

STRATEGIES FOR COORDINATING MONGOLIAN LIBRARY AND
ARCHIVE INFORMATION RESOURCES USING A VIRTUAL LIBRARY
CONSORTIUM

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Mongolian Digital Repository

The purpose of this paper is to outline broad strategies for achieving the vision of an accessible repository of information and knowledge produced in Inner Asia or about the Mongolic peoples of the world. On the user end, this will be an internet based environment in which researchers, collectors, authors, photographers, and audio-visual material producers can share their intellectual materials within a context other researchers and content producers can more easily discover them. On the organization end, the repository will pool technical knowledge and resources so local organizations are able to focus their energies on preservation, promotion, and access to their collections, as opposed to costly details of hardware, software, and standards.

Mongolia's geographic isolation and limited resources have prevented widespread distribution of the knowledge contained within Mongolian society and the international community of Mongolists. Books and other published materials are rare, remaining in isolated library collections, and information about these materials often remains sequestered in the tacit knowledge of specialized groups of academics.

Virtual Library Consortium

In order to achieve this goal, I propose the establishment of a virtual library consortium of local and international organizations. There is too much for any one person or organization in Mongolia to know in order to make appropriate choices and produce effective results while creating something as expansive as the digital repository described in this paper. Yet, forming a consortium presents its own challenges, and it may be easy to lose sight of the overall vision while discussing the formation of a consortium. A consortium is a means and not an end in itself. In this paper I view it as a way of

achieving a universally accessible Mongolian digital repository. Establishing a large information system is an ambitious goal in a country with arguably limited technical capacity and ambiguous government policy. A consortium is intended to mitigate some of the challenges presented by these conditions, as well as to defray the high financial and opportunity costs associated with going it alone, through the pooling of technical, social, and political knowledge and human, equipment, and financial resources necessary to successfully build a large digital repository.

Virtual Concept

The term virtual library consortium is meant to convey a sense of the quality of collaboration that is suggested throughout this paper. These are not strategies and ideas for establishing a permanent, bureaucratic confederacy of organizations. Virtual connotes something that is more fluid and transitory in terms of participation. It means open and accessible regardless of geographic location or time and primarily lateral or bottom up in terms of administration.

For the purposes of this paper, the virtual library consortium is composed of three general elements. There is a leadership group that facilitates the growth of the repository by providing the environment and the means for others to participate in the initiative. There is a group of partners who contribute to the effort but do not necessarily have reason or desire to join the leadership group. Then there are the tools and resources available to create and sustain the repository. These categories are used only as conceptual devices, and they do not represent an actual description of how the consortium should look. The composition and structure of the consortium will evolve out of

collaborative work among stakeholders, but whatever the quality of the consortium these three elements will be present.

Why Mongolian Information?

A relevant question to ask is why such a repository should be established. There are numerous answers to that question. Mongolia and the Mongolic peoples have historical or cultural connections to great numbers of ethnic groups on the Eurasian continent. It is the missing piece of the puzzle in understanding geo-politics in Asia during the Cold War. It is a burgeoning democracy and free market society, and the antithesis of the North Korean and Cuba models of transition during the Post-Soviet era. It is the land of Genghis Khan, the people who gave the Dalai Lama his name, and the keeper of a pastoralist tradition spanning centuries. It is a place of growing interest among international researchers and students, and it is a place welcoming to inquiry, observation, and critical analysis. It is the home of an endangered language and cultural tradition. It contains Siberian forest, arid steppe grasslands, mountain ranges, and the Gobi desert. It is a testing ground in understanding the impact of global warming. In short, it is the best kept secret in terms of original research, learning, and scholarship in Asia, and much of this work remains inaccessible, scattered, and unknown.

Paper Structure

This paper is divided into three main sections starting with examinations of the current use of ICT among Mongolian libraries along with two local and two international online resource portal models. These examinations are used in the second section to outline key principles for forming and sustaining the virtual library consortium and the qualitative properties of the virtual repository. This section is intended to develop

concepts for best practices in cooperating in the real world and the virtual environment. This is followed by a general description of the constituent parts of the consortium and repository which will be included in an actual implementation plan.

It is important to keep everything in perspective. Although online tools such as Google and Wikipedia are ubiquitous in many places in the world today, these tools and many others are less than a decade old. Technology is changing so rapidly that it is a challenge to remain at the cutting edge, especially if there are technical barriers to understanding what the technology is and what it is for. Although this paper may appear critical of some of the previous initiatives that share a similar vision of universally accessible Mongolian information resources, it should be kept in mind that the designers and supervisors of these projects faced many challenges without the benefit of hindsight and the technology available today. These projects are analyzed critically in order to build upon their successes and to avoid repeating mistakes. In pursuing grand visions one should be humble enough to remember Sir Isaac Newton's observation that "If I have seen further it is by standing on ye shoulders of Giants."

I. Mongolian Libraries and Repository Models

Traditional library functions are not particularly well managed in Mongolia. In general access to collections is contingent on the approval of specific librarians managing the collections, and reference guides and catalogs are either non-existent or difficult to acquire. The American Center for Mongolian Studies (ACMS), under the auspices of a Department of Education funded grant, conducted a survey of library collections during the summer of 2007, and the experience of disseminating the surveys and the initial interviews with librarians regarding how to complete it was in many ways more instructive than the surveys themselves. Librarians had difficulty understanding the purpose and meaning of the survey, which asked approximately 50 questions about the libraries' collections in terms of quantity, quality, preservation issues, and access both electronically and physically. Initial responses from several of the librarians indicated that they did not view their collections in the same terms as librarians in North America.

