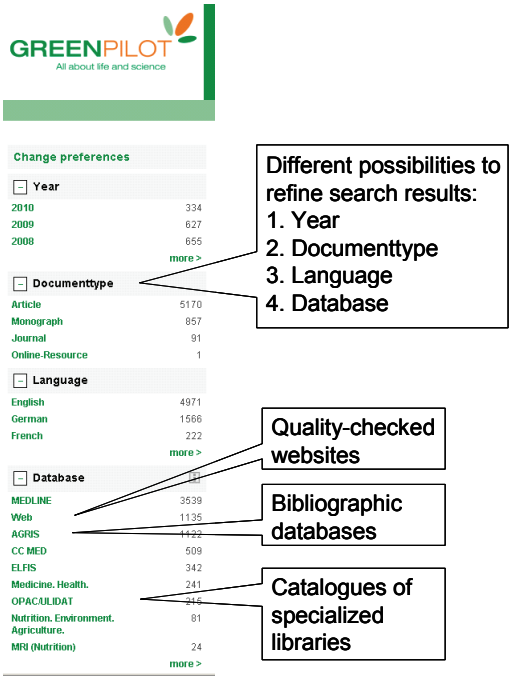


Figure 7: Different filters to refine the search

GREENPILOT offers, whenever possible, direct access to the relevant document. Search results from the worldwide web can be accessed or downloaded directly by clicking the appropriate button provided. In co-operation with the Electronic Journals Library (EZB), GREENPILOT offers comfortable online access to the full text in electronic journals.

Whenever the direct access to the full text is not granted, GREENPILOT offers more detailed information about the specific record so that the user can decide if this record is really important for his/her further work. Such detailed information includes, e.g. a copy of a table of contents, an abstract, a summary or any other information that the database provider has provided with the record. With such extra useful information about the desired record, the user can decide if this record is really what he/she is looking for and also whether to order it.

To order the document GREENPILOT offers an order button which enables the user to order the document either directly from the ZB MED or from one of the partner libraries co-operating in GREENPILOT.

The characteristics of a high-quality search engine are that it finds the most relevant results and that these results are then displayed in the first positions of the result list. GREENPILOT's quality is constantly evaluated.

The **content of GREENPILOT** will constantly be enriched with new scientifically-relevant information resources. These resources are identified with the help of co-operation partners.

For the **technical advancement** of GREENPILOT following steps are planed:

- Development of the subword lexicon with the objective of improving the semantic search
- Advancement of the terminology with the objective of optimising the use of the integrated thesauri
- Development of the associated search (Facet-search) with the objective of refining the search to get fewer but relevant search results
- Integrating a related-articles-function with the objective of finding similar documents
- Establishment of a GREENPILOT blog to enhance the communication and scientific culture in and about GREENPILOT.

On 29th May 2009, GREENPILOT was awarded the "**Selected Landmark 2009**" prize by the "Germany – Land of Ideas" initiative. The "Germany – Land of Ideas" initiative accentuates the positive associations made with Germany; a nation of science and culture; a land of poets and thinkers; innovative products "made in Germany". The patron of this initiative is the German President Horst Köhler. On the same day, GREENPILOT was launched in the Beta version 1.0.

3. Co-Operation in 2010 and beyond

The co-operation between AII/CAAS and ZB MED will be intensified in 2010 in the following fields:

1. Use of Chinese portals for German and international users (English website)
   - Library catalogue
   - Catalogue of current journals
   - Western e-journals
   - Agricultural Sci-Tech-Highlights
   - Agri-Search (in development)
2. Marketing of GREENPILOT in China
   - Courses for Graduates of the CAAS
   - User courses in CAAS
   - Flyers of ZB MED to be translated
3. Marketing of GREENPILOT to Chinese Users in Germany
   - Marketing activities with road shows will start in the second half of 2010 in Germany
4. Identification and Exchange of URLs of relevant PDF documents in China and Germany for integration into search engines
   - Currently, this is performed on a quarterly basis.
5. Exchange of Catalogue Data
   - AII/CAAS OPAC
   - OPAC ZB MED Bonn

- Exchange of files and examination of metadata for integration into GREENPILOT and Agri-Search.

6. Knowledge transfer: Collabarative research and exchange of experiences in the organisation of search engines
   - Development of Agri-Search-Portal using experiences gained from GREENPILOT.
7. Thesauri Exchange
   - Integration of Chinese Agriculture Thesaurus for the GREENPILOT search (51,000 descriptors in Chinese and English)
   - Facilitation of access to the Thesaurus for the Environment (UMTHES) to CAAS (10,700 descriptors in English and German).
8. Visualisation
   - Use of experience of CAAS in the visualisation of the relationships of concepts for effective search: PhD of Mr. Zhang Xuefu.
   - Idea: Setting-up a common project.
9. Other activities
   - Practical advice concerning library construction
   - Exchange of practical know-how in the technical field; scanners, scan robots, digitisation, long term preservation.

Session 3 – Portals

vascoda – Co-Ordination of International Activities of German Subject Portals

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Abstract vascoda is internationally well-known as the German national portal for interdisciplinary search. However, vascoda is far more than the portal. vascoda is based on three columns being the portal, co-ordination of the German subject portals and national and international co-operation. This paper focuses on vascoda's co-ordinating activities. Special emphasis is put on the question where the co-operation between Chinese subject portals represented by the National Science Library (NSL) and vascoda is of special importance for German subject portals.

Keywords Co-operation, co-ordination, interdisciplinary portal, NSL, subject portals, vascoda

1. Introduction and Review of the Workshop in 2008

At the Sino-German Library Co-Operation Workshop in Hannover in 2008, the main point of interest and discussion in the working group on portals was the vascoda portal itself. The vascoda portal [1] features a federated search covering data of more than forty German subject portals. One aim of the working group was the subsequent use of vascoda technology by Chinese portals; another one was the integration of Chinese data into the vascoda portal. After the workshop, metadata formats were exchanged and discussed with the following results.

1.1 Results of the Co-Operation So Far

Rather than integrating Chinese subject portals' data directly into the vascoda portal, relevant data should be integrated into German subject portals. Through these subject portals, the Chinese data could become searchable through vascoda.

For example, data of the NSL's Chemistry Information Portal [2] could become part of the German chem.de portal [3], or data of the NSL's Library Information Portal [4] could be integrated into b2i [5], the German subject portal on library, book and information sciences.

As a first step, a Chinese explanation of vascoda's English search interface has been set up in order to provide easier access to the vascoda portal and its data for Chinese researchers. This explanation, together with a link to vascoda, is part of the Chinese subject portals' websites.

2. Aims of the 2009 Workshop

Much more work needs to be done before Chinese data will be able to be efficiently searched through the German subject portals and vascoda. Whilst following these aims, the 2009 workshop also offers the opportunity of talking about additional fields of co-operation.

2.1 The Three-Column Model

vascoda is more than the portal mentioned above. vascoda is based on three columns, one being the portal and another one – possibly the most important one – is called "co-ordination" (see Figure 1). This means that the vascoda office located at the German National Library of Science and Technology and vascoda's boards provide platforms for knowledge exchange between German subject portals. Some of the tools offered by vascoda are discussion and mailing lists, a blog, newsfeeds or workshops open to vascoda members. Another very important aspect is the co-ordination of marketing activities.

Finally, the third column vascoda is based on, which is called "co-operation", is the one which should be the central theme of the discussions of this year's workshop.

Figure 1: The three-column model

3. Co-Operation

"Co-operation" means mainly international activities and co-operation. For international partners, vascoda is Germany's main portal for scientific information. Therefore, the data of subject portals integrated into vascoda is visible globally.

3.1 WorldWideScience.org

To illustrate this, the example of WorldWideScience.org [6] should be mentioned. Through the membership of the German National Library of Science and Technology (TIB) in the WorldWideScience Alliance, vascoda's data is searchable through worldwidescience.org together with data of many other internationally well-known institutions.

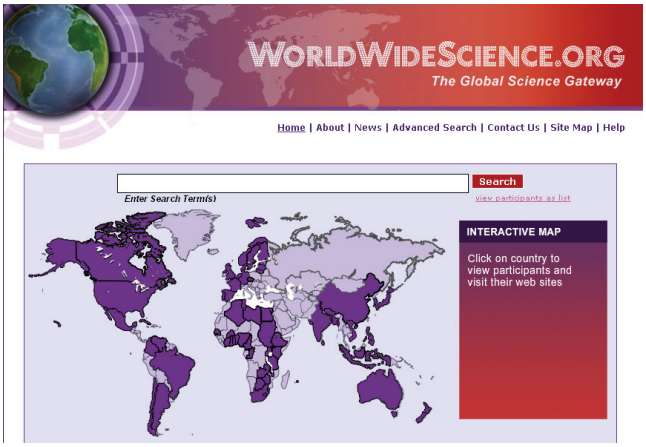

Figure 2: Countries represented in WorldWideScience.org

Figure 2 shows the countries represented in the WorldWideScience Alliance. The Institute of Scientific and Technical Information of China (ISTIC) [7] is the member for China.

Hits from vascoda are ranked relatively high in WorldWideScience.org. Apart from vascoda, the name of the subject portal originally providing the data is given and the subject portals can be accessed through WorldWideScience.org.

3.2 vascoda as a Co-Ordination Site

vascoda also has the role of a co-ordination site for the co-operation between German and international subject portals. Many countries in Europe and abroad are building up subject portals and some of them even have plans for interdisciplinary portals like vascoda.

vascoda serves as a contact point providing information on German subject portals, contact persons, collections and content of the portals. Examples for possible co-operation are colleagues from Switzerland planning to build up a subject portal on economics and also an interdisciplinary portal similar to vascoda or the National Science Library.

4. vascoda and the National Science Library

vascoda and the NSL have shared information on search engine technology and federated search and have discussed the option of integrating data from Chinese subject portals into German subject portals. Some colleagues from the German subject portals GREENPILOT [8] and CrossAsia [9] have actively been taking part in the Sino-German Co-Operation Project and have already presented results. However there are other Chinese subject portals

focusing for example on chemistry or library sciences. vascoda aims to connect German and Chinese subject portals that have not been partners in the Sino-German Co-Operation Project. vascoda is also responsible for passing on information, problems and results of other subject portals to its members.

On the other hand, German subject portals offer more services than search interfaces and access to subject-specific resources. Examples of other important tools are event calendars, researchers' databases, information on job offers, document servers, summaries of subject-specific blogs or information on international institutions.

4.1 Event Calendar and Researchers' Databases

EconBiz, the Virtual Library for Economics and Business Studies, features an event calendar [10]. Tools like event calendars need to be up-to-date. In order to be useful they aim to cover all relevant events from all over the world. For German subject portals it is relatively easy to find information on events in Germany and in Europe. For non-English-speaking countries on other continents it is however much more difficult. The most difficult point is to find the information well ahead of an event in order to allow researchers to hand in papers before the deadline of the call for papers. For German subject portals it would be very helpful to have international partners, for example in China, to co-operate with for tools like event or researchers' databases. The idea would be to have partners collecting data and information for their region or continent and then sharing this data.

EconBiz, the German Virtual Library for Economics and Business Studies, is already co-operating with an American partner, but they would be highly interested in being able to provide more up-to-date information on events in China and Asia by co-operating with Chinese subject portals. In return, they would collect information on events in Germany and Europe and pass this information on to the Chinese partners. A similar co-operation could be realised for researchers' databases and other tools.

5. Perspective

Co-operation between portals goes far beyond sharing data on printed and electronic resources. Through activities like the ones mentioned above, we aim to establish our co-operation step by step. Based on these first steps, the co-operation between vascoda and the National Science Library's portals may develop. Once the infrastructure and workflows are set, the co-operation may also focus on developing tools and techniques together from the beginning. vascoda sees itself as a co-ordinator of these activities and aims to actively continue in this role in the future.

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The Structure and Construction of Intellectual Property Network of CAS

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Abstract In this paper, we will introduce "The Structure and Construction of Intellectual Property Network of CA" (abstractedly called "IPNCAS") from background, introduction and content. Also we will discuss the details about every sub-system of IPNCAS.

Keywords CAS' IP service, Intellectual Property Network

1. Background

Along with the accelerated process of economic globalization and the rapid development of science and technology, the importance of IP is increasingly prominent in China.

CAS has always attached importance to IP work. Since 2008 CAS has decided to establish IP management and support service system, to strengthen IP strategic research, to improve incentive mechanism of IP creation and transfer, to enhance IP training. And CAS decided to establish "IP Network" in 2008. The target is to promote transfer of IP, to integrate IP resources effectively, to standardize management of IP, to improve the informationization level of IP work.

2. Frame of IPNCAS

2.1 Construction Frame of IPNCAS

As shown in Figure 1 below, IPNCAS provides service of four sides. They are information service of IP transfer, information service of IP creation, information service of IP management and information service of IP resources.

Information service of IP transfer is comprised by collection and release system of IP achievement, collection and release system of enterprise and online communication system of IP transfer.

Information service of IP creation is comprised by patent online analysis system and training system of IP.

Information service of IP management is comprised by IP management system of institutes and IP database of CAS.

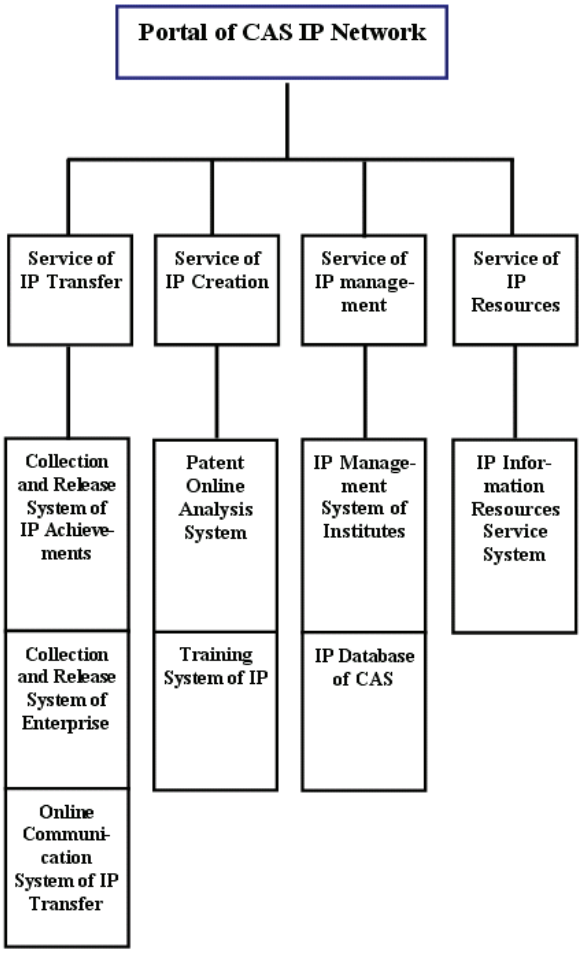

Figure 1: Frame Map of IP Network of CAS

Information service of IP resources is comprised by IP information resources service system.

2.2 Technology Frame

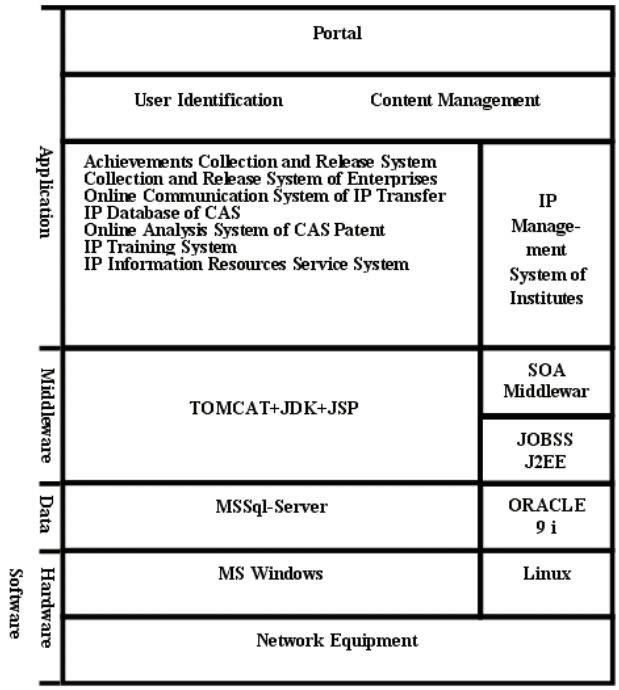

Figure 2: Technology Frame of Ip Network of CAS

IPNCAS is a complex system involving multiple sub-systems, the technical architecture is complicated. Most of the sub-systems are based on the Microsoft WINDOWS operating systems, database systems are based on Microsoft SQL-SERVER. Because it need to be compatible with the old system, IP management system is unique, it is based on the LINUX operating system and ORACLE database system. More detail information as shown in Figure 2 below.

3. The Details of Sub-Systems

3.1 Portal

IPNCAS is a complex and full-featured IP information integrated service system. The establishment of IPNCAS portal can effectively integrate multiple sub-systems of the service, and regulate the management of the various sub-systems. The information that comes from the sub-systems can be integrated and managed on the portal. This integrated service approach is conducive for the user to access information conveniently.

As shown in Figure 3 below one function of Central Portal is user unified authentication. In accordance with the difference of service content and object, central portal take three levels of authentication mode. They are: access free, IP authentication mode, the user login authentication mode.

The other function is Resources Unified Release. Central Portal can extract approved information from the various sub-systems and release them on the central portal.

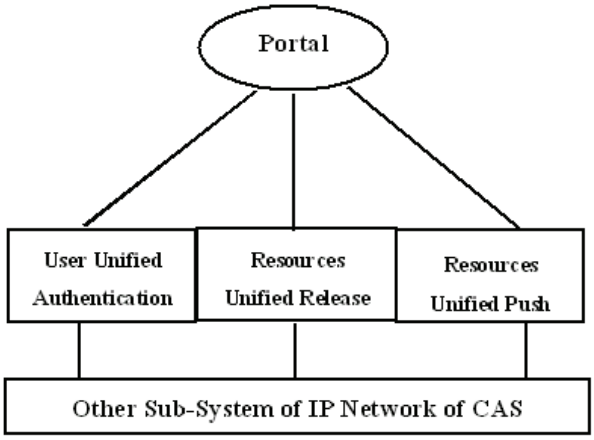

Figure 3: Function of Portal

The third function is Resources Unified Push. Registered users only need to customize demand and push frequency in the system, the system will push the latest information which meet user's need to user automatically.

3.2 Collection and Release System of IP Achievements

The core of CAS IP work is to ensure the validity of IP rights owned by CAS, while the transfer is one of the most important ways to achieve the value of IP rights. So the objective of this system is to collect and evaluate the IP of CAS and release them to community timely and accurately.

As shown in Figure 4 below, the system can extract IP achievements data from IP database. Then by combination of market information and the evaluation factor, the evaluators can give a comprehensive assessment of these IP achievements.

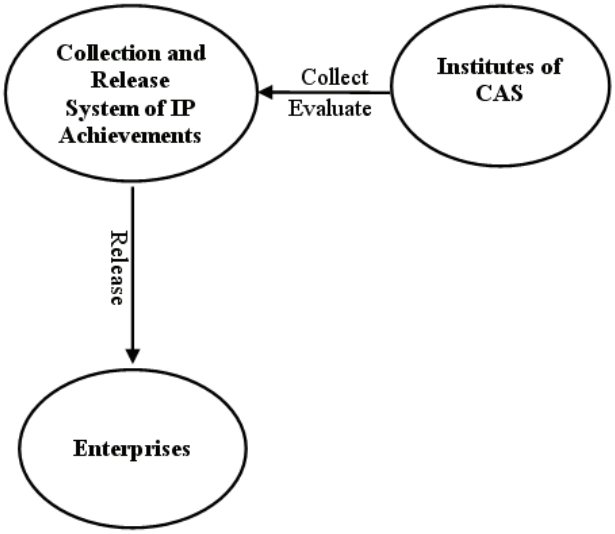

Figure 4: Function of Collection and Release System

In accordance with the user's registration information of local enterprises, the system can automatically and regularly push the information that meets their requirements to enterprises, so that enterprises can easily access the latest Achievements of CAS through multiple channels.

3.3 Collection and Release System of Enterprise Requirement

Another key of transfer of IP is that we should fully understand the technology needs of local enterprises. We should collect a wide range of scientific and technological needs of enterprises. By the co-operation with enterprises the IP owned by institutes can be more valuable.

This system is similar to Collection and Release System of IP Achievements, but the work process is opposite. The system can collect the enterprise requirement and technology problem, and accurately and timely send the information to Institutes of CAS. This can help institutes to acquire the accurate market requirement information.

3.4 IP Database

At present, IP information of CAS distributed in the three aspects. the public information is saved in the Chinese Patent Office and other patent offices around the world; Institute, the management information is saved in the Bureau of Planning and Finance of CAS; some more valuable information such as patents transformation is still saved in the Research Group at the Institute because of the absence of effective data submission mechanism. If we can integrate all these information to establish IP database of CAS, we can provide more regularly and accurately support for information access, data statistics, data analysis, etc.

As shown in Figure 5 below IP database will collect and release basic information of CAS IP. IP type includes patent, software, IC layout design and new varieties of plants.