The complete results of the survey are available on the ACMS website¹, and responses indicated that a subject heading categorized account of holdings was difficult for several of the librarians to provide. Many described their collections in terms of language, reporting a collection has X number of Mongolian books, Y number of Russian books, and Z number of books in other languages, without further elaboration on what the specific content of the books were.²

Most of the libraries participating in the survey indicated some use of an electronic catalog. The majority of institutions utilized a software package called LIB4U,

¹ For full survey results, see http://www.mongoliacenter.org/index.php?option=com_content&task=blogcategory&id=23&Itemid=100

² See <http://www.msue.edu.mn/library/fond.htm> for an example.

which was apparently developed in Mongolia around 2002, and continues to be sold by Wolves. LLC.³ The program has the ability to become an Open Public Access Catalog (OPAC), or online catalog, but only the Science and Technology University actually has the catalog open to internet users. The rest are only accessible within institutional intranets if accessible at all from computers outside the libraries. There appears to be a tendency for many librarians to refer to their electronic catalogs as online catalogs indicating a possible misunderstanding about the subtleties of computer technology.

Web Presence of Libraries

This is extended in some measure to the websites of institutions that participated in the survey. While investigating the quality of local library websites, I used the way websites are indexed by Google and Yahoo! as a proxy for measuring the quality of content and inter-linkages among pages on the sites. I sent queries to these two search engines using keyword phrases which included “Mongolian” and other words related to libraries in quotation marks. Google, for its part, ranks its indexed pages in large measure based on the number of hyperlinks connecting a particular page to other pages in addition to the actual content of the page. A page that is linked to pages from high value or high traffic sites is ranked higher than a page that has few or no links to it from other pages and low value sites. Yahoo! also describes itself as using some form of associated links to help determine the rank of pages it indexes. A combination of content and inter-linkages produce higher rank listings from search results because the assumption is the community of resource users tag useful content in the form of hyperlinks on their pages.

³ See “Lib4U Library software BRIEF INTRODUCTION” at http://www.soros.org.mn/osf_opac/lib4ueng.htm, and <http://opac.must.edu.mn/lib4unetmon.htm>.

The Ulaanbaatar City Library is the only local library that consistently appeared in the keyword searches.⁴ In fact, the American Center for Mongolian Studies and the City Library were the only libraries in Mongolia that appeared in the top 20 results from a keyword search on the phrase “Mongolian Library” using Google, and the American Center for Mongolian Studies was the only library that appeared in the top 20 results with the same search in Yahoo!⁵ Mongolian keyword searches only improved results slightly for other libraries, and ultimately the American Center for Mongolian Studies still appeared in the top 20 results for the keyword search “Library” even though it had only one page written in Mongolian about libraries when I conducted the test.

These results demonstrate something important about web pages on the World Wide Web and formatting and creating content for websites. The American Center for Mongolian Studies operates with the goal of improving access to information about Mongolian research to international scholars, and the organization attempts to design its online resources such that they will have a greater likelihood of being indexed and ranked highly by popular search engines such as Yahoo! and Google. Having a website means more than just putting information on the web. It requires understanding how potential users of a particular online resource are going to find a resource among the billions of other pages on the World Wide Web.

The websites associated with the libraries that participated in the survey in general do not take advantage of the hyperlinking functionality of web resources. Text within pages does not generally have hyperlinks to other associated pages, and hyperlinks that do exist often have a noticeable tendency to not lead anywhere. Cursors direct

⁴ See Table 1 and Table 2 in the appendices for the full results of the searches.

⁵ Ibid.

examinations of content on several of the sites indicated a preference towards describing the library and its facilities, as opposed offering access to reference materials and primary sources of information. Taken together this indicates a general lack of understanding of how to make the most effective use of internet technologies for library materials and services.

Two Local Models

During the course of examining Mongolia's ICT programs and policies, two institutional initiatives broadly aimed at increasing Mongolia's capacity to establish a knowledge driven and ICT supported economy and society emerged as relevant to the idea of establishing a digital repository of library resources.⁶ These are the Mongolian Development Gateway and Open Web Center. Each program is premised on the idea that improved access to information through aggregated resource portals will provide ordinary Mongolians the ability to more effectively and more equitably participate in economic and social changes occurring in the country.

Mongolian Development Gateway

The Mongolian Development Gateway is a World Bank initiated program that is intended to provide an information portal to support economic activity in Mongolia.⁷ It includes databases, reports, tender announcements, and news stories related to social and economic development. The Gateway also offers various computer and web training

⁶ There is an international program at www.childrenslibrary.org in which the Mongolian Ministry of Education, Culture, and Science is supervising contributions of scanned Mongolian books to an international repository of children's books. This project is also a good place to look for ideas of international cooperation and resource pooling, but it is not included here because its focus is not Mongolian books but rather children's books around the world in general.

⁷ "Mongolian Development Gateway: Partnerships for Development." Mongolian Development Gateway. n.d. Retrieved October 31, 2007. http://www.gateway.mn/about_us.php.

courses and services.⁸ The extent of participation from local partners in the program is difficult to gauge from the information available on the various websites associated with the program. Unfortunately, the sites appear hosted on unreliable servers and contain an unnecessary amount of graphics and animated content, so download times for pages often caused time outs or were completely unavailable while examining the site.

Open Web Center

The Open Web Center is an Open Society Institute initiated program that has objectives similar to the Mongolian Development Gateway, with the distinction of specifically facilitating the use of internet technology in the non-governmental, civil society sector. The Open Web Center is an aggregator and host of websites for civil society organizations in Mongolia. The hosting is offered for free, and the International Association for Mongolian Studies (IAMS), an academic organization without a reason for acumen in information technologies, is an example of an organization that presumably otherwise would not have a website if it were not hosted by the portal.⁹ Many other organizations appear the same, and the portal offers them a chance to have a web presence with relatively lower costs compared to hosting a site with a local internet service provider.

Two International Models

There are several well developed examples of digital library projects in the United States. Two programs in particular emerged as strong candidates as models for a Mongolian repository of library resources. The two programs represent two points on a

⁸ "Our services." Mongolian Development Gateway. n.d. Retrieved October 31, 2007. http://www.gateway.mn/our_service.php.

⁹ See International Association for Mongol Studies webpage at <http://www.owc.org.mn/iams/>

spectrum of conceivable options in terms of user driven content and decentralized administration.

At the almost completely open end of the spectrum lies University of North Carolina at Chapel Hill's (UNC-CH) www.ibiblio.org project in which the Ibiblio team primarily offers the virtual environment and tools to contribute to the collection but does not generally guide or influence the substance of these contributions. On the less open end of the spectrum lies the Tibetan and Himalayan Digital Library (THDL) project operated out of the University of Virginia which provides the virtual environment and tools, as well, but maintains a more rigid structure in terms of the substance of materials contributed to the collection; in other words, it is a more focused collection of digital materials.

Ibiblio

Ibiblio was established in 2000 as a continuation and broadening of an online archive that was established in 1992 at UNC-CH. From its beginning the project has been guided by the philosophy of open access and user driven content.¹⁰ A joint project involving UNC-CH and the Center for the Public Domain, the repository receives over 12 million information requests per day.¹¹ It is an eclectic mix of resources which includes books and manuscripts, video, radio, and photos all in the public domain.

Ibiblio generally only offers technical support regarding configuration problems encountered by users, but the actual form and structure of the resources are generally left

¹⁰ Carolina News Services. "Red Hat Center, UNC-CH join forces with \$4 million gift to launch [ibiblio.org](http://www.ibiblio.org)." September 11, 2000, No. 459. Retrieved October 31, 2007. <http://www.unc.edu/news/archives/sep00/ibiblio091100.htm>.

¹¹ "About Ibiblio." Ibiblio. August 17, 2006. Retrieved October 31, 2007. <http://www.ibiblio.org/about.html>.

to the users to decide.¹² The Ibiblio team, therefore, provides the central environment and forum for authors and curators to share their collections with a vast community of researchers. The primary costs associated with the program are bandwidth, power, and the salaries of the technicians.¹³ The servers for Ibiblio are hosted off site at a consolidated server farm for Duke University, North Carolina State University, and UNC-CH, although the Ibiblio team services the hardware directly, preferring not to have a fully hosted system.¹⁴

Tibetan and Himalayan Digital Library

THDL was founded in 2000 by the University of Virginia Library and the Institute for Advanced Technology in the Humanities.¹⁵ It is a more structured and narrowly defined digital repository in comparison to Ibiblio, focusing on Tibetan Area Studies as opposed to all public domain materials. The library is supported by the Fedora project, which is described later in this paper. The repository is fairly uniform throughout. Although there are numerous contributors, there appears to be a site wide standard for assigning metadata to the digital materials.

According to the THDL introductory page, the THDL presents several complex challenges involving the technology, working with resources across different mediums and formats, and coordinating a community of contributors.¹⁶ The model used in this digital library divides resources into five domains: collections, reference, community,

¹² Discussion with Paul Jones, Donald Sizemore, and Ken Chestnut at University of North Carolina at Chapel Hill, October 23, 2007.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ "THDL Introduction." Tibetan and Himalayan Digital Library. n.d. Retrieved October 31, 2007. <http://www.thdl.org/intro/>.

¹⁶ "THDL Introduction." Tibetan and Himalayan Digital Library. n.d. Retrieved October 31, 2007. <http://www.thdl.org/intro/>.

tools, and education.¹⁷ These domain names are fairly self-explanatory, representing adaptations of traditional aspects of libraries. Education, however, represents materials that extend the library into classroom use such as modules or classroom activities.¹⁸

Contrasting the Four Models with Local Skills

Although somewhat different in their administration, formatting, and design, the underlying framework the two international models operate from is one of inclusion and decentralized contributions to their digital collections. Providing contributors with the tools to make contributions, in fact, is an objective that both programs explicitly promote and pursue by relying on open source solutions.