Basic information comes from State IP Office, Copyright Protection center, Ministry of Agriculture. Patent Citation and Reference information comes from authority patent database.

Research and transfer information comes from institutes of CAS.

IP database will provide data support for IP analysis and transfer of CAS.

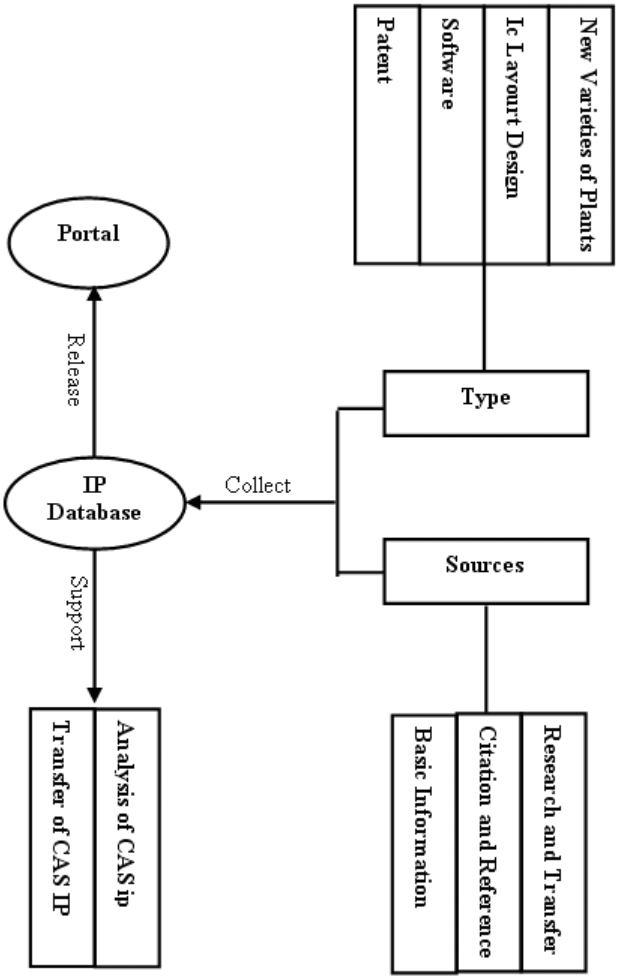

Figure 5: Function and Frame of IP Database

3.5 IP Online Analysis System

The application of patent information plays an important role in many aspects. The scientific use of patent information can greatly improve the research efficiency, reduce capital investment and improve the quality of R & D. It is an important way to make research strategy by use patent analysis system.

The system have established online analysis platform based on authoritative data provided by the State IP Bureau.

The IP Online Analysis System have established online analysis platform based on authoritative data provided by the State IP Bureau. Users can download the patent abstract and full-text information that meet their needs from online analysis platform and execute visualization analysis with these data.

3.6 IP Training System

Recently CAS has strengthened the training of IP. The researchers have more needs of IP training. It is important to establish IP training system so that researchers can conveniently achieve training information.

As shown in Figure 6 below IP Training System can provide technological and information support for IP training of CAS. It will release the latest training information on portal. Teachers and students can login and maintain information online. The system has built communication between researchers and IP Commissioners. Researchers can search and choose the commissioner who meets their needs.

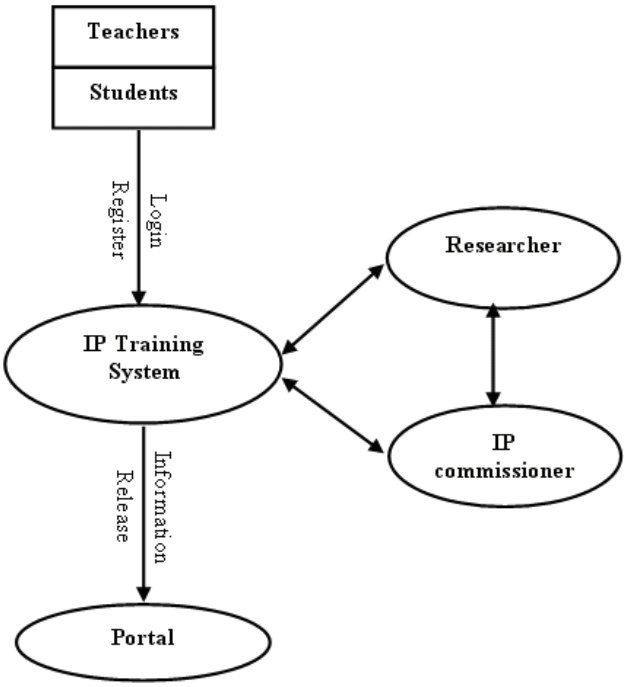

Figure 6: Function and Frame of IP Training System

3.7 IP Information Service System

IP information service system is comprised by these five parts. As shown in Figure 7 below. The system has accessed the authoritative data to build a local mirror by working with the state IP management agencies in consultation.

The system has collected and released relevant IP policy, IP regulations and other IP internet resources.

Meanwhile, the system has provided IP literature service and news service.

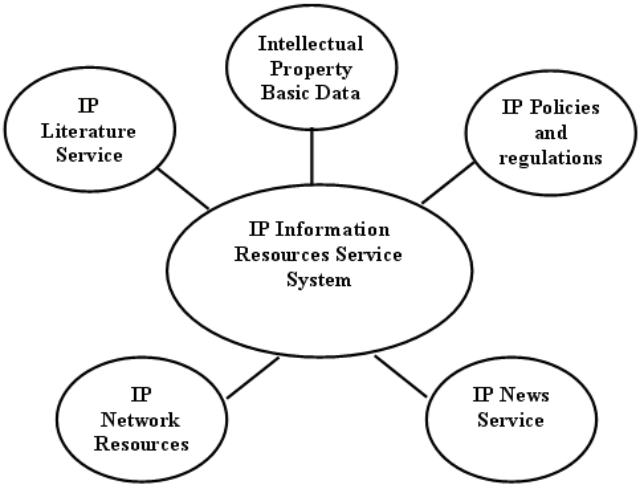

Figure 7: Frame of IP Information Service System

4. Conclusions

IPNCAS has promoted and will continue to promote the informationization level of the IP work in CAS. It is a complex IP information service system. Though it has made some progress, there have many things to do in the future.

The most important thing is to improve the accuracy and extent of data mining about IP rights and release them to the community so that enterprises can understand the CAS achievements more accurately. This can promote the efficiency of transfer of IP rights in CAS.

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Design and Implementation of the Sino-German Humanities and Social Sciences Portal

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Abstract The Sino-German Humanities and Social Sciences Portal (SGHSSP), which is co-supported by Sino-German Center for Research Promotion, National Science Foundation, China and DFG, is implemented by the National Library of China (NLC) and the Berlin State Library (BSL). This paper gives an extensive analysis of the portal in terms of information acquisition, system design and key functions based on introduction of the goal.

Keywords Humanities and social science, portal construction, subject portal

1. Introduction

China is an ancient nation with a long history and glorious civilization. For several thousand years, Chinese people have made important contributions to human civilization. In order to promote cultural exchanges between China and Germany, and to share the featured collections of Chinese literature among libraries in both countries, and further to meet the information needs of users in Europe for Chinese collections, in 2008 Sino-German Center for Research Promotion, National Science Foundation, China and DFG, launched a project to construct a portal named the Sino-German Humanities and Social Sciences Portal (SGHSSP) as a subsidiary of Sino-German integration services. NLC and BSL are responsible for the implementation. This project aims to integrate Chinese humanities and social sciences information resources in both countries so as to provide researchers with high-quality Chinese humanities and social sciences information and also a comprehensive information discovery service.

2. Mission and Goals

In our design, the SGHSSP is engaged in the provision of Chinese humanities and social science information to meet the researchers' specialized information needs. Through the SGHSSP, users can effectively access ancient books, ordinary books, periodicals, dissertations, chronicles and other Chinese resources through it. The SGHSSP is expected to build a comprehensive and reliable Chinese humanities and social sciences information resources service platform, to integrate humanities and social sciences information retrieval system between NLC and BSL, to strengthen bilateral co-operation in humanities and social sciences, to enhance the e-content visibility between Chinese and European libraries, and to achieve the exchange of metadata of non-commercial e-content.

3. Resources of SGHSSP

NLC is a comprehensive research library and serves as the repository of the national publications. It has the role of information acquisition, integration, storage, research, utilization and dissemination. NLC hosts vast and comprehensive holdings. By 2008, NLC's collection has amounted to 26,970,000 volumes and artifacts. It is renowned for its collection of ancient and rare materials. NLC houses 270,000 rare records and 1,640,000 ancient records.

Already in the earliest years of its existence the Churfürstliche Bibliothek zu Cölln an der Spree (Electoral Library) – the first name of BSL – began collecting Chinese woodblock prints and manuscripts (1665). It is today the most important academic research library in Germany, and has specially established the East Asia Department to collect material from East and Central Asia. With a stock of 710,000 volumes of original language literature boosted by some 20,000 new publications each year, extensive material in western languages and 4,000 current journals, the department has the most comprehensive collections of its kind in Germany and the rest of Europe.

3.1 Featured Collections

The portal integrates resources constructed by NLC on its own, for example, oracle bones, rubbings, digital chronicles and MinGuo (The Republican Period of China, which lasts from 1911 to 1949) periodicals, which can be accessed by images and full text.

3.1.1 Oracle Bones

NLC has collected 35,651 pieces of oracle bones, covering a quarter of the total number. Database of oracle bones includes 3,764 pieces of metadata of oracle bones and 7,532 pieces of images.

3.1.2 Rubbings

Rubbing is one of the most important carriers to record Chinese document. NLC has more than 230,000 rubbings including tortoise shells, bronze, stones and so on. Database of rubbings includes 23,000 pieces of metadata and 29,000 pieces of images.

3.1.3 Dunhuang Materials

The high quality images and historically accurate information are searchable on the IDP database. More than 100,000 manuscripts, paintings, textiles and artifacts from Dunhuang and other Silk Road sites are freely available on the Internet. Items are shown in context, with bibliographies, maps, photographs, site plans and other information relating to their provenance, history and present condition.

3.1.4 Chronicles

Database of chronicles includes 6,868 digital chronicles compiled before 1949 cross three dynasties – Ming Dynasty, Qing Dynasty and MinGuo period.

3.1.5 New Year Pictures

NLC has collected more than 4,000 New Year Pictures in various subjects. The database includes 278 pieces of metadata and 278 pieces of images.

3.1.6 MinGuo Periodicals

The Chinese MinGuo periodicals reflect MinGuo period in terms of politics, military, diplomacy, economics, education, ideology and culture, religion, etc. The database provides 4,329 titles of periodicals' full text in electronic images.

3.2 E-Books

The portal collects 2,289 e-books through The Wenjin Book Award Database. The Wenjin Book Award of NLC is a public book award annually held by NLC. The candidate books are recommended by publishers, readers, authors, experts and NLC covering philosophy, social sciences and natural sciences. Bibliographic items include: title, author, ISBN, publishers, publishing time, participating time, directories and profiles. Most of those have got permission from authors, and can be accessed in full text.

3.3 Journals

Through the two commercial databases CNKI Academic Journals and Wanfang China Online Journals purchased by the two libraries, the portal collects more than 30,000,000 articles, covering philosophy, religion, history, linguistics, social sciences, law and so on. Additionally, it also includes the relevant chemistry, physics, mathematics, information science and other natural sciences. Bibliographic items include: title, author, unit, keyword, abstract, CLC and so on.

3.4 Doctoral Dissertations

Dissertations in the portal, mainly from the NLC's doctoral dissertation database, come up to a total of 127,542. Bibliographic items include: Chinese title, foreign language title, subtitle, author, supervisor, major, research direction, degree level, degree-granting institution, keywords, degree-granting date, the total number of pages, Chinese abstract, foreign language abstract and call number. The portal also provides paper catalog and the former 24 pages full text image.

3.5 Crawled Web Information

Massive network information resources contain a large number of humanities and social sciences information resources. The portal collects the research institutions' web sites and databases in the fields of the humanities and social sciences, classifies them by subject categories, then makes links to create free database navigation.

4. System Construction

In order to ensure platform portability and maintainability, we take Java as the core platform of the system, meanwhile taking MySql which is free of charge as the database to store the data. The portal system is modular-designed. Besides the web interface and backend database, the system has two main modules in the core logic layer, the cross-database searching module and the meta-data management module. In order to ensure the stability of cross-database retrieval system, we use commercial software Metalib to manage databases and embed it into the portal system. MetaLib is a powerful portal system of the academic resources of libraries which has the core function of federal search. MetaLib can simultaneously take concurrent retrieval on a variety of heterogeneous resources. It provides a unified search interface and can convert the readers' retrieval types to certain types to meet different resource requirements. And the de-duplicated and merged results, OpenURL extracting, unified displaying format and multi-format preservation are also supported. At the backend meta-data management module is connected to Mysql database, and it can support the call of the metadata saved by the portal. System architecture diagram is shown below (Figure 1).

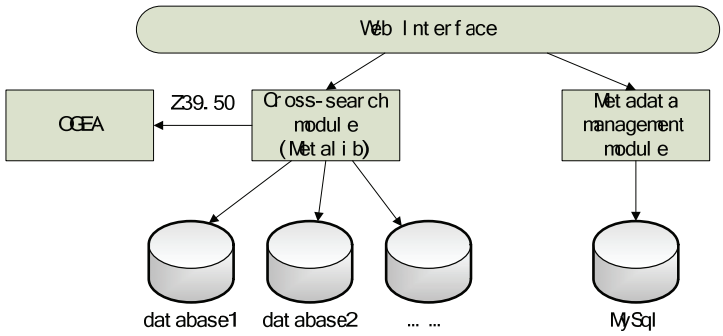

Figure 1: System architecture diagram

5. Key Functions of SGHSSP

The integration portal of subject resources maximize the integration of related resources and services and provide convenient and efficient retrieving and personalized services to meet the need of a particular user group or a particular subject. First, it is a resource platform, making full use of intelligent technology on the different types and characteristics of resources to realize integration of information resources, information technology and contents, and to achieve one-step search and inquiries. Secondly it is a service platform. Reference service, inter-library loan, document delivery and other library services are provided in the “one-stop” portal. The aim of SGHSSP is to expand library services to provide high quality information in Chinese humanities and social sciences to the researchers. It has the basic elements for integration portal of subject resources, such as: unified retrieval, know-

ledge navigation, service integration, user authentication and personalized services and so on.

5.1 Unified Retrieval

The SGHSSP integrates a variety of bibliographic databases, titles and abstract databases, full text databases, electronic journals and related websites. Some of them are from NLC, some from BSL. Some are self-constructed, some are commercial. There are multiple kinds of digital resources and the storage and reading formats vary, with distributing, heterogeneous nature, different access methods and retrieval interface and so on. During the portal construction, by using sophisticated federal search software, we successfully integrate these resources and provide a unified search interface. We realize the cross-platform & cross-database retrieval, minimizing the difficulty the users meet while searching different data sources for documents and a lot of time are saved. Nine databases are set in the portal, which are Chinese Bibliographic DB, Rubbings, New Year Pictures, Digital Chronicles, Wenjin Awards Books, Digital Dissertations, CNKI Academic Journals, Wanfang China Online Journals and OGEA – Online Guide East Asia. OGEA is an engine for online information about East-Asia provided by BSL. Z39.50 is used to build a connection between the portal and OGEA. So that OGEA can be cross-searched locally. The federal search module provides two different search methods, one is simple search, and the other is advanced search. Users can use the simple search to do federal search on selected databases by the keyword and get the results. Several other searching fields are provided in the advanced search, such as title, subject, author, ISBN, ISSN, year and so on. Also boolean search is supported for more complex and accurate retrieval.

5.2 Knowledge Navigation

Knowledge navigation is one of the most important methods for integration portal of subject resources. It aims at integrating the best information resources and serving them to the uses, and helping them to know rapidly and comprehensively about the library collections and web information about the subjects, and get the exact needed resources. The humanities and social sciences databases and information resources for academic institutions are revealed by the SGHSSP through the academic classification. The information from different sources are connected to expand the depth and broadness of the information reveal, and to make the information accessing easier for uses.

5.2.1 Database Navigation

The databases about the humanities and social sciences can be accessed through the portal. There are two kinds of databases. One is commercial databases purchased by NLC and BSL. The other is the free databases on the internet, such as Beijing Memory and Chinese Study. There are more than 120 free databases in the portal.

5.2.2 Institution Navigation

There is information about 150 humanities and social science institutions in China and Germany collected in the portal. Users can navigate the information by subjects and regions. In order to realize the navigating function, we catalogue the internet resources according to

the DC metadata standard and corresponding cataloguing criterions. The catalogued fields include title, other title, address, URL, encoding, format, availability, description, subject, region, language and resource type. After collecting and describing, we should organize them effectively. Based on the Chinese Library Classification, we classified the resources into 20 1st-level categories by subject primarily. They are general, history, philosophy & religion, people, archaeology, geography, economy & business, society, politics, law, education, performing arts, fine arts, literature, movies & film, language & linguistics, books & libraries, mass media, sports & recreation, teaching research. The number of 1st-level categories will increase with the project going on. Generally there are not 2nd-level categories under the 1st ones.

5.3 Services Integration

The SGHSSP does not only fully integrate those resources from different sources, in different types and formats, but also uses the integration tools of academic information resources, SFX, to provide in-depth personalized service of the subject knowledge, and organically integrates navigation, retrieval of electronic resources, inquiry of collection of books and periodicals catalogues, inter-library loan and document delivery, virtual reference, references cites as well as some expansion services such as web search engines to achieve a one-stop access to services. From customized portal links, users can get the most suitable and the best link service.

5.4 User Authentication

As the portal integrates NLC and BSL's related resources, in which there are authentication resources, there must be a strict user authentication to ensure that only the legal users can use those resources. The SGHSSP user authentication depends on the NLC and the BSL authentication service systems. Registered users can logon to the respective library's authentication system through the portal, and use the authorized resources and services in the library.

5.5 Personalized Services

Personalized services are user-oriented service concept. With the guarantee of high-quality information, we make full use of a variety of network technologies to provide users with personalized services. The establishment of personalized service approach is divided into two kinds: one is the users' customization; the other is pushing to the user by the servers. First users can get a variety of personalized services through the MetaLib. In the "personal space", users can set up their own "My E-Bookshelf", "My Database", "My E-Journals", "MySearch History" according to their preferences and needs to organize, collect the literature information, common databases set, commonly used e-journals list and search history related to personal issues and interests. Second, providing new resources through RSS allows users to keep abreast of the latest resources in the libraries.

6. Conclusions

Through the Sino-German integration services and co-operation portal project, we have successfully built a "Sino-German Humanities and Social Sciences Portal", providing authori-

tative and credible information navigation of humanities and social sciences and send the subject information resources and services to the users desktop. At the same time, we hope that the practice of NLC and BSL's building of an important platform for co-operation in Chinese resources sharing will promote the Sino-EU library community co-operation in the Chinese literature resources sharing and in the project's construction and development among the collecting units of Chinese literature. In this way we can make new contributions to inherit and carry forward the Chinese people's traditional culture.

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From a Virtual Library to a Virtual Research Environment: CrossAsia – CrossAsia Campus

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Abstract This paper describes the process of the development of CrossAsia – the East- and Southeast Asia Virtual Library – to the Virtual Research Environment called CrossAsia Campus.

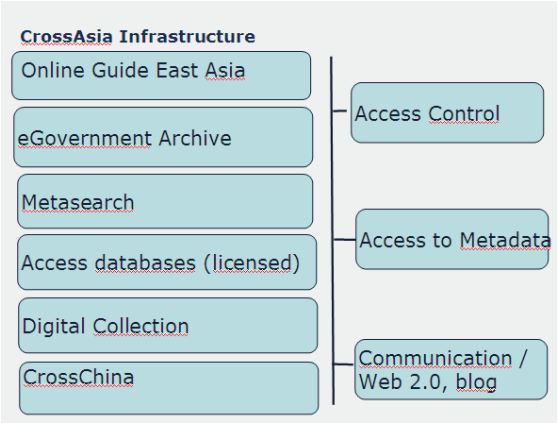
Keywords CrossAsia, East- and Southeast Asia Virtual Library, Staatsbibliothek zu Berlin, virtual research environment

1. Introduction

The establishment of CrossAsia – the East- and Southeast Asia Virtual Library – maintained by the Staatsbibliothek zu Berlin and the progress and growth of the German national accessible East and Southeast Asian collection which is supervised and partly funded by the German Research Foundation (Deutsche Forschungsgemeinschaft), made the access to more than 30 Mio. electronic (full-texts, eBooks, articles etc.) and printed items possible.

2. CrossAsia – the East- and Southeast Asia Virtual Libray

With the support of the German Research Foundation the Virtual Library East and Southeast Asia – CrossAsia – was created as a co-operative and collaborative portal in order to concentrate the electronic products on one platform and make them available. After registration, users may access all electronic resources of the East Asia Department via this platform. The same East Asian databases and infrastructure is offered to the Staatsbibliothek zu Berlin readers with their valid library card. For all users of the special nationwide interlibrary loan service ("Blauer Leihverkehr"), registration for CrossAsia is free of charge. Users of CrossAsia only get access to the electronic resources being licensed by the East Asia Department.



Within the framework of the CrossAsia virtual library, the Online Guide East Asia – a special subject guide – is being offered (in co-operation with the WWW China Virtual Library, Leiden and the Asian Studies WWW Virtual Library, Canberra). Moreover a meta search in catalogues, databases, and German union catalogues concerning East Asia is provided. This meta-search also supports different scripts.

The latest projects of CrossAsia are the eGovernment archive and the co-operation with the National Library of China which resulted in CrossChina, a guide to East Asian resources from the Beijing and Berlin view.

Currently, some 3.000 users are registered to CrossAsia. CrossAsia thus developed into an important support of research in the field of Asian studies in Germany. The access to the large selection of electronic texts offers new approaches to research and education. And it levels the playing field – even smaller institutes with a low library budget can make use of the access to databases, full-texts, articles and eBooks.

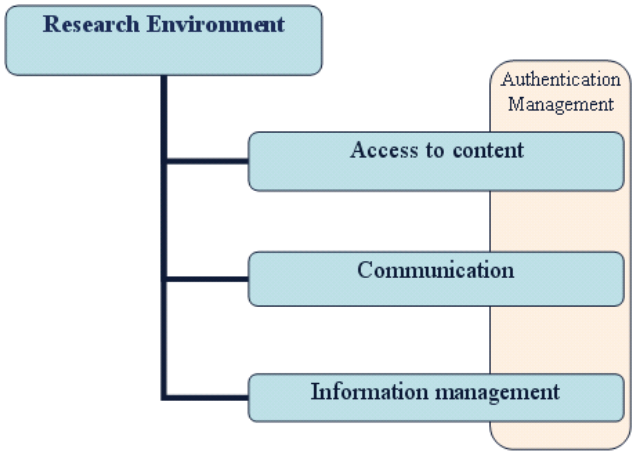
Nowadays, the East Asia collection of the Staatsbibliothek zu Berlin is the biggest of its kind in Europe. In terms of access to East Asian electronic resources, the East Asia Department of the Staatsbibliothek zu Berlin is even among the top players worldwide. It is responsible not only for supplying the German institutions, but also offers solutions for European consortia and within the field of technical handling. The Staatsbibliothek zu Berlin participates in the project "German national licenses" (supported by the German Research Foundation) and will keep on developing cost intensive projects through third party funds. In the future, the goal is not only to preserve the status quo and to ensure its sustainability, but prospectively to develop and enhance the collection and the products in co-operation with other institutions. Since 2002, the East Asia Department of the Staatsbibliothek zu Berlin has accomplished and established new strategies for licensing East Asian databases. Licensers had to accept that the situation in Germany and Europe is fundamentally different from conditions in America. The general set-up in Germany is specific: the Special Collection's programme (SSG) of the DFG and the East Asia collection as a national resource have created a national responsibility for the nationwide literature supply. In this respect, the traditional structures of the Special Collection's programme has had positive effects on the provisioning of electronic resources – at least for the special collection East and Southeast Asia maintained by the East Asia Department of the Staatsbibliothek zu Berlin. So, it is time to advance our work and to go beyond just organising access. We have to create a new online infrastructure as a framework of collaborative tools and resources that allow researchers to share and re-use their data via use a common platform, to combine services, and to promote new collaborative research practices within regional, national or international research groups.

Our new project CrossAsia Campus will establish a Virtual Research Environment (VRE) for CrossAsia users and beyond. It will focus on enhancing access to e-resources and creating a collaborative platform for communication and research independently of time and place.

3. CrossAsia Campus – Virtual Research Environment

The general definition of a VRE is to help researchers to manage the increasingly complexity and range of tasks involved in carrying out research cross-disciplinary. At first, CrossAsia Campus will focus on 3 different levels, i.e. access to content, facilitate communi-

cation, and provide information management. The backbone of these new services is a technical infrastructure with a flexible but reliable and secure authentication system which will support Shibboleth technology.



3.1 Access to Content

The CrossAsia and the CrossChina platform will be fully integrated into the CrossAsia Campus; this will guarantee that all e-content will be part of and accessible through the virtual research environment CrossAsia Campus. The full integration of all parts of CrossAsia into CrossAsia Campus will result in an open gateway to databases, e-journals and eBooks both free or subject to licence. Digital collections, library catalogues, archived material, statistical material, maps, art, and website resources will be part of CrossAsia Campus.

3.2 Communication

The second level of CrossAsia Campus is the communication platform. As a result of discussions with our CrossAsia users we noticed a need for a central space area for individual registered users as well as for regional, national or international research groups. This will be achieved by using Web-DAV technology in combination with an extended authentication system which will support Shibboleth. Registered CrossAsia users may have access to all e-resources which are subject to licence. In addition international research partners who for legal reasons can not become registered CrossAsia users may only use the central space area but will not have rights to access CrossAsia licensed databases.

Communication also means that this platform can be used to maintain and publish Open Access Journals or any other publication. Whether Blogs or Wikis will be accepted by the research community only time and experience can tell. If needed, we can provide this within CrossAsia Campus or we can integrate Blogs or Wikis from other hosts. As we offer access to a central space area, CrossAsia Campus will not need to offer special text-processing software. All documents can be accessed through the internet by any user at any time – only access to the internet is needed. We can expect that users will work with their own text-processing systems.

3.3 Information Management

Information management will consolidate the different parts of CrossAsia and CrossAsia Campus, i.e. enhance access to e-resources, e-journals, eBooks, and other free accessible information available on the internet as well as co-operative works and discussions as part of the research groups community. This will provide a one-stop-access point for specific research units and groups as well as a communicative infrastructure for regional, national and international research groups.

According to our self-assessment we will offer a new technical infrastructure to build new collaborative frameworks. It is understood as an offer to special research groups but also to all registered CrossAsia users. CrossAsia Campus is a framework to support research work by providing an infrastructure in combination with a central point for accessing e-resources. Researchers can accept these offer and work with different databases, eBooks, e-journals etc. They may work collaboratively within their research groups or as individual researchers. The new platform should at least support diverse research methods and approaches (i.e. computer-linguistic methods, semantic web, GIS or Geo-OCR etc.). In this sense CrossAsia Campus will not only support disciplinary or inter-disciplinary research but it will also become a platform for integrated science (i-science). However such platforms lives and thrives with the input and acceptance of its users and researchers – and acceptance can only be achieved by offering all necessary and needed services. The CrossAsia Campus thus needs supporting co-operative and collaborative research work and communication. Its maintenance and the development of this new infrastructure and framework depend on the input, ideas, and needs of the research community.

Cluster 2

Session 4 – Non-textual and Digital Curation

Competence Centre for Non-Textual Material (CNM)

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Abstract In this paper, we describe a concept for a competence centre for non-textual materials at the Technical Information Library (TIB). The TIB is planning a Competence Centre for non-textual materials where practical solutions for capturing, storing, finding and using of those materials will be found. The main idea is to make metadata of multimedia collections accessible to users across types of sources through one access point, regardless of whether the sources are kept by libraries, archives, or other institutions. In response to these needs, the TIB is providing GetInfo, a portal for science and technology.

Keywords Archiving, automatic content analysis, Digital Object Identifier, digitalisation, GetInfo, metadata, multimedia, non-textual materials, portals, visual search, visualisation

1. Introduction

Worldwide, digitised collections of non-textual material are growing fast, yet many of these materials are inaccessible because they are stored on researchers' local servers or physical storage media only. This drives the demand for new services, making audiovisual storage and search one of the major challenges for Information providers such as the Technical Information Library (TIB).

2. Objectives

The TIB has developed a concept for a Competence Centre for non-textual materials which, in December 2009, will be evaluated by a panel of experts and, in the event of a positive outcome, will receive financial support. The vision of the Competence Centre is to make efficient tools and technologies available to researchers, teachers and students, to enable them to search in a multimedia database through a central portal which is characterised by extensive, cross-media content, simple and media-specific access and high hit rates.

In order to realise these conceptions, we want to establish a media centre for non-textual media which covers the following fields:

- Collection, indexing, provision
- Automatic content analysis
- Digitalisation and archiving
- Integration of suitable search and presentation processes
- Advice from knowledge providers on questions of standardisation, archiving and provision

In addition, we want to establish an infrastructure for referencing research data which comprises the following items:

- Collection and provision of metadata
- Citability by allocating DOIs
- Co-ordination of infrastructure for data storage
- Development of a visual search process
- Scientific advice

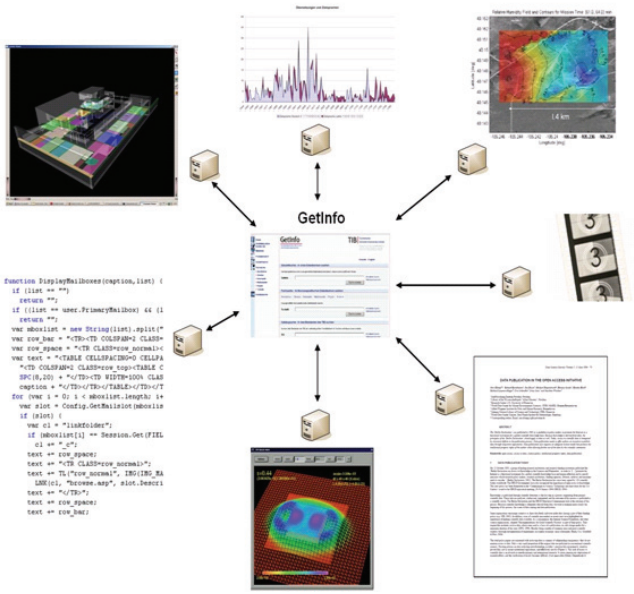

Figure 1: GetInfo

This diagram (Figure 1) clarifies the general concept: GetInfo is the TIB's central specialist portal for technology and natural sciences. Here, one can carry out research in catalogues and external databases. The goal is to provide both the metadata from films, videos, graphics, numerical data and also software using a common index and to guarantee access to the objects using a unique DOI registration. All of this will be independent of location and/or data archive.

3. Needs

- Increase in data volumes
- Heterogeneity of media types and formats
- Interoperability of metadata
- Automatic indexing of metadata
- Search and presentation process for multimedia retrieval

4. Indexing

On the topic of media indexing, a media management system will be used. It stores both content and technical metadata and divides videos up into separate scenes so that the content of each individual scene is described and can be searched for. Manually-indexed metadata would be abstract, commentary, subtitling, keywords, indexing and subject classification whereby a differentiation between work and sequence is made. Formal data such as file format, running length, time codes and key images will be automatically indexed by the system.

5. Media Provision

As a single access point to the non-textual materials of all partners, GetInfo makes metadata of multimedia collections accessible to users. Furthermore, the portal provides abstracts of all audiovisual media. There will be a link in GetInfo to a specialist site for digital films and videos where, in the future, there will not only be an online call-up for videos, but also special retrieval methods for multimedia will be offered. Further features will be the selection of sequences using an editing tool, order, download and preview in low resolution.

YouTube is no alternative to the above specified portal as we need a platform which provides years of reliable service and which we can actively shape ourselves. However, as an additional channel, YouTube seems to offer a very interesting opportunity to tap into new customer circles.

6. Digitalisation and Archiving

We have the problem of the digitalisation and archiving of analogue films in formats that will change in the future. In this respect it should not be forgotten that, for the time being, each analogue picture, e.g. from an SLR camera, contains more information than its digital copy. So, if it is worked from analogue originals, it will probably be necessary to digitalise repeatedly over time in order to achieve the best possible results.

Even with genuine digital originals, there is the problem of encoding in formats that are constantly changing (there are precious few long-lasting standards), and of course there is the problem of long-term archiving.

7. Automatic Content Analysis

In the face of a rapidly increasing number of multimedia objects and the necessity of indexing the contents even of individual film sequences, an intellectual, “manual” indexing is unthinkable. Content-based image retrieval (CBIR) provides methods to extend and complement text-based retrievals by querying and retrieving images and videos by content. CBIR solutions identify objects in images, segment videos into short sequences and compute features describing colour, texture, shape, position or motion information. There is a range of processes that can be used to automatically index content, e.g. algorithms for

- Shot and scene detection
- Camera movement detection (tilt and zoom)
- Face detection / identification
- Object detection
- Context detection (indoor/outdoor, countryside, buildings)
- Genre detection (news, sport, advertising)
- Event analysis (tennis, football, etc.)
- Text recognition
- Speech recognition

In order to improve access to multimedia objects. content-based image retrieval (CBIR) solutions will be implemented in the GetInfo Portal.

8. Visualisation

Just as with the automatic content analysis, visual search and retrieval processes are necessary in equal measure and will also become an R&D subject in the competence centre. Suitable search and presentation processes will be integrated in the GetInfo Portal. For example, visual input interfaces allow users to apply

- Query by Example
- Query by Sketch
- Query by Colour

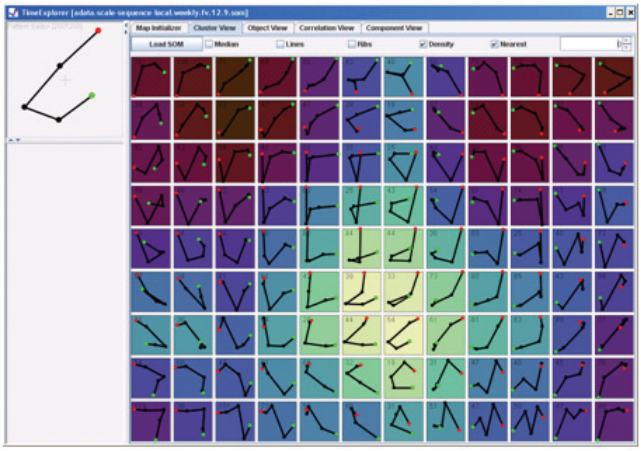

Figure 2: Visualisation of the graphical interactive search

Figure 2 here visualises the graphical interactive search within a large data quantity, using a user-defined curve shape pattern. The search query is placed through the interactive sketching of the curve shape that is being searched for (see upper left). A light-dark colour mapping over the complete range visualises the degree of matching of the defined shape pattern with the patterns within the complete data range.

9. Digital Object Identifier (DOI)

9.1 Background

Current practice involves data being primarily stored in private files, not in secure institutional repositories and this is why these are effectively lost. Furthermore, there is a lack of infrastructure in many disciplines, missed funding opportunities and a lack of policy for data contribution.

Problem solving:

- Creation of new and strengthening of existing data centres
- Global access to data sets and their metadata through existing catalogues
- By the use of persistent identifiers

9.2 DOI System

The DOI system is a worldwide system for persistent and actionable identification and interoperable exchange of intellectual property on digital networks. A DOI name is made up of two components, the prefix and the suffix (Figure 3):

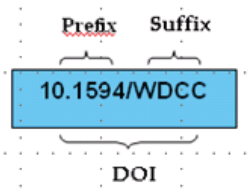

Figure 3: Components of a DOI name

The goal of using DOIs is to make multimedia objects citeable as publications. In 2005, the TIB became a non-commercial DOI registration agency for research data sets from the fields of technology/science and medicine. In this system, a multimedia object would be attributed to its investigators as authors and may have its own identity. Further development of the structures of the storage, referencing and availability of primary research data for non-textual knowledge objects, such as AV media, by the assignment of DOI names will be made in the competence centre. It is planned in CNM not just to assign an own DOI to complete films or a complete multimedia learning unit, but also to individual sequences or modules to provide long-term and generally accessible availability of audiovisual material.

9.3 Re-Organisation

- So far the TIB is a DOI registration agency for primary data (and other non-commercial scientific information) with other local institutions as its customers
- In 1999, the publishers funded their independent DOI agency CrossRef
- In 2008/2009, TIB will transfer the DOI registration to a new worldwide agency, carried by local information institutes and libraries

The name of the international setup will be DataCite. The TIB has signed-up the national registration agencies with their connections to local or national data centres. The metadata will be provided to libraries and other institutions for their catalogue and information systems. In November 2009, institutions from eight countries declared an interest in helping to jointly set up DataCite which will be established at London Online in December 2009.

10. Expected Results of the CNM

- Establish GetInfo as a single access point to the non-textual materials of all partners
- Agree on common interoperability metadata standards for non-textual materials
- Defining and initiating activities for long-term preservation of multimedia objects
- Setting-up the DOI registration of multimedia objects in co-operation with TIB
- Research and implement CBIR interfaces which allow users to explore multimedia collections either by example or by selecting properties from pickers such as a colour wheel, a sketched shape, a list of camera motions or a combination of these
- Establish a network in order to gather and disseminate knowledge in the field of non-textual materials (Figure 4)

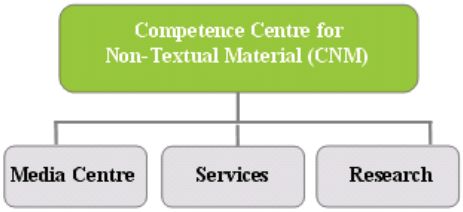

Figure 4: Competence Centre for Non-Textual Material (CNM)

Research and Practice on SIP Ingestion Based on Trusted Workflow Management

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Abstract From the perspective of trusted workflow management, this paper discusses research and practice on ingest management of digital preservation system of electronic journals. It first describes the trusted workflow management model and trusted chain mechanism, and then strategies on data package management and assembly workflow construction are described in detail. In addition, it divided the ingesting workflow into atomic processes combining with the actual processing requirements, and made a personalized workflow definition and processing demonstration taking IOP for example.

Keywords Digital preservation, ingestion management, trustworthiness, workflow

1. Introduction

Because of factitious mistake, technical upgrading, equipment damage and other reasons, it often results in a continuing decay and loss of integrity, authenticity, security and usability of digital objects, which is an important issue we must face in research and practice of digital preservation. As the digital preservation system play an important role in digital preservation, it need make use of a variety of strategies, technologies and methods to keep integrity, authenticity, security and availability of data objects.

In a digital preservation system, data ingesting module is the initial entrance of all digital objects which will be archived. It plays as a bridge for information transfer between digital preservation system and content providers. From receiving the information package (SIP), it carries out a series of related processes and finally creates an effective Archival Information Package (AIP) complying with archiving data format and data standards. So, effectively control on the ingesting processes of the original SIP will directly affect the quality of the data archived in the system, and the ingesting module is the first step to ensure integrity, authenticity, security and availability of archiving resources.

There are already some digital preservation systems doing research and practice on ingesting management based on different context and demand, such as the e-Depot and Portic, which formed the distinctive ingesting management functions and workflows. Based on the same purpose, we did in-depth studies on the trusted workflow management during developing our digital preservation of electronic journals.

2. Trusted Workflow Management Model and Trusted Chain Mechanism

Digital preservation is a complex systems engineering. There are some differences in requirement on data control and management between itself and other information system. Besides, it is difficult to find and correct the mistake during preservation process in short time because of the specialty of digital preservation. Therefore, it need stricter workflow management and control for digital preservation system.

Take into account related requirement of process management and trusted archive authentication, we proposed the trusted workflow management model (Figure 1).

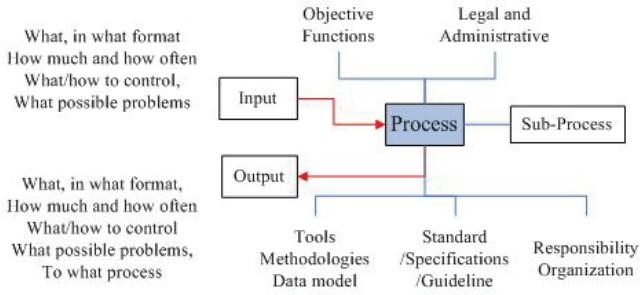

Figure 1: Trusted workflow management model [1]

According to the trusted workflow management model, we should define some information for each course as follows:

1. Atomic process definition and basic requirement
   We need define objective of each atomic process. In other word, we should confirm the operation tasks and its functions, referred technical specialty, performance requirement, related law limitation and management requirement and so forth.
2. Input information
   Meanwhile, we should be conscious of the input requirements of each atomic process which include the type, format, amount, input frequencies of input information. Besides, we should know how to control the input information and how to deal with the problems during the information import.
3. Output information
   Similar to the input information, here we should demonstrate the type, format, amount, output frequencies of output information, and identify how to control the input information and how to deal with the problems during output.
4. Process
   - Information management process is the core of workflow. Any activity that converts input resource into output one will be regard as a process. Each process could contain multi sub-process and the output of previous process might be input one of next process. To insure the efficiency of digital preservation, the system should identify and manage many related and interactive process. There are usually four elements in a digital preservation trusted workflow.
   - Information. It refers to the related data resources such as inner information, exterior information and flow control information. All of these are used to describe process

of workflow and expressed as digital preservation policies, procedures, guidelines and so on.

- Method. It contains standards, technologies and some methods for support other resources which would be used in digital preservation.
- Organization and responsibility. This element describes each entity and their relationship within workflow process. It is represented as digital preservation mechanism, personnel requirements, and work report systems and so on.
- Activity. Activity represents each process, sub-process and their restrict relationships which form a workflow. All these activities will turn into a complete workflow through some control manners such as ranking, combination, parallel, serial, repeated.