It is important to note that the Mongolian Development Gateway and Open Web Center have several aspects in common with Ibiblio and THDL in terms of providing a virtual environment for contributors to build collections of information and knowledge. Where the programs differ is in terms of providing the tools for users to make meaningful contributions to the resources from the bottom up. The Mongolian models are dependent on a top down approach to creating content, where as Ibiblio and THDL are dependent on bottom up contributions from the users themselves. This may be a consequence of assumptions about or direct experience with the level of local stakeholders' abilities to understand how to use complicated technology properly. Or, it may be a consequence of selecting technology to support the systems that does not facilitate or allow practical bottom up development. Given evidence that libraries in Mongolia do not have well developed strategies for utilizing web technologies, one should be cautious about sanguine assumptions regarding local abilities to contribute from the bottom up. However,

¹⁷ Ibid.

¹⁸ Ibid.

this does not necessarily preclude the adoption of technology that allows for bottom up or lateral contributions when and where skills and knowledge are present, because the technology and management approach used by Ibiblio and THDL offer the ability to administer from the top down or from the bottom up depending on the situation.

Another key difference between the two international models and Development Gateway and Open Web Center is the separation of the underlying technical aspects of the systems and the end product. From an end users standpoint, it should not matter whether the system is operated off an Apache or Microsoft server, or it is hosted in Mongolia or in Ireland. The use of some derivative of LIB4U or an open source suite should not matter either as long as users can access the information they need when they need it. The fact that the Development Gateway is accessible inconsistently because of server timeouts or poor web-design is avoidable. Server timeouts are an artifact of poor planning, not the state of currently available and affordable technology in Mongolia. Resources should be focused on accessibility, content development, and usability as opposed to whether the system is operated off an Apache server at the Science and Technology University or a Windows server using PHP-Nuke as the content management system at some other organization. It is important to choose technology that is sustainable, cost-effective, and accessible even to users that are not IT-specialists. The underlying issues of operating complex technical systems in Mongolia seem to creep into the user experience in ways that are detrimental to the development of the Development Gateway, and may slow down growth of the Open Web Center.

Evidence of the current skill level and knowledge of local librarians, along with some of the key attributes of the four models, suggests several important success factors in building online repositories of information:

1. Project administrators must thoroughly understand internet technology and remain informed about developments at the leading edge of open source software packages and applications;
2. They should have a clear idea of what services they want to provide users, and develop or borrow the tools to create these services;
3. They should create a sustainable and effective administrative umbrella in which to attract and retain broad sets of contributors and stakeholders;
4. They should produce a user friendly environment and the tools, which include online documentation and tutorials, for adding content to the repositories.
5. They must separate the technical aspects of the systems that are unimportant to the user experience, and from the user standpoint focus resources on improving user access-not the details of arcane technology choices.

These success factors involve much more than simply saying one wishes to establish a digital repository. The opportunity and financial costs are high, and lack of planning early on may lead to serious problems later on. This is especially true in considering the development of content for the repository. If the design fails to provide useful services and barriers to contributing are too high for local and international participants, then the repository will fail to grow beyond its initial start.

II. Operating Principles of the Consortium and Repository

It is essential for participants in any collaborative activity to recognize their limitations, and instead of viewing that as an admission of inadequacy, viewing it as an opportunity to expand the collaborative base of the project. There is evidence that local capacity is not fully up to the task of developing a sustainable digital repository (the American Center for Mongolian Studies is counted as local capacity), and any successful plan to build a digital repository requires methods for attracting talented people and innovative organizations to the project. The medium in which a digital repository is built and sustained is one without rigid geographical and temporal constraints on participation, which is the unique aspect of the internet age. That does not imply that cultivating collaborative networks of participants should be haphazard or ad hoc because anyone at anytime can participate. What it implies is that participants in the project can and should think globally about available resources and partners.

Universal Inclusion

With that in mind, the project also requires at minimum one organization to take the lead in the development process. Taking the lead does not mean being the first to do everything, and it does not mean having control or authority. It means being the first to encourage others to participate by providing them the ability to do so. In the early stages of this project, because there are no promises of grant money, no guarantees the project will work, and few other tangible incentives for many libraries to participate locally, it is likely that many libraries will remain on the sidelines. The core group that moves forward must leave the door open to these organizations to join at any time in the future, and universal inclusion must be the overall operating principle of a leadership group. This

operating principle should also underpin the decisions on technology choice and collection development. Leadership, as it is described here, is in the form of being the catalyst for change, not the impetus for it.

Multi-lingual Approach

There are serious cultural and linguistic barriers to fostering universal inclusion in an international collaborative project, and these barriers are acute in the Mongolian context. Thinking globally will require the consortium members to speak globally, so issues of language are important to consider early on in the development process. Doing everything in one language only, whether Mongolian or English, will either fail to include local participation or fail to include international participation. Therefore thinking bilingually, at minimum, is a corollary principle of universal inclusion that the leadership group must adopt. The door should be left open for other language groups such as Russian, Japanese, Korean, and Chinese to be included as well. But, as a start, Mongolian and English should be the operating languages of the project.