The Trustworthiness of a workflow is reflected in its own scientific, reasonable, trusted design. On the other hand, an obvious, clear, open and verifiable description or prescript about process and control practices of the workflow can also enhance its trustworthiness. From the perspective of process management, it requires related criterion, standards and management systems to implement the workflow. But also it need use related criterion, standards and management systems to insure trusted management of workflow. Therefore, we could make use of the inspection of some criterion, standards and management systems which are indispensable to evaluate the trustworthiness of a workflow.

To trusted chain mechanism, it means that a certain task is divided into workflow chain consist of successive, multi atomic process. The trustworthiness of each atomic process is based on trustworthiness of process context and previous process function of system. So, we could guarantee the trustworthiness of each atomic process though strict control management and insure trustworthiness of the whole flow via constructing a trusted chain of workflow.

3. SIP Ingestion Management Based on Trusted Workflow

The digital preservation system (DPS) of national science library applies Fedora as the substructure core repository. Considering the workflow complying with Open Archival Information Service reference model (OAIS), the requirement of trusted repository and actual demand on preservation, DPS provide a series of preprocesses on SIPs to support the next archive management.

3.1 Strategy on Data Package Management of DPS

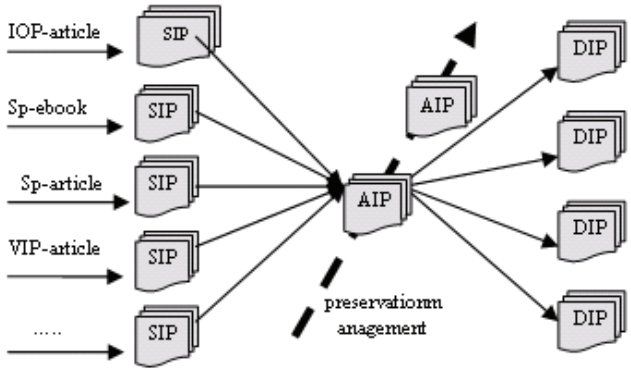

Figure 2: Strategy on data package management of DPS

Currently, SIPs are from different suppliers. They can't be submitted in the light of a uniform standard format. In this case, the DPS adopted a strategy in ingesting module design. It "receiving SIP in different formats, submitting AIP in uniform formats, distribute DIP in different formats". In other word, It allows the system to receive and process SIP in a variety of formats, and then generate a unified format of each SIP for archiving management (Figure 2).

3.2 Strategy on Assembly Workflow Construction

Before being ingested into archiving system, SIP in different format need go through various preprocess. Therefore, the ingesting system must be able to provide a more flexible workflow construction strategy, and offer customized workflow management for different submission format. According to the modularization program development thinking, the DPS divided ingesting process into many atomic processes. And then it defines the atomic processes one by one according to the trusted workflow management model, and develops modules separately for each atomic process. In the process of ingestion, operators can choose required atomic processes in term of the preprocess demands of SIP in different formats. They may add personalized information (such as documents, tools, standards and responsibility individuals), config and sort these atomic processes to form a personalized workflow (Figure 3).

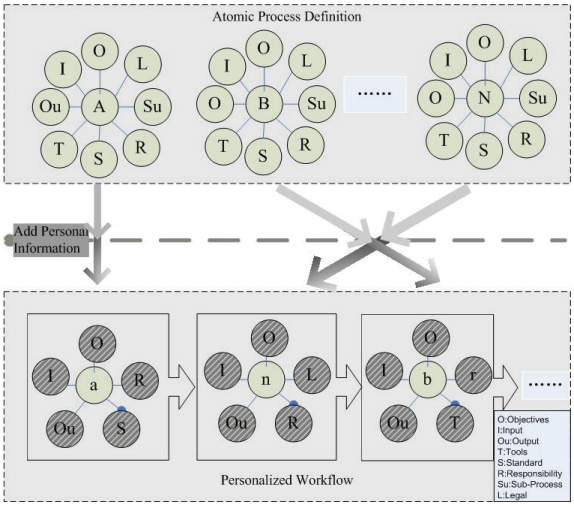

Figure 3: Assembly workflow constructions

3.3 Ingesting Workflow Decompose

There are some descriptions of ingesting module in the OAIS standard. But the OAIS model is only a conceptual one. We need refine the steps which don't have detailed definition according to our own demands in practical preservation system, such as data auditing, responsibility allocation, data semantic definition, workflow model standard and so on.

In addition, most people proposed some corresponding requirements in ingestion phrase in the trusted study of preservation repository. For example, the Nestor criteria catalogue claims that: Repository should define relative specifications of SIP from suppliers to ensure the integrity of digital object; identify the risk of digital objects migration; ensure safe transmission from supplier to repository; ensure integrity and quality of transmission. Criteria standards in OCLC' official release of "Trustworthy Repositories Audit & Certification: Criteria and Checklist (TRAC)" require that ingesting module should provide safeguards of digital objects' source, correctness, integrity and full control.

Based on these studies, we divide ingestion management into 10 detailed steps according to practical data ingestion and process: SIP Receipt, Transmission Integrality Check, Virus Check, Unzip, SIP Count Check, SIP Format Check, Metadata Check, Standard SIP Formation, Standard SIP Check, Archive. Then, in accordance with the trusted workflow model, we give detailed description of documents, tools, stuff, processing specification and other things required by each atomic process.

1. SIP Receipt: Receive data and related documentations from suppliers; carry out initial registration of this batch of data according to the documentations, including data sources, data type, the given time, the receipt time, the recipient, the time of archiving, and so on.
2. Transmission Integrality Check: Use the Checksum of original SIP for data integrity check.
3. Virus Check: Detect virus and Trojan.
4. Unzip: Unzip the archives to specified directory by the rules.

5. SIP Count Check: Count the numbers of various documents, check the path and relationships of them and compare the check result with the checklist submitted with the package by suppliers.
6. SIP Format Check: Check the formats of XML and PDF of initial submitted SIP.
7. Metadata Check: Check the fields and content of metadata using pre-defined XML structure and content.
8. Standard SIP Formation: If the package is not a standard SIP, it will be generated into standard one. Meanwhile, extract related metadata.
9. Standard SIP Check: Check the standard SIP before uploading.
10. Archive: Submit the standard SIP into the preservation system for archive.

4. Case Study on Data Ingestion Management

In our digital preservation system, we define atomic processes (including basic functional description, input and output information, related standards, criterion and technical methods, etc.) in the atomic processes management module of system management as flows (Figure 4).

Figure 4: Web page for atomic process definition

In the process management module, we can define a custom workflow for each resource which will be ingested. Figure 5 shows how to define a workflow for IOP. Firstly we select atomic processes which we need, then append personalized information (related requirements and responsibilities of staff, related policies, documents, manuals, work guide) of each atomic processes, sort them in need, finally form a personalized ingesting workflow.

Figure 5: Web page for custom workflow definition

During the ingesting, we will choose a pre-defined workflow for each package, after that, the system will call the atomic processes according to workflow. At the same time the system will provide the relevant information which is appended during workflow definition for the operator at the suitable time. After the process of each atomic process, the system will give recommendations for processing result. At the end of the entire process, the processing report and results will be generated. If any problem appears in any atomic process, the data package will be shifted into the error management and wait for manual handling.

Our DPS provides two kinds of processing approach: manual one and automated one while the automated one hasn't been completed.

5. Conclusions

After a lot of tests on some kinds of data packages, our design of ingesting workflow management was verified to be appropriate. It basically met with our requirements for flexible, customizable, personalized and scalable of the workflow management besides responding ingestion operation.

Ingestion processing of digital preservation system is actually performed by a coherent set of processing steps (atomic processes) with co-operation. The data packages flows between the different processes in accordance with pre-defined workflow, completes processing on different kinds of digital resources with the detailed specifications and system requirements. The ingesting workflow management program discussed in this article, division entire workflow into a series atomic process, defines functions and requirements of each step particularly, and lists specific standards and tools are used, and ensure integrity and availability of digital objects in the ingesting process, provides trusted support for the follow-up archive management. Related documents, recommendations and a detailed record of the process, make ingestion management has a very good transparency and intelligibility. As a complex application system, digital preservation system should have the trusted characteristics, the trusted ingesting workflow management make a good foundation for the trusted digital preservation system.

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Assessment of Trustworthiness of Digital Archives

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Abstract The trustworthiness of digital curation provisions is a crucial factor for success in long-term digital preservation. In this paper, the nestor Catalogue of Criteria for Trusted Digital Repositories will be outlined as a supporting resource for the comprehensible assessment of trustworthiness of digital archives. Test audits serve as a means to examine its suitability for practical application.

Keywords Digital curation, long-term preservation, test audit, trustworthiness

1. Trustworthiness Put to Test

The present-day ubiquity of digital media resources in science, technology, culture and civilisation gives overwhelming evidence of the numerous benefits of digital content compared to printed publications. But everything comes with a price: The benefits notwithstanding, it must be acknowledged that there are also disadvantages of digital publications which have to be taken into consideration. Rapidly changing technical requirements to access digital information and the perils of physical decay of storage media are only two of many more possible problems associated with digital media. While librarians and archivists have built expertise in preserving collections of printed books, journals and manuscripts for centuries, they still have to prove their ability to cope with the difficulties of long-term preservation of digital objects. Since we can't simulate the technological environments of the future, we cannot demonstrate the success of long-term preservation measures today. However, the trustworthiness of today's preservation efforts and environments can be tested.

Before discussing some of the challenges that this implies, it may be useful to go back to a rather generic definition of trustworthy digital archives which was published in 1996: "repositories claiming to serve an archival function must be able to prove that they are who they say they are by meeting or exceeding the standards and criteria of an independently-administered program for archival certification" (Preserving Digital Information. Report of the Task Force on Archiving of Digital Information, 1996, p. III). This statement emphasizes the need for establishing a solid basis on which the trustworthiness of digital archives will be assessable. A certification procedure, based on widely agreed requirements and criteria is considered to be a transparent means. In the following, some of the key criteria are considered.

1.1 Authenticity

Given the fact that reading books is at the core of our cultural techniques for hundreds of years it comes as no surprise that many readers are skilled in assessing the authenticity of a

printed book or journal. They are basically able to evaluate if the claim of a book to be written by a specific person or to be printed in a given year is plausible. The material character of printed books will allow for examinations of paper, printer's ink or binding methods. Of course there will be grey areas where it is difficult to find out if an author's claim concerning his identity is in accordance with his real identity. The recourse to using pseudonyms or fictional creators is a well-known literary technique. Nevertheless there are proven socio-cultural conventions and practices which will enable experienced readers to reliably assess the authenticity of a printed publication.

Concerning digital objects the situation is more complicated. Their intangibility causes difficulties, because the traditional techniques of evaluating the authenticity of a publication are almost inapplicable. The reliable attribution of an electronic document to a trusted source is even more important than in the case of printed material. There are tools which may help to make sure that a given claim of authorship is trustable. Independent institutions like providers of name authority files or URN registries can facilitate the process of evaluating the authenticity of digital content. Similar to printed books there are socio-cultural practices which help to assess if an electronic publication really contains what it claims to contain. One crucial difference is that these practices are relatively new and still in a state of continuing change.

1.2 Integrity

Since digital information is of an immaterial nature it poses new challenges concerning its integrity. While printed information seems to be virtually unchangeable after the completion of the publication process its digital counterpart lacks this quality of immutability in the eyes of many. Users of digital media are well aware that it is basically possible to change electronic texts or digital images, including metadata like author names or publication years. In contrast to printed objects it seems to be much more difficult to prove the manipulation of a digital object since the moment of its creation. Even more important is the fact that it can be a very complicated endeavour to assess the extent to which the essence of a digital object has been altered.

When we want to test the integrity of digital objects we can fall back to comparing the tested objects with copies which we consider to be unchanged. Yet, if there are no copies which we consider to be unmodified after their creation we will have to check the internal consistency of the tested objects. Tools like digital signatures, check sums or watermarks may help to establish a certain degree of trust into the integrity of a given object. Nevertheless we will have to keep in mind that this degree of trust is totally dependent on our reliance on the operability of the technical means we use.

1.3 Confidentiality

A further factor that determines success or failure of digital preservation is the confidentiality of digital content. Electronic documents can be easily copied and communicated via e-mail or optical storage media. Cases of unauthorized distribution of security-related information or of online privacy infringements are legion. Against the backdrop of an almost continuous stream of warnings concerning identity theft or other forms of cybercrime it is more than likely that guardians of digital archives will have to put much effort into securing the confidentiality of electronic content they have been entrusted with. To many clients of

digital preservation systems the aspect of data privacy will be even more important than the authenticity and integrity of single documents. The protection of the identity of persons whose data are represented in medical research material is an important example for the need to ensure confidentiality. If trustworthiness will be put to test the aspect of an absolutely reliable conduct of the operators of digital archives will be highly crucial for the acceptance of the digital archiving services they offer.

1.4 Availability

The digital archives of the so-called memory institutions assume enduring responsibility for the availability of the cultural and scientific heritage in digital form. As commercial enterprises and short-lived cultural projects may often not have an overwhelming interest and also lack the necessary resources and infrastructures to guarantee the implementation of the required actions for long-term accessibility of their published outputs, this task must nowadays be seen as a core business for many libraries, archives and museums.

There will always be cases where electronic documents which are deposited to digital archives will virtually never be retrieved again. But from time to time adverse circumstances may induce an urgent need to access archived copies of important data. Major natural disasters may lead to power outages and to regional or national problems with accessing international online services. In such cases, reliable availability of archived digital objects is indispensable. The provision of electronic publications by digital archives can serve as a temporary substitute solution until standard services of publishers and other providers of digital documents are available again. These substitute services will of course have to be operated with respect to intellectual property rights. In cases of emergency the trustworthiness of digital archives can be effectively proved by securing the availability of important data and services.

As far as our deliberations on digital archiving have dealt with academic publications we have focused on the aspect of objects whose publication cycle has been completed. But discussions about trustworthiness in digital preservation will also have to take into account that there are highly important research data which will never be formally published. In view of the growing open data movement it will be necessary to enhance the availability of research data to institutions and researchers interested in relevant databases and documents. Digital archives are therefore of crucial value for the conservation of the basis of research output. In future, the assessment of trustworthiness of digital archives will also have to consider societal requirements concerning the availability of publicly financed research data as an important aspect.

1.5 Multidimensional Assessment of Successful Digital Archives

The list of challenges could be extended, of course. Digital archives have to prove their trustworthiness on a multidimensional scale. Authenticity and integrity, confidentiality and availability are only some of the most important requirements which trusted digital repositories have to meet. Any assessment of the trustworthiness of digital archives will have to take into account a comprehensive catalogue of criteria. Some of these criteria are measurable by technical means which helps to decide if a certain criterion has been met. Other items can be classified as soft criteria which leave room for interpretation. Moreover, each archiving institution may have a specific organisational structure and use a unique set of

technical tools. A long-term digital archive is a highly complex and interrelated system which has to be evaluated with sophisticated instruments. Thus, the outcome of an assessment process will be the result of extensive consultation and of careful consideration of all aspects involved.

2. Nestor Catalogue of Criteria for Trusted Digital Repositories

The definition of standards and best practices concerning the trustworthiness of digital archives has to be approached in a joint effort of as many interested institutions as possible. With this consideration in mind, German cultural heritage institutions established a collaborative project named nestor ("Network of Expertise for Long-Term Storage and Long-Term Availability of Digital Resources in Germany") in the course of the year 2003. Important tasks of this network are the training of experts in the field of digital preservation, the cooperation of interested partners in a competence network and the participation in worldwide standardisation activities concerning digital preservation. In December 2004 the nestor Working Group on Trusted Digital Repository Certification was set up. The working group consists of representatives from libraries, archives, museums, data centers and publishers situated in Germany and Austria. In the long run the working group wants to help establishing a web of trustworthiness in which digital repositories are trusted as long-term digital archives.

During the first years of its existence the working group invested much effort in writing a criteria catalogue which could be used as a reliable basis for the assessment of trustworthy digital archives. Similar activities have been undertaken by the international initiatives DRAMBORA (Digital Repository Audit Method Based on Risk Assessment) and TRAC (Trustworthy Repositories Audit & Certification). The nestor project wants to advise on planning and realising long-term digital repositories and to promote the understanding and management of such repositories especially in the field of digital heritage institutions.

The criteria catalogue is an analytical instrument with a high degree of abstraction. Each criterion must be interpreted in consideration of the specific conditions and objectives of the individual organization. For a part of the criteria there are still no generally accepted standards which could serve as a basis for auditing purposes. The catalogue fulfils two purposes: It works as a set of guidelines for setting up long-term digital repositories, while it is also useful as an instrument of self-evaluation and as a tool for test audits. In the future the catalogue may present a framework for specifying more tangible definitions and standards. As a next step, nestor is involved in international activities of standardisation which in the long run aim at establishing a formal certification process.

Of course, the OAIS reference model (Open Archival Information System) serves as an essential point of reference for the nestor catalogue. The information model, functional entities and terminology of the OAIS reference model are at the basis of the criteria catalogue. From this starting point the nestor group defined a set of important criteria und related subcriteria which should enable operators as well as users of long-term digital repositories to assess the trustworthiness of specific archives.

Institutions which want to make the catalogue operational for their specific use case will have to meet some prerequisites before starting with the evaluation. A reliable application of the criteria will only be possible if some basic principles are respected. The first principle is documentation. The institution has to describe the objectives, basic structure, technical and

organisational requirements and implementation of a long-term digital archive. Only thoroughly documented organisation charts, workflows and technical procedures allow for a reliable evaluation of the digital archive. Transparency is another important principle. Relevant parts of the documentation must be published and accessible for third parties. This will enable all stakeholders to obtain a realistic assessment of the trustworthiness of a certain digital repository. Access to sensitive or confidential parts of the documentation can be restricted to a limited group, e. g. to certifying auditors. The third principle is adequacy. Since the definition of absolute standards can present problems every assessment procedure has to take into account the specific conditions and objectives of individual repositories. As a multidimensional endeavour the evaluation has to consider the whole context of its subject of examination. In this specific context some criteria may prove irrelevant or inapplicable. Thus the required degree of compliance concerning individual criteria can differ from case to case. Finally, the principle of measurability has to be observed. A multidimensional assessment will always have to deal with criteria which cannot be measured objectively. In such cases it is necessary to define a set of indicators that, at least, can help to evaluate approximately the degree of trustworthiness of a long-term digital repository.

The nestor criteria catalogue is divided into three sections: The first part addresses questions of the organisational framework, the second section is dedicated to object management aspects, and the third part covers infrastructure and security topics. In total the catalogue contains fourteen major sections which again include two or more subsections. An example concerning the organisational framework of a digital repository may help to illustrate the structure of the catalogue. This is the wording of criterion 3: “Legal and contractual rules are observed”. This abstract requirement is followed by a general explanation: “The DR's actions should reflect legal regulations. These may cover the acquisition of the digital objects and also their archiving and use. The DR should strike a balance between the legitimate interests of the producers and those of the users and also, where applicable, the individuals concerned (in the case of person-related data).” This explanation is completed by a literature reference.

Criterion 3 is supplemented by three subcriteria. The first subcriterion reads as follows: “Legal contracts exist between producers and the digital repository”. This requirement is exemplified by a detailed explanation: “In order to ensure planning and legal security the DR, where possible, should conclude formal agreements with the producers or suppliers. The nature and scope of the delivery, the DR's archival obligations, the conditions of use and, where applicable, the costs should be legally defined. The legal agreements should be supplemented with concrete implementation provisions. If it is not possible to conclude a formal agreement, the grounds for this should be given.” This explanation is supplemented by several concrete examples. In this specific case a list of possible formal agreements like archive laws or licence agreements is provided (all quotes derive from: Catalogue of Criteria for Trusted Digital Repositories, p. 10).

The nestor document concludes with a checklist which gathers all fourteen criteria and forty subcriteria. A simple five-stage rating system makes it easy to assess the developmental level of the digital archive with regard to every single list item. If a certain criterion or subcriterion is already implemented in a digital archive, it will be rated as level 3. If the implementation has already been successfully evaluated it will be rated as level 4. This checklist helps to identify areas where only conceptual groundwork has been done (level 1) compared to areas where more has been achieved through to cases where even published results (level 5) can be presented.

3. Test Audits

The abstract nature of the nestor criteria catalogue requires thorough testing of its applicability and usefulness in realistic use case scenarios. Other digital preservation initiatives, especially DRAMBORA and TRAC, have also developed instruments to assess the trustworthiness of digital archives. TRAC has assembled its own criteria catalogue and follows an exploratory methodology similar to the nestor concept. The DRAMBORA initiative focuses on a more process-oriented and quantified approach. Both initiatives have implemented test audits during the last years. The findings of these test audits have been used to clarify open questions and to enhance the respective methodologies. In view of the high complexity of digital preservation systems it is necessary to gather as much practical experience as possible. The process of international standardisation will very much benefit from any auditing effort.

Self-auditing is an important starting point for the assessment of digital archives. It can serve as a continuously applied control mechanism of institutions involved in digital archiving. Since standardised auditing and certification procedures are still in the making the criteria catalogues and assessment methodologies of TRAC, DRAMBORA and nestor can be used as support and guidance. Self audits can also be very helpful in preservation planning. A very important part of this planning process is the quality management of digital archives. The use of criteria catalogues for trustworthy digital archives can be of great benefit concerning quality management tasks. Just as the nestor catalogue demands that a digital repository has to react to substantial changes (criterion 5.3) it should be considered an indispensable task to self-assess the applied tools, formats and methods on a regular basis. Technical developments concerning image formats may, for example, suggest the option of a format change (e. g. from TIFF to JPEG 2000). Quality management also includes regular testing of possible hardware or software obsolescence. The integration of existing tools into a common interface can help to realise a smart digital preservation system which is prepared to cope with substantial change.

Up to now, the practicability of the nestor criteria catalogue has rarely been tested except by a few German-speaking institutions. Thus it was a good opportunity to organise an experimental test audit at the Chinese Academy of Sciences (CAS) in November 2009. A team of three staff members of the German National Library (Sabine Schrimpf) and the Bavarian State Library (Tobias Beinert, Gregor Horstkemper) visited the National Science Library in Beijing and put the nestor criteria catalogue to test. The subject of this effort was to apply the criteria catalogue to the digital preservation system of the Chinese Academy of Sciences which has been established under the direction of Professor Xiaolin Zhang.

Because of the exploratory character of the test audit it was conducted as an informed dialogue and exchange of ideas. All criteria of the nestor catalogue have been comprehensively discussed on the example of the CAS digital preservation system. Due to the fact that the participants of the test audit work under diverse organisational conditions and with different technical tools the meeting can be characterised as a fruitful knowledge exchange. The nestor team was provided in-depth insight into the digital preservation system and made suggestions for improvement in some areas. Both parties took the opportunity to discuss selected digital preservation issues. Among the topics addressed were the definition of designated communities, the criteria for the selection of digital objects and the choice of appropriate organisational frameworks of digital preservation systems. The nestor team got valuable feedback concerning the general usability of the criteria catalogue as well as the

applicability of individual criteria. The CAS team acknowledged that the nestor criteria catalogue can be used as an abstract guideline in the assessment of trustworthiness. Nevertheless it was recommended to clarify some details and to extend the list of concrete examples given in the criteria catalogue.

The findings of the test audit will be very useful for future work on the nestor criteria catalogue. At the same time the discussions during the test audit may have provided some suggestions concerning the further development of the CAS digital preservation system. As an overall result of the meeting it can be stated that all participants saw an urgent need for further co-operative development of instruments and tools to prove the trustworthiness of digital archives.

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Cluster 3

Session 5 – Information Literacy and OA

Information Literacy in Tsinghua University

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Abstract In this paper we describe the promotion of information literacy in Tsinghua University, including the research on information literacy competency standards for higher education with Delphi method, the practice activities for promoting information literacy, and the construction of web-based virtual learning center.

Keywords Assessment, competency standards, Delphi method, evaluation, information literacy, IL, Tsinghua University, virtual learning center

1. Introduction

Since 1974 when Paul Zurkowski firstly used the term information literacy (IL) in his proposal for a national program to achieve universal IL [1], the concept of IL has been promoted greatly by library and information professionals. There have been so many efforts on academic researches around the world concerning IL definition, connotation and educational practice et al. Several IL standards and IL guidelines come forth.

In 1984, The Ministry of Education of China issued a documentation regarding to a course for IL promotion. In this document it is required that each university in China should give the course named Literature Retrieval and Use. It is insisted on that the academic libraries should be the main participants for the course. Since then, Tsinghua University (THU) has put the course on the formal curriculum. Tsinghua University Library (THU Lib) has assumed the responsibility for this credit course and some other similar courses designed for the students with different levels and different majors separately.

Along with the decrease of credit hours required for graduation and more and more elective course candidates to be chosen from, the proportion of number of students who take the course as an elective to the total students on the THU campus has decreased gradually, from nearly 90% in 1980's to about 50% in 2008.

Fortunately, computer technology and network technology gave us much more opportunities for IL promotion than ever before. Kinds of courseware and web-based tutorials for students' learning by themselves have been developed since the millennium, while the credit courses in classrooms are still continuing. In addition, lectures and training sessions designed especially for database search and information use have been welcomed because of clarity of purpose and high efficiency. Diverse programs focus on courseware, web-based tutorials, series of lectures and training sessions result in the second wave for developing IL.

Have the students gained strength in IL after attending classes for IL or involving in IL programs? It's necessary to assess the IL strategy and practice programs by measuring the impact on the students quantificationally and evaluate the efforts by the library and it's librarians. THU Lib has conducted in-depth study of IL competency with collaboration with BUAA (Beijing University of Aeronautics and Astronautics). In 2005, **Information**

Literacy Competency Standards for Higher Education in Beijing [2] worked out using Delphi method. Furthermore, **Information Literacy Competency Standards for Higher Education in China** was submitted to The Steering Committee for Academic Libraries of China, Ministry of Education of the People's Republic of China.

To promote IL in THU, several web-based systems have been developed in recent two years, including Class Training Reservation, Online Survey et al. Based on the IL competency standards, an IL self-evaluation system is under construction too.

2. The University Library Plays an Important Role in IL

There is no doubt that people need to improve their professional practice and lifelong learning with IL ability. In spite of Zurkowski's emphasis on the importance in the workplace, the main arena for subsequent IL developments has been formal education [3]. Rader estimates that 60% of the annual published output on IL relates to higher education, with another 20% are concerned with schools [4], which means that there have been more advantage for IL promotion in formal education and much more close attention paid on IL by formal education, especially higher education. It can be concluded that the best stage for personal IL development is during his/her higher education, where he/she can receive better training on IL skill.

Tsinghua University (Beijing, China) has been attached great importance to students' comprehensive competence, including IL. Though almost all of subject faculty and librarians in the university have championed developing IL, so far most of discussion about IL remains essentially confined within the library. The University Library (THU Lib) has been playing an important and unique role in IL, due to:

- IL is based on knowledge, perceptions and attitudes. It is regarded commonly as a superset of library literacy, computer literacy, network literacy, media literacy et al. In all of these literacy, library literacy is primary and it is essential because of that one who is library literate must be computer literate, network literate and the like in digital age.
- According to the definition by ALA, to be information literate, a person must have the ability to locate, evaluate, and use information needed effectively [5]. Consequently he/she need skills to search library's OPAC, to do electronic database retrieval, and to acquire academic information for researches. University libraries subscribe and develop various information resources, such as information systems, search platforms, commercial databases, bibliographic databases for library holdings, navigation for e-journals and information portals et al. Meanwhile the reference librarians are adept at these e-resources. They are responsible and capable to help library patrons using these resources effectively via kinds of instructions and tutorials.

Since 1980's, the librarians in THU Lib have paid a lot of effort in programs for IL promotion, from strategy to practice. The feedback from the library users indicates that after participating in activities provide by the library, such as lectures and library skill training, their information consciousness and ability to locate, evaluate, and use information effectively improved at different degrees.

3. Information Literacy Practice in Tsinghua University

3.1 Projects for Recruits

Being supported by the university, the librarians give guided tours of the library to all freshmen in class as a unit after their entrance to the university, which is helpful for the freshmen to acquire perceptual knowledge about essential functions and services of the library.

Another project focusing on library tours is especially for graduate students and teachers who just entered to the university. Each September THU Lib announces a tour schedule in advance on campus web and posts, so that the recruits may select their favor time to visit the library and get acquainted with professional library services by talking directly with the subject librarians.

A website named **Column for Freshmen** is well maintained by the librarians [6]. There are plenty of multimedia resources designed and developed specially for freshmen. The freshmen could get reference answers at any time by access to this website.

3.2 Curriculum for Undergraduates and Graduate Students

THU Lib offers 11 credit courses for IL promotion, such as The Brief Introduction to Library Use for the first two years-students, Information Retrieval and Use for high-grade students, Information Access: Principles and Technology and Information Retrieval & Paper Writing for graduate students. Through course studies, students acquire knowledge concerning retrieval, selection, analysis, and use of information systematically. The class lessons are welcome widely. Here are some feedback on the curriculum from students – "This is a helpful course to our studies and researches" – "I wish there would be more teaching hours" – "Everyone should take this kind of courses". According to evaluation results for the curriculum in THU, the university library received desired average score with about 2 points (100-point scale) higher than that of the whole university. 17 textbooks for IL promotion have been published since 1980's.

With the invitation of subject faculty, the librarians often give course-integrated instructions to undergraduates and graduated students too.

3.3 Series of Lectures and Information Skill Training

A lecture on how to use A&I journals launched firstly in 1981. Since then information technology has developed rapidly. As more and more electronic resources come out, more requirement for IL, together with computer literacy and network literacy, become indispensable for learners and researchers. People at different IL levels expect improve their information competence via flexible diversity of learning ways. So THU Lib put more effort on lectures and information skill training than ever before. By 2001, a series of lectures for advanced inquirers took shape. In 2009 there are 3082 persons attending the series of lectures and training sessions. The series of lectures in 2009 consists of 78 sessions with 33 topics on:

- General resources and services in the library
- Information retrieval skills
- Information resources for special subjects

- Reference tools
- Bibliographic management software (RefWorks, EndNote Web, NoteExpress)
- Open access resources on Internet
- How to submit academic papers to core journals
- How to use commonly used software (MS word, MS excel, Latex) etc.

Besides of the series of lectures and training sessions, the librarians usually give specific subject-focused instructions to small groups of persons on request of the library users. This kind of customized instructions is usually more effective for one's specific information demands.

3.4 Virtual Learning Environment

Variety of guides and booklets about library resources and services are always necessary to improve IL. While continuing to compile instructional materials in print format, building a virtual learning environment for IL development has been in process in THU Lib. Since 2000, the library has released lots of web-based multimedia instructional materials, including tutorials for kinds of information resources use, courseware for self-learning and online videos of lectures, et al. The library users can learn any of these digital instructions entirely or even if only a few of specific sections of an instruction for their specific purposes at any time desired.

Two websites for developing IL are well maintained by THU Lib. The first one aims at the library users, listing all of the courses offered by the library and the schedule of lectures and training sessions. The students can learn online and download files of instructions on this website [7]. The second one has been constructed for AILHEB (Association of Information Literacy for Higher Education of Beijing). It is a public platform for facilitating academic study of IL and improving IL practice in colleges and universities in Beijing [8]. On this platform people who are concerned with IL development may exchange their ideas to each other, present their effort and find the events about IL in China. Lots of documents, including IL competency standards can be located here too.

3.5 Reservation System and Survey System

3.5.1 Online Reservation System

Some lectures or training topics are so pop that the number of the attendees for one session is usually much larger than the maximum content of the training room. For safety considerations and ensuring better effect of the program, a reservation system is released by THU Lib in November of 2009. The library users may browse the schedule for lectures and information skill training in advance and reserve any favor sessions.

The reservation system has been playing a guiding role in IL development. Programs for lectures and training can be adjusted to the needs from faculty member and students.

3.5.2 Online Survey System

In order to gather information for a survey, the attendees are requested to make out anonymous questionnaire after each lecture or training session. THU Lib launched an online survey system in April of 2009 [9], which is more likely to be accepted by the library users than

questionnaire in paper format. The library can get significant statistical data and feedback from the survey system conveniently. Based on the analysis of survey results, the library can draw the conclusion on

1. What are the impacts of a lecture or training session to the audience?
2. What are the more appropriate ways of notification for activities of IL programs?
3. What kinds of topics are welcomed commonly?
4. Which topics would be added in the future?

According to the survey, over 92% of respondents thought such lectures and training sessions effective or pretty effective for their IL promotion.

3.6 Information Literacy Competency Standards for Higher Education in Beijing

IL assessment is an integral part of IL promotion in academic libraries [10].

3.6.1 IL Competency Assessment

IL competency assessment is referred to assessing people's IL competency before and after IL instructions. A web-based learning center for IL is under construction by THU Lib. As one of important components of the learning center, the self-evaluation system is designed based on **Information Literacy Competency Standards for Higher Education in Beijing**, which was put forward by a research project and approved by Institute of Beijing Academic Libraries (IBAL) in 2005. It is the first information literacy competency standards for higher education in Mainland China, and has been widely cited in peer-reviewed journals.

With literatures review, it could be concluded that there are three lays of IL competency in higher education (see figure 1). From bottom to top, the first level is for basic IL competency, which consists of basic library skills and basic IT skills. The second level is for generic IL competency, which is a set of skills applied to the process of information retrieval, evaluation and use across academic disciplines, and with the addition of information needs of daily life. The third level is for discipline-specific IL competency, which are IL skills that are embedded within the research paradigms and procedures of certain disciplines. The three lays of IL competency are successive. Possessing the lower lay competency is essential for the higher one.

Corresponding with the three levels of IL competency, the IL competency standards for higher education were designed with two lays (see Figure 1). The first one is designed for generic information literacy competency standards, which describe the outcomes of the basic and generic IL competency. The second one is for discipline-specific IL competency standards, which describe the outcomes of the specific information literacy competency required with different disciplines. The discipline-specific IL competency standards are the expansion and extension of the generic competency standards.

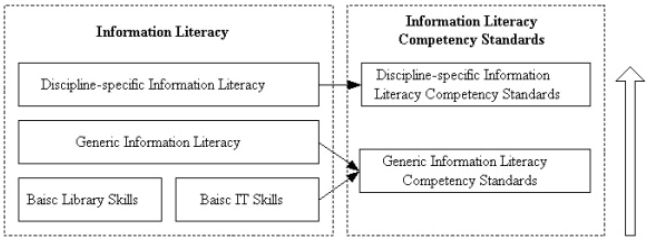


Figure 1: 3 lays of IL competency and 2 levels of competency standards for higher education [11]

3.6.2 Methodology Used for the Information Literacy Competency Standards

Based on extensive studies on related subjects, including articles review, exploring the documentations enacted by Chinese educational authorities and analyzing local conditions of China, the standards have been framed to reflect the IL competency that a student should possess. IL competency consists of four aspects: information consciousness, information knowledge, information ability and information moral. The four aspects are determinant of the abilities of information retrieval, information analysis, information use and communicating information.

The framework of IL competency standards consists of dozens of evaluating indicators. They are built with hierarchy model. From top to bottom, they are standards, performance indicators and outcomes. Some of the indicators are designed with consulting the **ACRL Information Literacy Competency Standards for Higher Education** to a certain extent.

Delphi method was used in the process of consensus-building. Delphi method is a technique of obtaining the most reliable consensus from a group of experts through a series of questionnaires. The main steps of Delphi method are:

1. Selecting members of a panel for Delphi method application. Customarily, the panelists are experts in the area to be investigated.
2. Designing the first round Delphi questionnaire and distributing the questionnaires to the panelists.
3. Analysis of the first round responses and preparation of the second round questionnaires.
4. Dissemination of the second round questionnaire to the panelists, inclosing with the analysis results of the first round response.
5. Analysis of the second round responses (Steps 3 to 5 are reiterated until consensus of opinion among the experts comes out.)
6. Preparation of a final report to present the conclusions of the study.

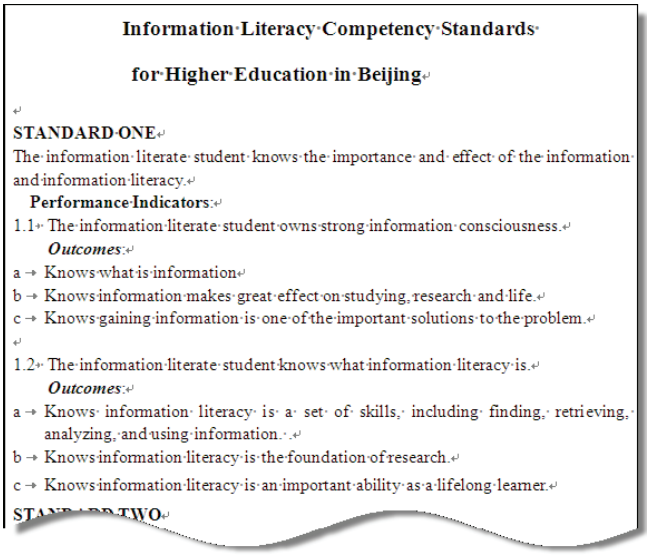
Thirteen experts who committed in IL education were invited to form the panel for the project. They come from thirteen different university libraries in Beijing.

3.6.3 Result of the Project

After two round Delphi method questionnaires, the project team put forwarded the final document **Information Literacy Competency Standards for Higher Education in Beijing** with 7 standards, 19 performance indicators and 61 outcomes. 7 standards are as follows:

- Standard 1: The information literate student knows the importance and effect of the information and information literacy.
- Standard 2: The information literate student determines the nature and extent of the information needed.
- Standard 3: The information literate student accesses needed information effectively and efficiently.
- Standard 4: The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base to construct new knowledge.
- Standard 5: The information literate student manages, organizes and communicates the information effectively.
- Standard 6: The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.
- Standard 7: The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.

Under each standard, there are several performance indicators. Each performance indicator contains of a few of outcomes. The standard one, for example, has 2 performance indicators with 6 outcomes in all (see Figure 2).



Information Literacy Competency Standards

for Higher Education in Beijing

STANDARD ONE

The information literate student knows the importance and effect of the information and information literacy.

Performance Indicators:

1.1 The information literate student owns strong information consciousness.

Outcomes:

a → Knows what is information

b → Knows information makes great effect on studying, research and life.

c → Knows gaining information is one of the important solutions to the problem.

1.2 The information literate student knows what information literacy is.

Outcomes:

a → Knows information literacy is a set of skills, including finding, retrieving, analyzing, and using information.

b → Knows information literacy is the foundation of research.

c → Knows information literacy is an important ability as a lifelong learner.

STANDARD TWO

Figure 2: Hierarchy structure of the standards

4. The Prospects

Nowadays most of young students have strong capacity for application of computers and network. They are usually called “digital-natives” and prefer learning online. In addition to on-site lectures and training program in classroom, an applicable virtual learning environ-

ment would be indispensable for IL promotion. Following the IL strategy of THU Lib, a web-based learning center for IL has been under construction, which consists of five independent units (see Figure 3) and will open to the whole campus network available 24/7.

With this learning center, the faculty members and students can access to diversity of online instructional tutorials and recorded lectures in video format, reserve their favor lectures or training sessions, and communicate with the library. The library can conduct statistical surveys for IL practices.

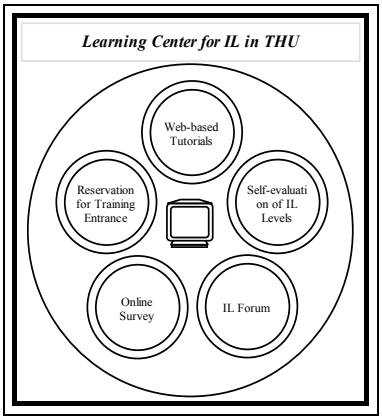


Figure 3: Web-based learning center for IL

The unit of IL forum is a place, where people exchange their ideas about IL, discuss topics regarding to information retrieval and use, seek help from others for specific problem solving, et al. From this virtual location, the library staff may understand what the library users are thinking and know their real demand for IL promotion.

At the present stage, there is an emphasis on self-evaluation program, which is expected to achieve 5 objectives:

- Determine individuals' IL level through self-testing personally.
- Understand IL level of a group of people by gathering and analyzing self-evaluation results from individuals.
- Know the learning outcomes for students.
- Evaluate the impact of IL promotion by subject faculty and librarians.
- Adjust the strategy to improve IL practice.

The framework design of the self-evaluation system has been fulfilled. It is composed of three modules for different IL level (see Figure 1). The design and arrangement of question sets for different levels would be on the basis of **Information Literacy Competency Standards for Higher Education in Beijing**. Each set consists of a series of questions with respective numeric marks. When a quiz is over, the test score would be displayed in a computer screen, and at the same time a suggestion for further learning would be given by the self-evaluation system.

A freshman may be asked to take the self-evaluation test of level 1 to realize his/her ability to use the library and IT skill. A senior undergraduate should take the self-test of level 2 to estimate his/her learning outcome over the past few years. Meanwhile the instructors can evaluate their efforts on IL practice by gathering and analyzing the self-test results. For

graduate students and subject faculty, the self-test of level 3 would be useful to evaluate their discipline-specific IL competence by themselves. With the large number of self-evaluation results of different levels, the IL instructors should adjust the strategy constantly to facilitate IL promotion for people at different IL levels.

According to **Information Literacy Competency Standards for Higher Education in Beijing,** rubrics are necessary to perform a perfect assessment of IL. So rubrics should be concerned with great effort too.

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Developing Information Literacy Skills by Informal Learning

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Abstract In this paper, we describe how the use of user-centred design for a library website can support the user in developing information literacy skills. The didactical concept is based on the idea of informal learning using a self-study resource, like a subject specific search site, which shows all resources for a subject at a glance.

Keywords Informal learning, information literacy, usability, user-centered design, UXD

1. Introduction

We live in a world where the amount of information is staggering. Through changing technology, we now have access to constantly expanding multiple media information resources.

The ability to find, identify, evaluate and use information has become a survival skill for university, work and daily life and this is why Information Literacy is an important component in the TIB.