Raising Awareness

The library survey, librarian interviews, and subsequent research have indicated there is not a strong tradition of cooperation among libraries in Mongolia. One can speculate endlessly about the reasons for libraries not having a strong tradition of cooperation, but it is more productive to discuss how cooperation might be fostered and increased. This is a clear area where leadership plays a part in sustaining a project. Effective leadership requires keeping stakeholders informed on a continuous basis. The critical role of any leadership group to form out of this project is to provide the means for stakeholders to understand what has occurred, what is occurring, and what still remains to

be done. The American Center for Mongolian Studies and City Library of Mongolia, for example, both have significant assets to provide to a leadership group in this regard. The American Center for Mongolian Studies has a consistently high ranking website which serves primarily English speaking patrons and a broad network of contacts in the US and Canadian academic communities. The City Library of Mongolia has a website and regular newspaper written in Mongolian that has potentially broad reach in Mongolia. Utilizing these assets to disseminate information costs little more than the time of writing and distributing, but the benefits are continuous awareness among potential partners and contributors of the opportunity to effect change through participation. Raising awareness therefore is another corollary principle of universal inclusion, and there is no purpose in doing a project such as this without this guiding principle.

Partners

Partners in the project can be thought of as three concentric circles with the leadership group at the core, surrounded by local partners, which are surrounded by international partners. Any organization or individual has the potential to be included in the leadership group, so in reality there are only local and international partners to consider.

Local Partners

Local libraries and archives make up the most significant partners, although it is easy to overlook them because one might assume these libraries would automatically make up the core leadership group. While this may seem true, participation is not guaranteed, and the leadership group must consider elements of the project that will attract libraries to contribute to the consortium's success regardless of whether they take

on a leadership role. These partners should not be taken for granted, and every effort should be made to provide them the ways to participate in the consortium. Awareness among international partners of resources available at local libraries and archives and exposure to international partners are the most obvious benefits to participating in the consortium. A potential weakness of efforts to organize libraries may be failure to encourage partners to participate on their terms at their level of skill.

Experienced Local Partners

The Mongolia Development Gateway and Open Web Center are two established programs in which to seek out partners beyond the local libraries, as the contributors to these programs have experience establishing digital repositories in their areas of focus and utilizing and training local capacity to do so. It is important to discuss with stakeholders in these programs about best practices they have discovered, as well as how a principle of universal inclusion can be extended across the projects. The benefit that these programs would potentially gain by participating in the virtual library consortium is raising awareness and use of their own resources. It would also offer an opportunity to have access to new and innovative ideas about how to support and structure electronic resources using open source technology.

The Ministry of Education in cooperation with Datacom Corporation, a local internet service provider, has also spearheaded an e-library project that currently contains approximately 20 scanned Mongolian books.¹⁹ This project is an attempt at creating a digital repository, and it is clearly a potential partner in this initiative. The areas where this particular project could improve and benefit from participating in a virtual library

¹⁹See E-library at <http://www.elibrary.mn>.

consortium are decentralizing the management and workflow of contributions. Moreover, it would offer an opportunity to explore making the site bilingual. At present the site is only presented in Mongolian limiting its reach.

International Partners

International partners are too numerous to examine in a comprehensive way in this paper. However, opportunities abound among government agencies, private foundations, businesses, universities, and individuals. The ability to attract international partners is dependent on the ability to sustain collaborative relationships with local partners. International organizations and individuals, especially private ones, are generally results oriented, wanting assurances that their participation or support will produce results that are tangible, visible, and build upon or encourage other initiatives. This is a critical element missing in other IT projects in Mongolia I have observed. There must be sufficient focus put upon cultivating a strong base of local support to potentially complement the resources and skills of international partners and to avoid frustration and disenchantment from both sides of international partnerships.

Articulation and communication of goals is the key point in the early stages of developing a partnership. Based on the lessons offered by the two international models in the last section, the virtual library consortium's general objectives should be to encourage use of open source software, to establish standards of resource preservation and metadata coding, and to create a inclusive environment for creating and contributing knowledge, therefore facilitating the cultivation of relationships with potential international partners with similar goals.

Open Source Community

The open source development community is a very logical place to begin, and this may be narrowed down further to the organizations and individuals working on the software programs that the consortium chooses to adopt. The compelling aspect of the open source development community is that it is a working model of what the virtual consortium itself will try to achieve. It is a forum for organizations and individuals with resources and skills to tackle IT challenges and improve access to information. The open source community is a hub of spokes connected to government agencies, private foundations, businesses, universities, and individuals. Therefore, creating a local forum or local entity that can engage with this international forum provides opportunities to apply for grants at the Andrew W. Mellon Foundation, seek sponsorship from IBM, or solicit the consulting skills of leading programmers. For the consortium's part, it could provide access to information and resources unique to Mongolia, and a challenging new environment to test ideas.

Although forming international partnerships is a significant objective of the consortium, it should not be viewed as an ends in itself. It is a means to pursue the general goals of the consortium. The principles of inclusive participation therefore remain critical to the development of these partnerships. It begins with leadership coordinating local partners and working outwardly towards other partners who can see the benefit in participating.

Tools and Resources

There are several open source digital repository software packages in various stages of development. Three that offer stable packages are Dspace, Fedora, and Greenstone. Another package that is in the early development stages called "Open

Library” is intended to bring the best collaborative aspects of Wiki’s to metadata collection and cataloging. A demo version of the project is available at <http://demo.openlibrary.org>. At the pace the Open Library developers are moving they may have a stable version of the package in the very near future, so this project is also included in this section.

Each project supports the standards outlined in the Open Archives Initiative - Protocol for Metadata Harvesting (OAI-PMH), which are interoperability standards for metadata.²⁰ Each project is also designed as scalable digital repositories for research institutions and libraries. With the exception of Greenstone, they are designed with decentralized content and metadata contributions in mind, allowing creation of communities of contributors to the repositories.