2. Activities, Programmes, Strategies

As far as information literacy is concerned, the TIB pursues the following activities, programmes and strategies:

- Program
  We provide courses for different target groups; beginners or advanced students, for different subjects, for PHDs and for pupils. We cover topics like “Knowing my library”, “Resource strategies for my subject”, “Finding articles”, “Databases” “Reference management” or “Web 2.0”.
- Learning material
  We have self-paced tutorials for a variety of subjects, quizzes and videocasts (up to 3 min.) for isolated problems such as “How do I find a book in the OPAC” or “How can I find a specific article”. You can find them on our website (http://www.tib.uni-hannover.de/en/tibub/study-environment-tibub/study-materials.html) and you can also watch them on our YouTube Channel (http://www.youtube.com/user/TIBUBnet).
- Learning Scenarios
  We offer face2face seminars, online learning and blended learning seminars. We provide courses from 90 minutes up to courses which last for a whole semester and are integrated into the curriculum. Our teaching methods are as learner-centred as possible with collaborative approaches.
- Infrastructure
  In the near future, we will be providing laptops for our students so that we can be more flexible as far as rooms and teaching methods are concerned.

- Public Relations and Marketing
  Without communication, nobody knows what we are doing and this is why public relations and marketing are important components in our information literacy strategy. We have posters, flyers and postcards and, in 2010, we plan on holding roadshows in the faculty buildings.
- Social Software
  We also publish our library news like new databases etc, on Twitter, we have our profile on Facebook, a YouTube Channel and we provide RSS Feeds and link-lists on Del.ico.us.
- Website
  Our webpage was relaunched in spring 2009 and that's the place where we provide access to all the resources and services we offer (Figure 1).

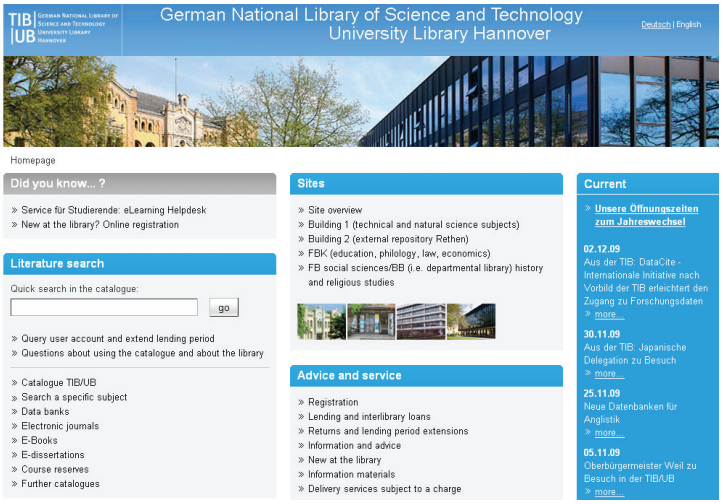

Figure 1: Website TIB/UB

3. Formal and Informal Learning

Our programmes, courses and activities are based on formal and informal learning in order to cope with different learner types.

"Formal learning is accomplished in school, courses, classrooms and workshops. It's official, it's usually scheduled and it teaches a curriculum".

"Formal learning is like riding a bus; the driver decides where the bus is going; the passengers are along for the ride" says Jay Cross (2006).

Informal learning is a form of learning that is more clearly related to individual interests and backgrounds and also to practical applicability.

Informal learning is basically learning by doing. It happens everywhere – at home, in leisure time, at work, etc. Examples are learning through observing, trial-and-error, calling the help line, reading a magazine, browsing through a library catalogue or checking out web pages.

Advantage: It is self-directed and highly flexible; the learner defines his/her own goals.

However, it is definitely not informal instead of formal learning but a combination of both which we feel supports the user most efficiently in developing information literacy skills.

4. What role can library websites play in meeting the informal learning needs of our users?

McGivney (1999) has suggested that informal learning is learning that takes place outside a dedicated learning environment and which arises from the activities and interests of individuals or groups, but which may not be recognised as learning. On the basis of the literature review briefly mentioned above, we have evolved a context-based definition of informal learning which particularly includes becoming information literate by using library websites.

4.1 User-Centred Design

In order to give the students a good framework for a learning experience with your websites, ease of use (better known as usability) is not enough. There are other aspects such as being desirable to use and the storage of valuable and credible information which can be easily accessed (see Figure 2).

Figure 2: The UXD honeycomb, semanticstudios.com

There are a lot of user-centred methods which support us in finding out about the users' needs and the goals and activities they want to carry out on a webpage like Focusgroups, Observation, Cardsorting, Personas, Usability tests and Eyetracking.

This approach ensures that

- no vital features are left out
- users want to use the page
- users are able to use the page
- users have a positive learning experience with the page.

5. Researching the Customer and User Needs

We began our work by observing users in completing their daily tasks on our old webpage like doing research, for example, and we also did some Focusgroups asking people about their needs.

Problems we found were:

- information overload
- Library jargon which confused our users
- Lack of transparency, users just didn't know how to find the information they needed on our webpage.

Upon analysing the results, one thing we found out was that the users wanted to have an online learning and information environment where all the resources, search and communication tools, syndication, podcasts and tutorials were all tailored to their specific subject and all on one page which would be easy and desirable to use.

6. Designing the user experience

Once we were confident that we understood our users' workflows, we developed a prototype that reflected the information and visual design of a subject specific search site.

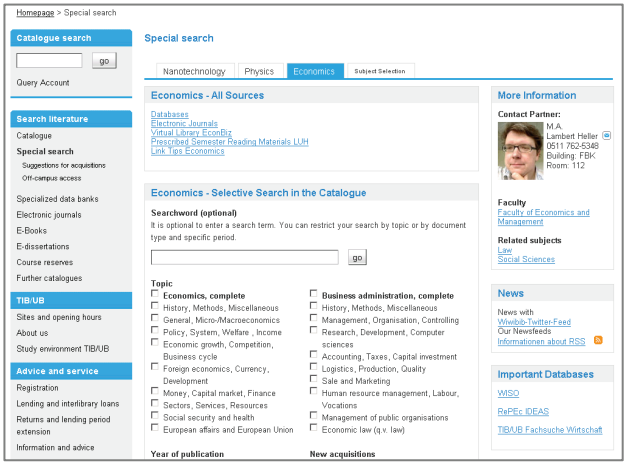

Figure 3: The subject-specific search

The subject-specific search (Figure 3) has the following features:

- Catalog search with filters like: subject, document type, year of publication, language, new acqusitions, etc.
- Databases, with the 6 top databases listed
- eJournals
- Virtual Library e.g. EconBiz
- Semester reading material
- Link lists on Delicious commented by the subject specialist
- Contact partner
- Subject-specific Twitter news

7. Conducting Usability Evaluations

Usability testing assesses the degree to which the system is easy to use. We let the users complete real world tasks just observing the efficiency of the solution and the users' satisfaction. If the tasks are hard or impossible to complete then the system is not easy to use.

1. Your tutor pointed out some new databases for your subject. Try to find them on the TIB/UB website.
2. Which are the top 5 databases for your subject?
3. Find the office hours of your subject specialist.
4. Add another subject tab.
5. Make a suggestion for an acquisition by using the form.

As we had included the users right from the start in the design process, we only found some minor problems at this point. The completion of the task for first time users was around 80%. We fixed the problems and asked the users again how they liked the page. Here are some statements on the general idea:

- That's exactly what I need for my studies.
- I like the filters, that's pretty efficient.
- All resources for my subject, that's cool.
- Do I miss out on something when I use the subject search?
- Good idea, that facilitates access to all kinds of resources.
- That's timesaving.

The aim of the subject-specific search we were designing with UXD Methods was to support the users in developing information literacy skills by informal learning. Here are some statements on the learning outcome:

- There is more than Google and Wikipedia.
- There are filters which make my research more efficient.
- I can access information efficiently by having a good framework.
- I can participate in subject communities through subject-specific portals.
- I can learn through subject specialists' annotations how to critically evaluate information and its sources.
- There are annotated resources outside the library world like link list for my topic on Del.icio.us.
- There is somebody I can ask and I know what he or she looks like.
- My library cares for me.

The conclusion was that library websites designed by UXD Methods seem to be a good framework for an informal learning experience.

Open Access and the Collaboration with Publishers

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Abstract Open Access has seen many political statements, mandates to deposit and other useful implementation activities. Often these activities focus on the library and repository area. The European OAPEN and PEER projects aim to explicitly collaborate with publishers on various strands. OAPEN's (Open Access Publishing in European Networks) initial focus is on University Presses and on Open Access for monographs in the Humanities and Social Sciences. PEER is a joint effort of STM publishers, research, library and repository communities to work on evidence-based research for the deposit of journal articles and to define harmonised workflows for the direct transfer of journal articles (incl. metadata) to repositories.

Finally, the paper gives a brief introduction into COAR (Confederation of Open Access Repositories), a new international organisation which aims to bring together repository networks from all countries and continents.

Keywords Open Access, publishers, repositories, university presses

1. OAPEN – European Publishers Collaborate to Enable Open Books

Scholarly publishers are beginning to discover that Open Access is a publishing option for books as well as for journals. This offers new opportunities for international visibility and uptake of research in particular in the Humanities and Social Sciences, but also presents challenges for a careful design of sustainable publishing models. A promising route to pursuing this goal is by joining forces as a network of publishers and to collaborate with libraries providing repository infrastructures.

The European "Open Access Publishing in European Networks" project (OAPEN) aims to develop and implement Open Access publication models for academic books in the Humanities and Social Sciences. The project, co-funded by the eContent*plus* programme, started in September 2008 and will run for 30 months until February 2011. The OAPEN consortium consists of seven university presses (Museum Tusculanum Press Kopenhagen, Presses Universitaires de Lyon, Amsterdam University Press, Leiden University Press, Firenze University Press, Universitätsverlag Göttingen, Manchester University Press) and two universities as technology and research partners (Amsterdam and Leiden University, respectively). All involved presses are open-minded with regard to Open Access and aim to analyse and implement appropriate publishing and financing mechanisms in a shared publishing environment.

OAPEN addresses the needs of Small and Medium-Sized Enterprises (SME) and not-for-profit publishers. Its purpose is to offer its solutions to publishers as well as to stakeholders such as authors, libraries and research funders. OAPEN will aggregate content from SME publishers to attain a collection of high-quality HSS books substantial enough to be useful and sustainable.

1.1 Key Objectives

The key objectives of OAPEN are

- to improve the accessibility and impact of European research in the Humanities and Social Sciences
- to create and aggregate peer-reviewed books across Europe in an Open Access Online Library
- to promote the extension of Open Access funding mechanisms to book publishing
- to serve as a network of expertise and test bed for Open Access book publishing experiments
- to adopt common standards and metadata to improve the retrievability and visibility of HSS publications
- to reuse and share infrastructure (OAPEN platform)

1.2 Open Access Platform for Books

To achieve its key objective, i.e. improving the accessibility and impact of European research in the Humanities and Social Sciences, OAPEN will aggregate and present freely-available peer-reviewed books across borders within an Open Access Online Library. The OAPEN platform will present this collection in an integrated fashion and will deliver additional services adapted to the needs of users and publishers. This includes searching and browsing functionalities as well as order mechanisms for print copies, including high-quality print and print on demand.

In practical terms, OAPEN strives to integrate a wide variety of publications into its collection and to market the content, in particular by the creating of a brand based on high-quality standards and professional services. To disseminate the content as far as possible, the platform will offer metadata via standard interfaces to other service providers, like subject-based portals and databases. To enable such services, the consortium has agreed on metadata standards like OAI-PMH as well as requirements for metadata, based on the guidelines developed by the DRIVER [1] European infrastructure project.

1.3 Network of Stakeholders

Within its first year, OAPEN has been active in developing a network of stakeholders with a strong interest in sustainable book publishing as well as a wide dissemination of research outputs on the basis of Open Access. This involves not-for-profit as well as commercial publishers, libraries, funders and academic institutions. In this context, OAPEN acts as a network of expertise, offering a discussion forum and the opportunity to gain practical experiences.

Network partners are invited to contribute to the development of the project and to use the OAPEN platform as a test bed for Open Access experiments.

1.4 OAPEN's Research

To explore the needs of stakeholders with regards to book publishing and Open Access, OAPEN is conducting a series of studies; the first exploring the attitudes and expectations of all stakeholder groups with respect to electronic publishing and Open Access. The second study combines a systematic overview of on-going experiments on Open Access publishing of books with a snapshot of the book-funding landscape in Europe. This is based on interviews with experts, round table discussions and online surveys addressing various aspects

of this varied and complex field. These explorative studies of expectations and activities conclude with a report summarising best practices and reflecting this on the publishing model OAPEN will offer.

By now, the majority of funders' Open Access policies are focussing on the publication of journal articles, but there are a few examples which provide special opportunities for the Open Access funding of books. Announced in early October 2009, the Austrian Science Fund (FWF) has launched new Open Access programmes which particularly extend the project-related funding of Open Access publications to monographs. Moreover, it introduces additional Open Access subsidies into FWF's traditional book-funding programme [2]. These programmes are considered as a test and will be evaluated after three years. Only a few other research funders already expect researchers to provide Open Access for project-related books.

Based on its research and practical experiences, OAPEN will continue its discussion with private and public research funders. The project is interested in exploring how funders and institutional policies on Open Access publishing can be extended to book publishing and how the publishing model and infrastructure developed by OAPEN might serve as an environment to further reshape the book-publishing landscape.

1.5 Forthcoming Activities

In the forthcoming months, OAPEN is building up its virtual network of publisher's repositories, accomplished by a central repository for smaller publishers. OAPEN will strive to further extend its network especially with commercial publishers to attain critical mass and to further develop its service concept. Publishers interested in collaboration with OAPEN will be offered an Open Access publication scheme, including model licences and a calculation framework for Open Access books based on hybrid print and electronic editions. To summarise, OAPEN, with its collaborative approach, aims to develop a key business and funding model which will benefit other publishers in the Humanities and Social Sciences. At the same time, this will serve librarians, academics and the general public by providing a growing Open Access collection as an ideal resource for research and reading. Similar to the Sciences, Technology and Medicine, the development of Open Access opportunities for the Humanities and Social Sciences will heavily depend on the commitment and policies of research institutions, libraries and research funders.

2. PEER − Pioneering Collaboration Between Publishers, Repositories and Researchers

PEER [3] (Publishing and the Ecology of European Research), supported by the EC eContent*plus* programme [4], has been set up **to monitor the effects of large-scale, systematic archiving of authors' final peer-reviewed research outputs** accepted for publication (so called Green Open Access or stage-two research output) on reader access, author visibility and journal viability, as well as on the broader ecology of European research.

Peer-reviewed journals play a key role in scholarly communication and are essential for scientific progress and European competitiveness. The publishing and research communities share the view that increased access to the results of EU-funded research is necessary to maximise their use and impact. However, they hold different views on whether mandated deposit in open access repositories will achieve greater use and impact. There are also dif-

ferences of opinion as to the most appropriate embargo periods. No consensus has been reached on a way forward so far.

The lack of consensus on these key issues stems from a lack of clear evidence of what impact the broad and systematic archiving of research outputs in open access repositories might be, but PEER aims to change this through building a substantial body of evidence, via the development of an **"observatory"**, to monitor the effects of systematic archiving over time.

PEER's role is to deliver credible data (observables), insights into the impact of self-archiving and models that publishers, libraries and funding agencies can use to develop consistent and workable policies that benefit researchers. However, it should be noted that the project partners feel strongly that PEER should not recommend what these future policies should be.

2.1 PEER Consortium

The PEER Consortium consists of seven partner organisations representing the key stakeholder communities involved in academic research and scholarly publishing: The library & repository communities, scholarly publishers and research communities including research funding bodies and researchers both as authors and readers. The five Executive members are:

- International Association of Scientific, Technical and Medical Publishers (STM) − Project co-ordination
- European Science Foundation (ESF)
- Göttingen State and University Library (UGOE)
- Max-Planck-Gesellschaft (MPG)
- Institut National de Recherche en Informatique et en Automatique (INRIA)

In addition, the SURF Foundation and the Universität Bielefeld bear the function of technical partners.

2.2 PEER Observatory

Key to the observatory are the publishers and repositories which have agreed to participate in PEER. PEER currently benefits from the active support of twelve participating publishers who have proposed a total of 240 journals to date for active participation in the project in the areas of life sciences, medicine, physical sciences as well as social sciences & humanities.

As of September 2009, the STM publishers participating in PEER are:

- BMJ Publishing Group
- Cambridge University Press
- EDP Sciences
- Elsevier
- IOP Publishing
- Nature Publishing Group
- Oxford University Press
- Portland Press
- Sage Publications
- Springer
- Taylor & Francis Group
- Wiley-Blackwell

At present, six **repositories from across the EU** are participating in PEER:

- eSci.Doc.PubMan, Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V. (MPG) (http://pubman.mpdl.mpg.de/)
- Göttingen State and University Library (UGOE) (http://repository.peerproject.eu:8080/jspui/)
- HAL, Institut National de Recherche en Informatique et en Automatique (INRIA) & Centre pour la Communication Scientifique Directe (CCSD/CNRS) (http://hal.archives-ouvertes.fr/)
- BIPrints, Uni Bielefeld (http://129.70.12.25/opus4/public/home)
- Kaunas University of Technology, Lithuania (http://peer.elaba.lt/fedora/search)
- University Library of Debrecen, Hungary (http://ganymedes.lib.unideb.hu:8080/udpeer/)

The e-Depot of the Koninklijke Bibliotheek (National Library of The Netherlands) serves as a long-term preservation archive for all the PEER content.

2.3 Content

Collectively, the journals actively participating in PEER are expected to provide approximately 20,000 EU articles for the project each year, giving a total of around 60,000 over the three-year duration.

To ensure a critical mass of content for the project, participating publishers are submitting approximately half of the articles in each of the four broad subject disciplines on behalf of the authors. For the remaining half, publishers will invite authors to submit their own accepted manuscripts to repositories participating in PEER (or to an alternative repository of their choice). To facilitate the identification of PEER articles submitted by EU authors, publishers are also providing metadata for the journal articles participating in the author submission aspect of the project.

2.4 Infrastructure to Enable Publisher and Author Deposits

To assist the deposits being made by publishers on behalf of authors, a central facility called the PEER Depot has been created. Content is being submitted from both publishers and authors to the PEER Depot, a central facility for adjusting deposits, and will be held there until expiry of the embargo period, after which it will be distributed to the participating repositories and the LTP depot.

Procedures for manuscript deposit for repository managers and publishers were used as the basis of the guidelines to be followed by participating publishers and repositories. These Guidelines are publicly available from the PEER website [5].

Following extensive consultation with the participating publishers and repository representatives, standards for full-text formats and metadata elements have been defined: The full-text articles have to be provided as PDFs, with PDF/A-1 the preferred format.

The metadata requirements have been derived from the DRIVER Guidelines [6]. Mandatory metadata elements identified for PEER are: Title, Creator, Date, Identifier and Type. Additional metadata elements are recommended.

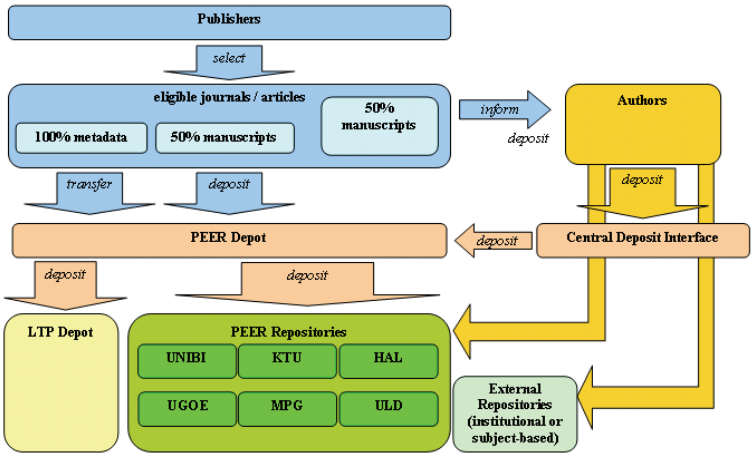

Figure 1: PEER deposit workflow

2.5 Workflow

Publishers will deposit both 50% of the full-text outputs, as well as 100% of the metadata outputs from eligible journals at the PEER Depot. The 50% full-text outputs will be transferred from the PEER Depot to the repositories participating in PEER (see Figure 1 and Figure 2).

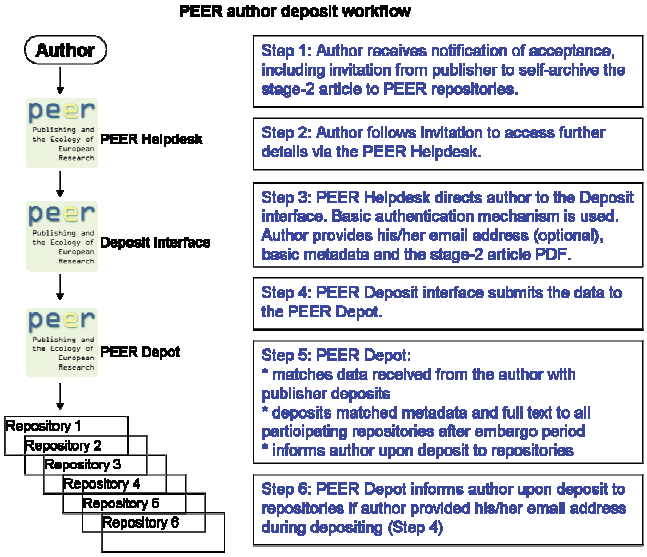

Figure 2: Content submission by authors

2.6 Author Communication

The PEER project intends to limit interference with established deposit practise, in support of the behavioural research methodology envisaged.

For data privacy reasons, the participating publishers are not able to make the contact details of eligible authors available and no direct communication is envisaged. Publishers are therefore provided with generic texts to communicate sufficient and consistent information to authors.

At the point of acceptance of their manuscripts by their publishers, the authors will receive an invitation to deposit their manuscript within the framework of the PEER project. However, since it is expected that authors may choose to respond immediately upon receipt of invitation to deposit, the invitation will be linked to the PEER Helpdesk website where authors are informed about their deposit options.

2.7 PEER Helpdesk

In addition to the PEER website information, the PEER Helpdesk [7] has been established as a key point of contact for stakeholders, primarily however for supporting authors who may need guidance with self-archiving, perhaps even for the first time. The Helpdesk will offer direct support by means of an online query and mediated response service in the form of a ticket system throughout the project duration. Although it is expected that the implementation of the Guidelines will be straightforward, the PEER Helpdesk will guide publishers and repository managers through the deposition process by offering consistent explanations and information.

Moreover, the author is given the option to deposit immediately at the Central deposit interface linked from the helpdesk. This online interface guides authors through a simple deposit procedure for direct deposit to the PEER Depot.

2.8 PEER Research

The PEER Research is divided in three major strands: Usage Research, Behavioural Research and Economic Research [8]. The Usage and Behavioural research teams have already taken up their work with the tender for Economic research still being open at the moment.

To ensure the quality control of the research undertaken for PEER, a Research Oversight Group supports PEER through the evaluation of the tenders, advises on methodologies and provides recommendations to the PEER Executive which makes the final selection of research teams.

The Research undertaken so far involves interactions between the research teams and participating publishers and repositories for the usage research and the research community as authors and readers for the behavioural research.

A complete review of the selection process for participating journals [9] was also undertaken to ensure the validity of the content selected for PEER.

2.8.1 Behavioural Research

Behavioural Research is being undertaken by the Department of Information Science and LISU at Loughborough University. The research team has been using questionnaires and

undertaking focus groups to explore researcher attitudes towards open access repositories, both as authors and users. The objectives of this strand of research are to track trends and explain patterns of author and user behaviour in the context of so called Green Open Access and to understand the role repositories play for authors in the context of journal publishing as well as for users in the context of accessing journal articles. The results will form a baseline report for PEER. The research will be repeated later in the project to assess whether attitudes have changed over time.

2.8.2 Usage Research

The repositories participating in PEER, along with the twelve participating publishers, are providing usage data (log files) for the Usage Research being undertaken by the CIBER group, University College London, UK. The procedure is documented in the *D2.2 Final report on the provision of usage data and manuscript procedures for publishers and repository managers*, publicly available from the PEER website [10]. The Usage research is therefore measuring the actual behaviour of researchers as users and other non-research users of research content. The objectives of the PEER usage research are to determine usage trends at publishers and repositories; to understand the source and nature of use of deposited manuscripts in repositories and to track trends, develop indicators and explain patterns of usage for repositories and journals.

2.8.3 Economics Research

An additional area of research looking at the **Economics** of Green Open Access will be undertaken in 2010 and this will also involve interaction with the identified target user groups.

3. COAR – The New International Confederation of Open Access Repositories

The international Confederation of Open Access Repositories (COAR) was launched in Ghent on 21 October, during Open Access Week 2009 [11]. The aim of the organisation is the networking of over 1000 global scientific repositories comprising peer-reviewed publications under the principle of Open Access. This will be achieved by means of common data standards and the co-ordination of scientific research policy development.

Coinciding with the sixth anniversary of the Berlin Declaration to provide “free and unrestricted access to sciences and human knowledge representation worldwide”, COAR takes responsibility for the execution of this vision in bringing together scientific repositories in a wider organisational infrastructure to link confederations across continents and around the globe in support of new models of scholarly communication.

COAR emerged from the European DRIVER project, (Digital Repository Infrastructure Vision for European Research), funded by the EU Commission under the 6th and 7th Framework Programmes for “eInfrastructures”.

Among the 28 founding members of COAR, 23 organisations are based in 13 European countries; others in China, (Chinese Academy of Sciences), Japan (National Institute of Informatics and the Digital Repository Federation), Canada (Canadian Association of Research Libraries) and the USA (University of Arizona for the Global Registries Initiative).

As the membership continues to grow, interest in COAR is reflected in numerous related organisations such as the SURF Foundation, JISC, SPARC Europe and eIFL.net, as well as OCLC and Microsoft Research, all of whom support a common strategic objective to make research findings freely accessible to science and society.

The objectives of COAR are defined by the needs of the community and include topics such as filling repositories with content (e.g. through concerted OA agreements with publishers), facilitating and ensuring interoperability of repositories across countries, publications and research data or operating and maintaining a global datastore of repositories. The latter would offer metadata through machine-to-machine interfaces for the inclusion of repository data by service providers.

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Cluster 4

Session 6 – IR and National Licensing

Progress in Developing CAS IR Grid

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Abstract In this paper, we introduce the current practices of building Chinese Academy of Sciences institutional repositories grid (CAS IR Grid). Firstly, we outline its vision and implementation strategies. Then we describe the status quo of spreading IRs across CAS institutes, which covers mainly the release of a formal version of IR building package based on open source software DSpace, establishment of long-term working mechanism of promotion IR service, and the achievements of spreading activities. We also present the development of CAS IR Grid service portal. Finally, we put forward some considerations on future development of CAS IR Grid are explained.

Keywords Chinese Academy of Sciences, institutional repositories, repositories network, repositories grid

1. Introduction

Planning and building an institutional repository (IR) service has become a popular knowledge management practice in institutions. IR is an institutional knowledge asset management platform to help institution set up a centralized space to collect, organize and preserve its knowledge outputs in a systematic manner, thus to avoid the most likely risk of losing them, which now are scattered among various groups and administered by researchers themselves. IR also provides new means and channels for showcasing and disseminating institution's research outputs, which will increase their awareness and rate of use, bring growing scholarly influence and prestige for researchers and institutions [2]. In addition, it can be used to develop practical solutions to enable research assessment activities [3]. Hence, IR is also an important facility and mechanism for institution to develop knowledge capacity and disseminate its knowledge as a whole.

Chinese Academy of Sciences(CAS) has more than one hundred institutes in 28 cities across China and more than 25,000 researchers and 40,000 graduate students (50 percent are doctoral) organization [7], it plays a very important role in Chinese science research and is a major producer of STM information in China. So as a pragmatic strategy for advancing knowledge management practice and advocating open access activities in CAS and China, the CAS IR Grid was brought forth by NSL in 2007. It envisaged helping each institute establish its own local repository as a node of the Grid, and NSL will construct a centralized metadata repository via harvesting and aggregating metadata of academic resources stored in distributed institutes' IRs, and will keep an integrated interface for the aggregated resources and provide other value-added services. At present, CAS IR Grid is progressing smoothly, there are nearly half of institutes having started IR service, and a pilot portal for CAS IR Grid has been launched as well.

2. Visions and Strategies

As strategic actions of pushing open access activities and facilitating actual knowledge management practices, CAS IR Grid bears visions as follows:

- Develop a knowledge management infrastructure to facilitate capture, access, preservation, dissemination of CAS-wide knowledge attainments, and to be an indispensable component of integrated information and knowledge environment across CAS.
- Shape a sustainable knowledge capacity building mechanism for institutes across CAS.
- Bootstrap and foster a culture of open access in CAS and China.
- Facilitate national and international collaboration in development of high-level knowledge repositories network service.

To realize above visions, we take a two-stepped strategy to build CAS IR Grid service progressively (see Figure 1). The overall process is divided into two successive steps, and evolutionary principle is followed within each step as well.

The first step is to build IRs in institutes. In this phase, NSL plays a leading role to provide consultation and support service, and institutes libraries assume major implementation tasks in planning and advancing their own IR service in the help of NSL. Support services provided by NSL are involved in the whole process of implementing IR in an institute, including offering consultation on planning, helping devising policy mechanism and framework, providing IR software packages and technical support service, etc. Meanwhile, we also adopt a demonstration strategy to push work of spreading IRs forward effectively. We select some institutes as early adopters to set up examples, to show demonstration effects and to attract more institutes to follow actively.

The second step is to develop and deploy CAS IR Grid service portal running by NSL. It is some kind of an implementation of an OAI-PMH service provider, can harvest metadata exposed by IRs deployed in institutes via their built-in OAI-PMH data provider interface. Of course, CAS IR Grid service portal will not just act as an OAI service provider, in some extent, it is a grand IR at CAS-wide level, therefore, is necessary to provide advanced browse and search services and other enhanced services.

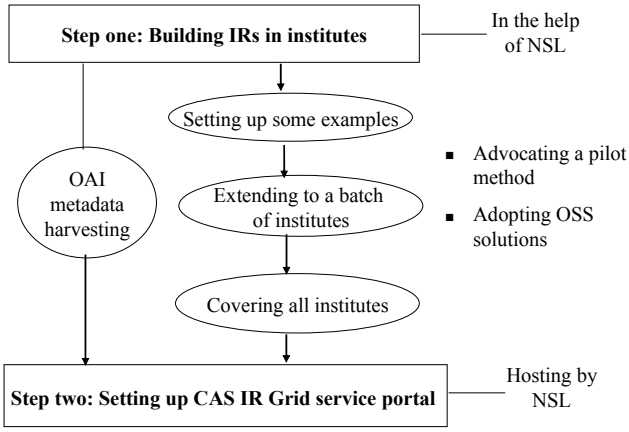

Figure 1: Strategies for developing CAS IR Grid

Concerning technical aspects of implementation of CAS IR Grid, the advantages and disadvantages of making use of proprietary vs. OSS software are hotly debated [1], however, CAS IR Grid is determined to take a strategy of embracing and making use of OSS applications actively.

3. Status Quo of Spreading IRs in Institutes

3.1 Finished Setting up an Exemplar IR for Others to Follow

Best practices are very important for implementation of IRs in institutes. By conducting a pilot deployment of IR, firstly, it will help get experiences in building IR; secondly, it will serve as example thereby stimulating and attracting other institutes to participate actively in the community of building IRs; thirdly, it will help understand accurately the requirements of institutes in building IRs. Therefore, we are very careful in choosing the institute for setting up an example and laid out the principles for doing this work as follows:

- The candidate must have urgent needs of building an IR;
- It can get strong support from the head of the institute;
- The institute library has clear understanding of IR;
- It can guarantee necessary inputs to IR implementation;
- It has comparatively rich experiences in implementation of information applications.

After evaluation, Institute of Mechanics, CAS became our choice. In the collaboration with the institute: (1) we got a clear understanding of needs and requirements from institutes, which laid a basis for later selection, customization and extended development of IR building software. (2) We also have put forward a set of recommended policies framework for referencing and guiding institutes' IR building practice. (3) An exemplar implementation of IR has set up for other institutes to follow.

Figure 2 shows home page of this demonstration IR site (http://dspace.imech.ac.cn).

Figure 2: Home page of IMECH IR

3.2 Released an Internal Version of IR Building Package Based on DSpace

As stated above, we are in favor of using OSS solutions in construction of our IR platform. After some comparisons and evaluations, we choose DSpace [5] as a prototype system to build CAS IR platform via a way of extending and optimizing. Main reasons for choosing it are including: (1) it has the largest community of users and developers worldwide. (2) It can theoretically manage and preserve all content types. (3) It has critical core functions we need. (4) It has a layered architecture and clearly defined API, by which can it be easily customized and extended. (5) Using Java platform makes it very convenient to integrate plentiful OSS packages or tools, when needed, in Java world. In general, we think using DSpace is a cost saving and efficient selection.

In a concrete case, we use DSpace 1.4.2. To make it well adapt to meet our needs and requirements, we have done many optimizing and extending development work. Following is a list of some major customizations and extensions:

- It has been highly localized to support Chinese application, not only providing Chinese interfaces, but also handling names of people, order of sorting, search queries, etc to conform to Chinese customs.
- The default metadata schema has been extended to meet the needs and requirements for describing special content types, for instance, patent.
- Additional quick submission workflow is extended to be default alternative to replace its built-in complicated submission workflow. Now it contains just two-steps (pages) to finish one submission in a few minutes, therefore, making submission an easy-doing job.
- The import function of DSpace is enhanced to support bulk import particular formatted data, for example, those legacy data accumulated in excel format.
- An extended function is implemented to support knowledge asset statistics. It can generate knowledge inventories at institute-level, research unit-level, or individual-level, and with combined conditions of researchers' position, status, and publication date of item. The statistics results can be exported with an excel-formatted file to be saved or printed.
- The default installation of DSpace is based on a compiling method containing many steps to be executed manually. This makes the deployment of DSpace-based application a laborious work, and usually needs some technical skills. For deploying an IR application in many institutes easily, we improve its installation process and create one-click installation package, therefore, any one with little computer skill can install the IR package in a few minutes.
- There are other major or minor optimizations, enhancements, or extensions having been done concerning user interfaces, browse and search, knowledge organization, user management, access control, etc.

3.3 Established a Long-Term Work Mechanism for Promoting IR Service

3.3.1 Organizational Structure of IR Promotion

Figure 3 presents an overall organization structure for promoting IR service in CAS.

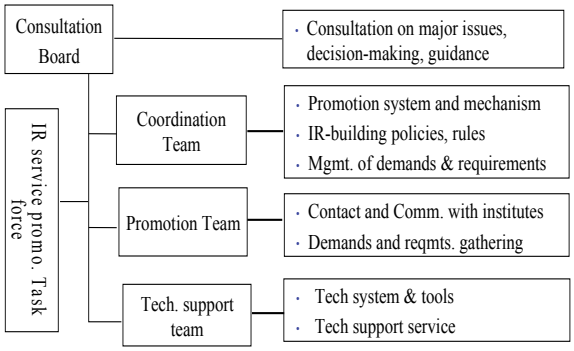

Figure 3: Organizational structure of IR promotion

The consultation board consists of leaders from NSL. Its main tasks are to guide the direction of promotion service, make important decisions involved in overall promotion arrangements, and provide regular consultation service on major issues concerning the promotion activities.

The coordination team is mainly responsible for overall organization, coordination and collaboration tasks involved in the process of promoting IR service. They include proposing a set of policies templates to be referenced by institutes; capturing, analyzing and allocating efforts to meet service needs from institutes; and establishing work mechanism for promotion of IR service.

This team is composed of members from NSL and institutes. Those from NSL are usually head of coordination groups of NSL. They coordinate efforts to meet the requirements that need their support. In addition, members from institutes are usually directors of libraries of institutes as representatives of institutes to propose requirements.

The promotion team is composed of subject librarians from department of subject information service of NSL, and is responsible for concrete IR promotion tasks. Each member of this team will take charge of several institutes' IR promotions. They are required to provide following services:

- Pre-consultation service: it may cover any issues concerning IR building.
- Help the institutes plan an IR service.
- Help the institutes formulate an adapted policy framework based on what policies templates proposed by the coordination team.
- Help the institutes work out feasible work procedures for running IR service.
- Help the institutes install CAS IR package.
- Provide training in using and maintaining IR system.
- Help the institutes prepare legacy content and transfer them into IR system.

The technology support team consists of IT engineers from IT department of NSL. Their responsibilities concerning following two aspects:

- Develop software package and tools in support of building IR. As described in section 3.2, we need to customize, improve and extend DSpace to be a more suitable application for us. In addition, we also need to add new features constantly to keep up with the development of IR itself.
- Provide technical support service involved in IR promotion and application activities. Regular technical support services may covers a range of services, such as installation

of IR package or tools, training, guiding the use of application, customization, distribution of software patches or updates as required to resolve specific issues/problems, providing technical advices or resolving any other specific inquires or technical problems. These services usually are required to be provided in a timely manner via telephone, email, instant messages, support site, or remote desktop technology.

3.3.2 Basic Working Procedures for IR Promotion

Organizational structure clearly defines division of responsibilities and sets up communication and collaboration mechanisms among working teams. However, in order to conduct IR promotion service methodically, we have established following official working procedures to guide the smooth running of the promotion.

- First, with the help of responsible subject librarian from NSL, the institute library on behalf of the institute submits an application request to NSL, namely consultation board of the project. This application should include clear-cut definition of strategic goals of building IR service, definite team organization, commitments to establish effective policies and supply supportive conditions and facilities, such as funds, basic hardware and software, etc.
- When consultation board receives an application, it performs a routine assessment of its feasibility, checks whether required conditions are met, and finally draws a conclusion if or not the application is passed through.
- If an application is approved, NSL assigns an agreement with the institute. As an official engagement between two sides, it prescribes bilateral responsibilities and obligations and is taken as a starter of building IR service in the institute.
- Finally, we enter procedure of bilateral practical co-operation. Those teams of NSL and the team of the institute will work together to push the implementation of IR service in the institute. During the course of this procedure, subject librarians will get much involved in consulting and helping institute work out a detailed implementation plan and finish constituting an adaptable policy framework; then the institute perform preparations such as hardware and software environment and other required pre-conditions to get ready for installation of IR package; technical support team help institute complete tasks such as remote or on-spot or self installation of IR package, post-configuration, training, trial running, official lunching, and other technical ones.

3.4 Achieved an Expected Level of Deployment

Until now, over 50 institutes have assigned building agreements with NSL, and nearly 40 institutes have launched IR service.

Among them, some have gradually established sustainable support mechanism for the development of IR service. For instance, the Institute of Semiconductors has incorporated the developing IR service into its informationization development, and established mechanism of combining content submission with assessment and reward of graduate students, researchers, and research units, to stipulate and encourage individual participation in IR building. The Institute of Software, the Dalian Institute of Chemical Physics and others have also set up similar mechanisms.

Concerning the content collection building, peer-reviewed journal articles, conference papers, theses and dissertations are the most concerned scholarly content. Many IRs also

have included presentations, books, book chapters or sections, patents, project achievements, and other materials. Moreover, research data are of most future concerned research outputs to be included in IRs.

In respect of content recruitment, it is still in an initial stage overall. Except some IRs have reached a several thousand-level, many of them have totally accumulated less than one-thousand items.

4. Development of CAS IR Grid Service Portal

4.1 Architecture of CAS IR Grid

CAS IR Grid service system itself can actually be regarded as a CAS-level IR system. Compared with institutes' IRs, it focuses on CAS-wide knowledge content aggregation, as well as knowledge dissemination, communication and discovery. Collection, deposition and preservation of knowledge artifacts will not be its essential services. A three-layered architecture of CAS IR Grid is presented as in Figure 4.

The content layer consists of IRs distributed in institutes. They are the nodes of the Grid, and each has built-in OAI-PMH data provider interface and can expose their metadata with default oai_dc format or more applicable qdc format to be used in the Grid system.

The aggregation layer provides metadata aggregation service. The harvester component collects metadata records from OAI-PMH data providers, in here are institutes IRs, and creates a central metadata repository, which serves as a base on which various tools and services can be developed.

The interface layer provides not only user-oriented services but also application-oriented services. User services will include basic and conventional services such as browse and search service. In addition, it will support services like dynamic creation of knowledge communities, institute profiling, generation of CAS-level knowledge inventories, and cross-subjects or cross institutes data linking, integration and discovery service.

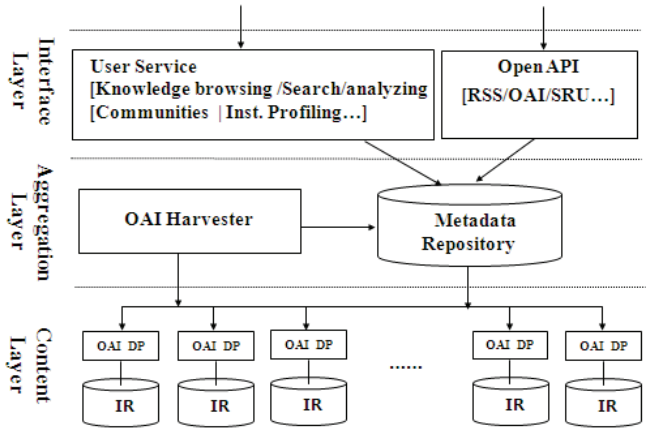

Figure 4: Architecture of CAS IR Grid

The application-oriented services are mainly standard-base interfaces, such as open interfaces of OAI-PMH, RSS, SRU/W, etc.

4.2 Development of Harvest and Aggregation Service System

We continue to follow our OSS strategy in development of harvest and aggregation components of CAS IR Grid. After a preliminary investigation and evaluation, two candidates were left, they are D-NET [6] and OAI ORE patch for DSpace [6].

Actually, we much prefer D-NET. It has powerful and attractive service oriented architecture, and is not just a harvester system; in fact, it is a open-sourced software package with much more complex functionalities to support running of a repositories network. Moreover, it is support platform of DRIVER Repository network. From the point view of ongoing collaboration between DRIVER and CAS IR Grid, it is a best selection for using it as basic platform for CAS IR Grid. Thus, as part of collaboration between two sides, DRIVER installed a test D-NET application in our local servers.