Dspace

Dspace was jointly developed by the Massachusetts Institute of Technology (MIT) and Hewlett Packard (HP).²¹ It is currently being used by over 200 institutions around the world.²² As such, there are numerous models to gather ideas from, and it has extensive documentation resources.

Fedora

Fedora was jointly developed by Cornell University Information Science and University of Virginia Library.²³ It is currently being used at approximately 35

²⁰ See Open Archives Initiative at <http://www.openarchives.org/pmh/>.

²¹ “Who built Dspace?” [dspace.org](http://www.dspace.org/). n.d. Retrieved October 31, 2007. http://www.dspace.org/index.php?option=com_content&task=blogcategory&id=40&Itemid=88#dspace.

²² “Who is using Dspace?” [dspace.org](http://www.dspace.org/). n.d. Retrieved October 31, 2007. http://www.dspace.org/index.php?option=com_content&task=blogcategory&id=43&Itemid=46.

²³ “About Fedora.” fedora.info. n.d. Retrieved October 31, 2007. <http://fedora.info/about/>.

institutions around the world.²⁴ It is also the platform utilized by the Tibetan and Himalayan Digital Library, which I described in the last section. Just like Dspace it has documentation and tools to assist in developing customizable repositories.

Greenstone

Greenstone was developed by the University of Waikato in New Zealand in cooperation with UNESCO and the Human Info NGO.²⁵ It is currently being used for approximately 60 projects around the world, with a significant number in developing or transition countries such as Afghanistan or Sudan.²⁶ Unlike the other software packages, Greenstone does not appear to support user contributions to the repository, keeping the development side centralized at the libraries. However, it does offer the ability to convert databases to CD-ROM, offering a way to distribute resources to communities without internet access.

Open Library

Open Library is a recent addition to the digital library offerings. Its idea was conceived and initiated in early 2007.²⁷ It is intended to provide a fully collaborative metadata structure and repository. The project's goal is to create a library that contains every book ever printed.²⁸ It's a grand vision, but in the meantime the project software may offer a simpler way to create a union catalog of resources for technologically challenged organizations.

²⁴ "Fedora / Community." fedora.org. n.d. Retrieved October 31, 2007. <http://fedora.info/community/>.

²⁵ Greenstone Homepage. Retrieved October 31, 2007. <http://www.greenstone.org/>.

²⁶ "Examples: Greenstone Digital Library Software." Greenstone.org. n.d. Retrieved October 31, 2007. <http://www.greenstone.org/examples>.

²⁷ "About Us (Open library)." Open Library. n.d. Retrieved October 31, 2007. <http://demo.openlibrary.org/about>.

²⁸ Ibid.

Common Elements of the Software

It is beyond the scope of this paper to compare the pluses and minuses of each system. Needless to say, the leadership group will need to discuss and decide which system will fit the needs of participating libraries and achieve the vision of a universally accessible digital repository. The points to keep in mind are that each system is open source, offers extensive documentation, has broad communities of developers and users, and is customizable, meaning that Mongolian supported versions can be produced.²⁹ Tapping into the international IT development community also mitigates some risk in terms of adopting a system that may become obsolete in the future. The wider the user base the lesser the risk.

²⁹ See Greenstone's listing of Mongolian as an already supported language at <http://www.greenstone.org/factsheet>.

III. Constituent Parts of the Consortium and Repository

There are numerous ways to establish a digital repository. As I have described so far, Mongolia presents several challenges that need to be overcome and several strengths that should be used to create positive momentum. Many of the challenges have been examined, but the strengths should be reiterated. There are several examples of previous attempts at aggregating Mongolian information on the internet. These efforts have not produced unequivocal successes, but there is reason to believe they have provided experience to the sponsors of those programs that can inform this project. Building upon past successes and learning from failures is part of the process of reaching goals. There are several models both locally and internationally to learn from, and every effort should be made to include stakeholders in those models to begin to contribute to this initiative.

Mongolia is also a burgeoning democracy which continues to make steps towards affirming an individual's right to free speech. This is an asset to any project involving information, because government is likely not to interfere with the principle of universal inclusion. This is not to suggest that any and all areas are open, but rather that the areas that are open are wide enough to engage archivists for several years.

How to use these strengths and overcome the challenges cannot be summed up neatly in a 30 page report. There are too many factors that influence outcomes, especially in situations involving high technology and multiple stakeholders with potentially different motivations for participating. The following is only a rough outline of the constituent parts that require attention in order to establish and sustain the digital repository:

1. Hardware

2. Software
3. Copyright and Standards
4. Workflow
5. Content

Hardware

This is probably the least problematic aspect of designing a digital repository. In many ways the hardware issue is one that could be described as a “solved problem.” Seamless systems exist that allow technically unsophisticated organizations such as the ACMS to utilize hardware, as long the organization has access to the Internet, without knowing anything about the details of the maintenance of the servers. Even with hardware set-ups in which one uses a dedicated server, there is no requirement that servers be physically present with the system administrator to be utilized. As long as a server is accessible via the internet, then its physical location is irrelevant to the administration and use of the hardware. Maintenance of the server in terms of electronic components, power, and internet connection is dependent on physical location, but that requires a different set of skills not necessarily required for the administration of a server or system operating on a server. There are numerous examples of organizations consolidating servers into single locations to take advantage of lower maintenance costs, such as the universities in North Carolina do, without any discernible loss in the ability to administer the server or systems running off them. This is the reason hosting and virtual server systems can function and are affordable, and in Mongolia access to the Internet is readily available in the capital and provincial centers.