However, current D-NET 1.1 as an interim version is still under development, so it is not so stable to use it in a production environment. Moreover, from the point of view of using DNET in China, we need additional Chinese interfaces. But current version of D-NET has no built-in l10n/i18n support, so if we want to use it, we have to hack source codes to gain a localized version beforehand. Apparently, doing like this is time-consuming and not sustainable as well.

Therefore, we temporarily use alternative solution of building CAS IR Grid service portal, i.e. using OAI ORE patch for DSpace. This patch can function as a basic OAI-PMH harvester and an OAI ORE harvester, and we just use it as the former. It is relatively easy to be integrated into DSpace. Based on the integration, we have set up a test CAS IR Grid service portal (see Figure 5). However, the patch is just an implementation of OAI harvester; it is worth looking forward to new release of D-NET, because we are informed that the new release will have updates we need.

Figure 5: Test site for CAS IR Grid service portal

5. Future Considerations

Developing CAS IR Grid service is a long-term task, we will continue to try our best to push it forward. Our future concerns may exist in following aspects:

- Develop successive enhanced version of IR package. It is expected to support wide-expansion of knowledge content types, provide further search and discovery features, enhance capturing context and relationship between knowledge objects, and advance its composability and interoperability to integrate or to be integrated with other services easily.
- Spread IRs in most institutes across CAS. Currently, less than half of institutes have launched IR service; we need to help rest institutes join our IRs community in next years.
- Upgrade CAS IR Grid service continually. We will keep it harvesting IRs across CAS as many as possible, and develop advanced search and discovery functionalities.
- Make concrete progress in metadata sharing with DRIVER. In addition to current collaborations, which are particularly in the area of technology, we both sides need to promote bilateral collaboration to metadata exchange level.

6. Acknowledgments

We thank DRIVER, in particular, Dale Peters, Marek Imialek for their help in providing many consultation and support services involved in evaluating D-NET. We would also like to thank for hard work done by our colleagues from NSL.

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Building Repository Networks with DRIVER: Joint Explorations with the IR Grid in China

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Abstract Scenarios of collaboration for supporting Open Access to research results through institutional repository networks have been explored between the IR Grid of the National Science Library of the Chinese Academy of Sciences and the European DRIVER-Initiative through its German partners Bielefeld University Library as well as the State and University Library Göttingen. The activities included a joint analysis of the DRIVER infrastructure software D-NET and also resulted in the registration of Chinese Repositories in the DRIVER network.

Keywords Institutional repository, Open Access, research infrastructure

1. Introduction

Institutional Repositories (IR) have been established worldwide for providing Open Access to digital research results for human discovery through internet applications as well as reliable and fast exchange via machine based protocols. Thereby repositories are becoming a significant content provider in international research infrastructures. Since research results in repositories are originating at the local, institutional level, methods of systematically networking the repositories have to be put into practice. The European DRIVER-Initiative [1] has achieved this over many national networks in Europe through organisational measures and technical systems based on the D-NET software. It provides a European Information Space aggregating the content of repositories compliant with the DRIVER-Guidelines and offers national portals as well as independent infrastructure installations of the D-NET software. The National Library of Science – Chinese Academy of Sciences (NSL-CAS) has implemented a national approach to institutional repositories, the "IR Grid" [2]. Collaboration between the German partners in DRIVER, Bielefeld University Library as well as the State and University Library Göttingen, and the NSL-CAS has been launched in order to exchange knowledge and identify synergies between the two initiatives.

2. Activities and Results

Building upon the ongoing collaboration between the NSL-CAS and the State and University Library of Göttingen for aligning processes in the development of Open Access in general, specific actions have been carried out in order to strengthen collaboration on practical aspects of institutional repositories. In a testing-activity of mutual interest, the Chinese Academy of Science provided servers in China and Bielefeld University Library installed the latest development version of the D-NET software on these servers for testing. In this installation, the NSL-CAS could analyze the technological solutions of D-NET for building repository

networks in order to draw conclusions for their own IR Grid. DRIVER had the benefit of receiving feedback for their current development process of D-NET.

In a second line of activities, an expert from the NSL-CAS visited Germany, mainly the State and University Library Göttingen, in order to enable on-site knowledge exchange supplementing the intensive on-line collaboration described above. The expert's visit at Bielefeld University Library was focusing on the question how to include Chinese repositories in the D-NET software. The exercise included in-depth analysis of the DRIVER-Guidelines that became a de facto international standard for repositories with translations in English, Spanish, Portuguese and Japanese and applications in many countries. Specifics of Chinese repositories were analyzed, so that the NSL-CAS can exploit the principles of the guidelines more easily and Chinese requirements can be included in future versions of the DRIVER-Guidelines. Futher activities resulted in the registration of the first Chinese repositories in the DRIVER Information Space.

3. Discussion and Conclusions

Interim conclusions of the collaboration were drawn in the Sino-German-Symposium 2009. The collaboration of only a few months so far yielded practical results such as the D-NET test-installation in China and the registration of Chinese Repositories in DRIVER. Additionally, through the establishment of the points of contacts on both sides, a major step towards joint activities in the future has been made. Identified issues for future collaboration such as the internalization features of D-NET and Chinese repositories can be thus followed up easily. Further plans made at the Sino-German workshop 2009 pointed at a possible scenario for a realization of future collaboration in the context of the "Confederation of Open Access Repositories", a recently funded international repository organisation.

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Explore New Model of National License in China

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Abstract In this paper, we briefly discuss the models and services of national licenses for STM digital information resource construction in China.

Keywords China, information resource construction, national license

1. Introduction

Science and technology (S&T) information resource is a critical component of the research and education infrastructure in a country. The establishment of the National Science and Technology Library (NSTL) was a major event in current history of S & T document and information service development in China, and its construction and development is not only an epitome of construction of China's modern S & T document and information support system, but also an example of public service in S & T information service fields in China. After more than 9 years of development, the NSTL has become one of the most important S&T document and information service organizations in China.

In recent years, when STM publishing goes to digital, NSTL has to find a most convenient way to serve its clients. National licensing is one of the effective ways for NSTL to do so. As a pillar of its resource development strategy, NSTL started to offer electronic STM resources on national license basis to the nation's STM communities in the early year of this century.

2. The Models of National Licenses in China

Up to 2009, it has been experienced with 3 models for national licensing activities in China:

2.1 Model 1: Full National Site License (1998-2004)

The subscription of the electronic journal *Science Online* in 1998 started the history of national license in China. The licensing library was Beijing University Library, and the licensing budget was co-sponsored by NSFC, Ministry of Education, Ministry of Science, and Chinese Academy of Sciences. *Science Online* was the first web-based full text journal service in China. The service model for *Science Online* is to access the journal totally free to users all over mainland China. Everyone in mainland China could access it without necessary of pre-registration and with no limitation for the usage. Taking the place of Beijing University Library over, NSTL licensed the journal between 2002 and 2004, and then stopped licensing after 2004 for some reasons.

2.2 Model 2: National R&E Site License to Public Research and Education (2004–)

Beside the journal *Science Online,* NSTL began to license other electronic journals on national license basis in 2003. The service model was national R&E site license, that was to say the access of publications data would be controlled by the user's IP address filtering. A list of public R&E institutions pre-certified by NSTL and the institute that was not included in the list could self-request to the agent of licensing. Usage statistics provided to NSTL yearly by publishers. Publications licensed were all current electronic journals in different STM fields, and the number of journals licensed increased annually in last years.

There were 215 titles from 24 publishers licensed to the end of 2006, and 322 titles from 38 publishers to the end of 2007. By the end of 2008, the number of journals licensed by NSTL on model 2 was 513, that was 191 (59.3%) increased by the number of 2007, which is shown in Figure 1. The number of publishers reached 45.

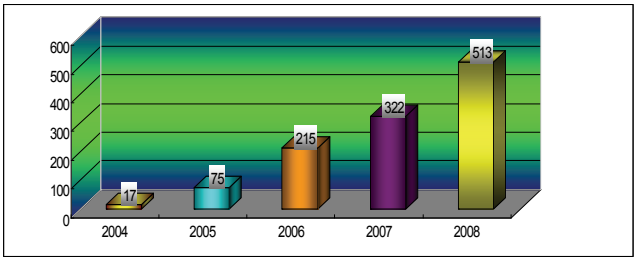

Figure 1: The Number of Journals Licensed by NSTL on model 2 (2004-2008)

2.3 Model 3: Funding to Consortia of R&E Institutions for Subscription of E-Resources (2005-)

Since 2005, NSTL has supported to consortia of national research institutions and key universities, by funding them about 1/3 of their subscription costs for some special databases. In 2009, NSTL funded 60 R&E institutions and universities from two consortia for subscription of 55 e-journals (all the publications of AIP, APS and ACS), as well as the ProQuest agricultural database. The full-text electronic journals subscribed can only be used within these institutions.

2.4 Usage Statistics of 2008

In 2008, 5,172,651 articles from 329 journals on model 2 were accessed, which was 54% increased than that of 2007, which is shown in Figure 2. And, 12,646,400 articles from 49 databases on model 3 were accessed, which was 13.12% increased than that of 2007.

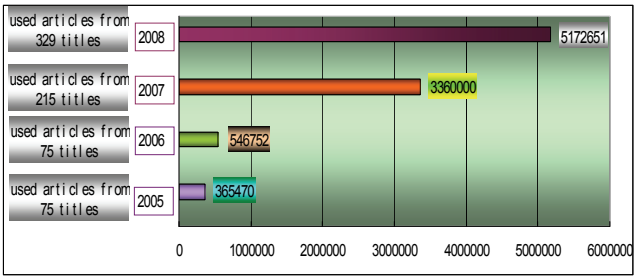

Figure 2: The Access Statistic of Articles from journals on model 2 (2005-2008)

3. New Model of National Licenses in China

After several years of negotiation with the publishers and agents, it is decided that since 2010, NSTL will establish a new model for national license service of digital resources, offering retrospective database of journals and e-books to the users in mainland China.

3.1 Characteristics of the New Model

Publishers will offer the raw data of retrospective database to NSTL and the data will be processed by NSTL, and the service system will be established on local system of NSTL. NSTL can yearly get the raw data of digital resource they have subscribed and preserve them locally. The users in mainland China can be flexible linking to either local service system or the publisher's original service system abroad on the basis of the user's IP address filtering controlling.

3.2 Number of Journals on the New Model

In the first stage of this model, there will be 1,147 journals from 6 publishers serving to the users (see Table 1).

Publisher	no. of journals	no. of papers	Period of time
Springer	961	1,634,688	1854–1996
OUP	142	813,324	1849–1995
IOP	37	177,065	1874–2002
Turpion	6	30,190	1958–2002
Nature	1	380,000	1869–1986
Total	1,147	3,035,267	

Table 1: Data statistics of the retrospective database

Besides, NSTL will also offer access service of 4,054 e-books published by Springer by its local retrospective database service system.

3.3 Advantages of the New Model

The new model shows many Advantages:

The users can access the data without necessary of paying international internet fee if they use the system locally. Or they can obtain the benefit of liking between current and historical data of the journals if they use the system offered by publishers abroad.

In china, as well as in foreign countries, each library needs retrospective data for serving their users but not each library can afford of licensing the whole set of retrospective data. Offering retrospective database service by NSTL on its local system can save much budget of many R&E libraries in China on the whole.

As the establishment of the retrospective database locally, the country's digital resource support capacity could be strengthened to a large extent. And the databases established by NSTL could be serving as a part of the country's long term service and long term supporting system of digital information resources.

Some large-scale publishers can afford the cost for transferring the digital resources and metadata if necessary, while most of small-scale publishers, which have consigned platform service providers to maintain their data and surrogate their service, have to pay extra commission to platform service providers. However, they could not afford this. With this model, publishers can also get benefits from saving costs for transferring data and paying of commission.

4. Conclusion

During the last several years, NSTL has paid much attention to long-term preservation of digital resources while negotiating with publishers or agents. Publishers have gradually understood and recognized the request on digital preservation of NSTL. The new model would be one of the possible solutions. In the future, NSTL will explore more models for better services of the full-text digital journals to its clients. Moreover NSTL is going to make a fair use agreement of digital resource with each R&E institution to protect copyright. Trying to find more funds for maintaining more digital journals will also be one of the important missions of NSTL.

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German National Licensing Activities: A TIB Perspective

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Abstract In this presentation, the German National Licensing Programme, funded by the DFG (German Research Foundation), is described. After giving a general outline of the programme, the presentation takes the target group, the shared responsibility of numerous institutions in negotiating and stipulating the licensing agreements, the different types of collections already acquired under a national licence into focus and takes into account the special subject collection plan which was set up long before the national licensing programme and still continues. The licensing models under which journal archives and current content have been acquired are explained, financial aspects and practical consequences shown. The international collaboration within the Knowledge Exchange initiative, aiming to make a layer of scientific and scholarly information openly available on the internet, is mentioned.
This presentation provides a concise summary of the National Licensing Activities in Germany as well as the TIB perspective.

Keywords Current content, DFG, Germany, Goportis, journal archive, Knowledge Exchange initiative, licensing, national licence, TIB

1. National Licences for Electronic Media

Since 2004, the German Research Foundation (DFG) has been funding the acquisition of licences for electronic media with the goal of providing electronic specialised information to all German Universities, Research Institutions and Academic Libraries with just one contract and providing the same conditions of use for all. These licences, valid for the whole of Germany, are called “National Licences”.

This new scheme is designed to complement the existing scheme for the national availability of scientific literature (German Research Foundation’s plans for specialised subject collection fields).

The decision to fund new, additional National Licences by the German Research Foundation (DFG) is taken on an annual basis and this has led to the number of national licences being increased every year so far.

2. Target Group

First and foremost scientists and students have free access to databases, collections of digital texts and electronic journals. They can access the collections through their home institution (German University, Research Institution or Academic Library as participants in a particular National Licence).

In addition, private individuals with an interest in scientific topics can register individually for several National Licence products.

3. Negotiating Institutions

Nine leading institutions in Germany act as negotiators, organising partners and administrators for the national licensing initiative. They are:

- Berlin State Library – Prussian Cultural Heritage (SBB-PK Berlin)
- Leibniz Institute for the Social Sciences, Bonn (GESIS Bonn)
- University Library, Frankfurt (UB Frankfurt)
- Göttingen State and University Library (SUB Göttingen)
- German National Library of Science and Technology (TIB, Hannover)
- German National Library of Economics (ZBW, Kiel/Hamburg)
- University and Municipal Library Cologne (USB Köln)
- German National Library of Medicine, Cologne (ZB MED Köln/Bonn)
- Bavarian State Library, Munich (BSB München)

These institutions are responsible for the negotiations and conclusion of licence agreements with publishers, learned societies and other information providers. Among this group, the responsibilities for the negotiations are divided according to the subjects in which each of the institutions specialises on a national level. The TIB is the leading library in the field of science and technology and thus leads negotiations for licences in these subjects.

4. Acquired Collections

As of November 2009, a collection of currently 6 bibliographic databases, 44 journal archives, 52 full-text databases, 8 archives of reference books and 12 current journal collections had been licensed with the National Licensing Programme.

The National Licensing Programme is complementary to the already existing and practised German Research Foundation's funding for specialised subject collection fields ("Sondersammelgebietsplan"): In accordance with the subject specialist collections programme of the DFG, libraries which have proven to be especially strong in one or more scientific subjects receive additional funding and are obliged to acquire all national and foreign publications (electronic or in print) which satisfy scientific standards in the subject they represent. Additionally, they are obliged to satisfy inter-library loan and document supply requests.

Available funds for the national licensing programme are currently about 10–20 million Euros per annum. Negotiations for backfiles and archives, but also for current content have been carried out separately.

National Licences have been acquired for the following archives (among others):

- Elsevier Journal Backfiles on ScienceDirect 1907–2002
- Oxford Journals Digital Archive 1849–2007
- Springer Online Journal Archives 1860–2001
- Taylor & Francis Online Archives 1799–2000
- Wiley InterScience Backfile Collections 1832–2000

5. National Licences for Archives Negotiated by TIB

Currently, the TIB has concluded national licensing contracts for 17 products. These include only journal archives and backfiles, not the current content. As a strategy, most products will be hosted either by the TIB or a contractor in Germany and have been acquired for an indefinite period of time.

DFG funds awarded to TIB in the category of "Journal Archives" total about 17 million Euros. In this category, national licences have been concluded for the following journal archives:

- ACS Legacy Archives 1879–1995 (27 journals)
- AIP Digital Archive 1930–2008 (10 journals)
- APS Digital Backfile Archive 1893–2003 (10 journals, TIB hosting since 01.07.2009!)
- China Academic Journals – Technology and Science (approx. 3000 journals)
- IOP Historic Archive 1874–2008 (54 journals)
- IUCr Backfile Archive 1948–2001 (8 journals)
- Nature Archive 1869–2007 (in association with SUB Göttingen, 5 journals)
- RSC Journals Super Archive 1841–2008 (62 journals)
- Science Classic Archive 1880–1996
- Springer Online Journal Archives 1860–2001 (almost 1100 journals)
- Springer Lecture Notes – Archive 1964–1996 (Computer Science, Control and Information Science, Earth Science, Mathematics, Physics; 3590 volumes)
- Taylor & Francis Online Archives 1799-2000 (diverse subject collections, 378 journals)
- Transtech Publications – Archive 1984–2008 (10 journals and proceedings in the area of Materials Science and Engineering)

6. National Licences for Current Content

National licences for current content have been stipulated applying two different licensing models:

- Model 1: A National Licence for journal packages with a low market-relevance for which area-wide access is granted.
- Model 2: A national consortia/National Licence on an opt-in-basis for journal packages with high market-relevance. Institutions can decide whether they want to participate (opt-in participation of institutions).

These licences have been concluded for the 2008–2010 period.

In addition, agreements have been reached towards integrating current issues licensed under the national licences for current content in the Backfile Archive Licence Agreements after a defined period of time with a moving wall.

Therefore, the TIB-negotiated national licences for backfiles mentioned below (No. 7) have been extended until 2007 and the current issues (years 2008–2010) will be made available as backfiles by the publishers at the end of each year.

As a result, the complete collections of these journals have been acquired with the exception of journals first published after 2007.

7. National Licences for Current Content Negotiated by the TIB

The TIB negotiated and concluded contracts on a national level for the following three products on an opt-in-basis:

- American Institute of Physics National Consortium (including 14 journals)
- Institute of Physics National Consortium (including 48 journals)
- Royal Society of Chemistry National Consortium (including 27 journals and 6 databases)

Further information is available under www.nationallizenzen.de.

8. Knowledge Exchange

With the founding of the Knowledge Exchange initiative, some changes have taken place in respect of international collaboration in licensing matters. Within the Knowledge Exchange initiative, the relevant agencies of Denmark (DEFF), the United Kingdom (JISC), the Netherlands (SURFfoundation) and Germany (DFG) are collaborating to make a layer of scholarly and scientific content openly available on the internet [1].

After undertaking a multi-national tender, a number of framework agreements for the years 2009-2011 were concluded. These agreements have resulted in special conditions for the national consortia.

Two of these products are administered by TIB:

- Multi-Science Publishing: 14+7 journals; national consortium with 50% funding from German Research Foundation (DFG)
- Wiley-Blackwell OnlineBooks (Multinational Discount Agreement including favourable terms and conditions) [2]

The multinational licensing work is carried out in the Knowledge Exchange Licensing Working Group who also worked out the tender for the products named above.

9. Summary

As the German Universities' library budgets are financed by the 16 German States ("Länder") for its institutions, the building and administration of consortia had occurred on a regional scale in the past. However, for some time now, the regional consortia have opened-up to nationwide memberships for a number of products. In addition, the exchange of information between consortia has become easier as the regional consortia collaborate in the GASCO – the German Austrian and Swiss Consortia Organisation [3].

In 2004, the German Research Foundation (DFG), which already has an important role in financing so called "special collection fields", started to allocate funds for the acquisition of national licences for electronic backfiles. Subsequently, the DFG also decided to fund a pilot project for the national licensing of current content for the years 2008-2010.

The way national licenses have to be negotiated and co-ordinated and also the need to benefit from licensing co-operation on the European multi-national level present new challenges to the structure of negotiation and licensing for the German academic market.

10. Outlook

The practice to allocate negotiations of national licences to a small number of key players has proven to be effective.

During the present strategic discussion in Germany – although controversial – a model was suggested which aims to concentrate the negotiation in a national licensing agency held by representatives of "subject clusters" (German National Libraries of Science and Technology (TIB), Medicine (ZB MED), Economics (ZBW) as well as three other institutions for subject clusters of Humanities and Social Sciences. Among others, the co-operation of four major players (BSB, TIB, ZB MED, ZBW) has already been practised in negotiations for national licenses of E-Book collections in 2009. TIB, ZB MED and ZBW have a close licensing co-operation (Goportis Licensing) including a co-operative office and common staff since 2007.

The emergence of central services (which can be located decentrally) would allow the regional consortia to concentrate their resources on the needs of their respective regions. This would be beneficial, since local and regional licensing activity will remain the major part of licensing for the academic market in Germany.

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