According to the Ibilio team the primary costs associated with operating their digital repository is bandwidth, power, and labor. These are issues that can be resolved

with careful planning, such as consolidating hardware or utilizing excess capacity on hardware systems. There is no particular reason why a Mongolian digital repository should be physically stored in Mongolia, so attaching the repository to an already established infrastructure may provide economies of scale in terms of expenses. A university in North America or an organization in Mongolia such as the Open Society Forum, which currently hosts the Open Web Center, may be able to provide bandwidth, power, and labor at affordable levels through a variety of hardware configurations. The choice of hardware, therefore, should be dependent on cost and long term stability as opposed to where the repository physically exists or what kind of server it operates from.

In the early stages of this project two institutions stand out as potentially offering cost-effective solutions to the hardware question. In Mongolia there is the Science and Technology University, which has faculty members who have already undertaken several online resource projects, including an E-library³⁰ and a dissertation database³¹ that demonstrate experience working with software systems if not hardware systems. The other institution is the University of North Carolina at Chapel Hill, which hosts the Ibilio repository and offers access to an established hardware set up, relieving the local consortium members of the need to understand the underlying systems supporting the digital repository.

Software

During the library survey process, the ACMS discovered that a system administrator at the Mongolian Academy of Sciences has been working on translating the D-Space system into Mongolian. This fact together with the large community of D-Space

³⁰ See <http://www.elibrary.mn/>

³¹ See http://www.itpark.mn/index.php?module=erdemten&m_id=37&sid=55&lang=mon&action=isForm

users makes for a compelling argument to adopt this system for the digital repository. It addresses the desires to make the repository both multi-lingual and to include a broad base of stakeholders and partners in its development. Other systems may prove more effective after further investigation, but at least in the initial phases of design, D-Space appears the frontrunner.

A corollary issue to forming a repository is whether there are opportunities to bind together disparate systems already in existence, such as the Science and Technology University's dissertation database, so that from a user's perspective moving from database to database appears part of a coherent and related set of information resources. D-Space and other open source content management systems offer possible solutions to the problem of creating a resource portal that complements the repository.

The repository alluded to in the first instance above should be thought of as offering digital resource creators a place to store their materials without having the need for specialized knowledge about how the technology works at the technical level. The resource portal alluded to in the second instance is a way of centralizing resources from the user's perspective, but still allowing organizations with their own technology systems to maintain direct supervision over all aspects of those systems. Any choice of software should allow for both of these options, and D-Space appears to offer this in a scalable and free package.

Standards and Copyright Issues

The issues of standards and copyright are massive. There are numerous organizations and government entities engaged in understanding their impact on digital projects and society as a whole. Engaging partners is an important aspect of addressing

these complex issues, because without communication there can be a tendency to duplicate efforts or adopt inappropriate systems.

In terms of standards, a conversation with digital collection specialists at the Library of Congress revealed that even that institution suffers from haphazard choices of standards for digital collections, decreasing interoperability of many collections.³² The Library of Congress is supposed to be the leader in establishing library standards in the US, so it is instructive to see even it struggles with these issues. Choosing the right standard for collections is an imperative, and it is important to be cognizant of the international standards available to choose from and the perils of proceeding without properly understanding them.

The software packages I described in the previous section all adhere to current international data preservation standards, so choosing an internationally developed program may mitigate several issues related to metadata and interoperability across platforms. However, there is also the issue of material preservation standards, such as the most appropriate resolution to scan certain kinds of materials. Centralizing knowledge about these issues through a consortium and digital repository may offer ways to avoid duplicating efforts and making inappropriate choices.

Copyright issues are even more complex and controversial. The Center for Public Domain and several University libraries such as Cornell University Library and University of Pennsylvania Library are places to begin to look for answers to these issues. There is also the growing movement inspired by the Creative Commons (www.creativecommons.org), a non-profit organization which is working to provide

³² Meeting with Timberly Wuester and Steve McCollun, Digital Conversion Specialists, Library of Congress. October 16, 2007.

individual authors and creators the ability to license their works with specific reference to how and when materials can be reproduced and used. The core leadership group in the consortium will need to consider, especially in light of any special Mongolian copyright laws, how best to approach copyright issues with regards to the distinct quality of a virtual repository. It is an issue that should potentially involve individuals or organizations with some knowledge of copyright issues (e.g. lawyers), and this is an area that may be the most difficult to find collaborative partners. It may also be one of the most important areas to do so.

In the initial stages of the project it may be important to focus on materials that have easily identified copyright licenses, and attempt to address issues of receiving permission to reproduce those items digitally. Moreover, the core leadership group should establish licensing standards, possibly modeled off the Creative Commons, to allow individual authors and creators to contribute to the repository with more flexible licensing agreements than the traditional “all rights reserved” licensing agreement. The involvement of the ACMS, which maintains permanent offices in the US and Mongolia, may offer an opportunity to adopt a Creative Commons or other similar licensing scheme for originally produced materials, such as research papers or audio files, because the ACMS falls under an already well defined legal jurisdiction, offering a de facto standard targeted specifically at digital intellectual property.

Workflow and Administration

The choice of technology should allow decentralized contributions and administration of the repository. It is important to establish a workflow and administration system to ensure that the repository continues to develop over time. I

suggest thinking of participants in the workflow and administration of the repository as creators, curators, administrators, specialists, and users.

Creators

Creators will be individuals or organizations producing particular digital resources. These might be photographs, scans, written material, audio or video files, or other items stored in digital form. Creators will produce the content for the repository.

Curators

Curators will be individuals or organizations with knowledge of materials and collections of materials that allow them to arrange and present those materials in meaningful and useful ways. A curator is a collection level manager, and creators may easily be curators of their own collections. For example, an independent researcher recording audio files of wildlife sounds might contribute his collection to the repository and also manage its presentation through assignment of descriptive metadata as the collection curator.

Administrators

Administrators will be individuals or organizations that maintain a global perspective on the repository and manage issues that cut across all collections. Administrators will come from the core leadership group, and they will establish and enforce the standards for the repository. The administrators will also play a crucial role in encouraging the contributions of creators and curators to the long term development of the repository through a combination of administrative and procedural systems, which will include methods for recognizing and rewarding contributions.

Specialists

Specialists will be individuals or organizations that contribute to the functioning and development of the repository in ways that are not completely specific to the repository itself. For example, a server administrator will not necessarily need to understand digital repository standards in order to contribute her skills to the maintenance of the hardware or software. Specialists will address many of the issues that are not library specific, such as hardware and software issues, copyright issues, and aspects of administration. Specialists will come from both local and international partners.

Users

Users will ultimately be the most important aspect of the repository. If no one uses the resources, then there is not much point in developing it in the first place. Establishing ways for users to provide feedback and to improve the delivery of services will be a crucial point to address as the project moves forward. Moreover, users will be the pool in which to find creators, curators, administrators, and specialists, so that users will again be a core constituency in establishing workflow and administrative systems.

The operating principles I outlined in the previous section are an important part of defining and then establishing a workflow and administrative system for this digital repository. The virtual library consortium members should make technology choices that allow individuals to contribute in ways that are decentralized and allow them to maintain an acceptable amount of proprietary control over their contributions, but also at the same time encourage the pooling and broadening of the repository's resources. The core leadership group of the consortium will have a leading role to play in fostering an environment in which these competing forces are balanced in an effective way.

Materials

The repository at its fundamental level will provide consortium members, as well as other transitory participants, pooled resources of hardware, software, standards, and contributors so that more emphasis can be put on the development of materials to offer to end users. For example, the Mongolian Press Institute initiated a project to digitally preserve newspapers spanning the early years of Mongolia's transition to a democratic and market based society. The project was funded by the Endangered Archives Programme at the British Library, and it is noteworthy because of its use of the open source software package Greenstone described in the last section. In about 18 months the project produced searchable copies of five years worth of issues from 45 titles totaling over 20,000 pages of Mongolian newspapers.³³

The interface for the database is not well formed or designed, and there are little signs here and there that the administrators of the Greenstone platform do not fully understand how to use the system. For example, web page titles that appear in the web-browser header read "Greenstone Digital Library Software" as opposed to "Mongolian Press Institute Newspaper Archive – Home."³⁴ This is something fairly easy to change, but it has significant implications for the accessibility of the website because search engines will index pages associated with Greenstone related keywords rather than with keywords more directly associated with the true content of the website. One may wonder how much effort was put into choosing the platform to make the archive accessible to a broad base of users, only to have it lost in the cacophony of information on the internet because of poor formatting.

³³ "Digital Librarian Lends Expertise to Mongolian Project." UWM Libraries Newsletter. Fall 2007, No. 52. Retrieved October 30, 2007. <http://www.uwm.edu/Libraries/Admin/fall07/records/features.html>

³⁴ See <http://www.pressinst.org.mn/elib/gsd/cgi-bin/library?a=p&p=home&l=en&w=utf-8>. Last retrieved 10/30/2007.

The existence of a uniform repository may have provided this organization, as well as other organizations or groups that have developed online resources, the ability to successfully deliver access to their resources without having to utilize limited funds and time to establish an independent delivery platform. While investigating different leads with regards to various projects that have been funded to digitally preserve Mongolian materials and artifacts, I discovered several examples of resources being put online for short periods and then going offline presumably for lack of funds or interest in maintaining the resources. An example is an Arts Council of Mongolia funded project entitled “Unique Mongolian Historical and Cultural Heritages Online,” in which the Cultural Heritage Center intended to digitize 200 cultural artifacts and develop an interactive website for children with lessons on the artifacts.³⁵ The website is no longer available on the Web, but it is possible to verify it once existed by using the “Wayback Machine,” which is an online archive of websites at www.archive.org.³⁶ Although the html files of the website are preserved in this archive, the digital artifacts are not. Where they are today is a mystery, and it is a shame that they are not available on the internet as the Cultural Heritage Center had originally proposed.

Materials are available already in digital form that could potentially provide some initial content for the repository. In addition, the establishment of the repository will mean in the future other organizations with a desire to preserve materials will be able to focus on preservation itself—not on the particulars of how to independently and expensively deliver the content to end users. Members of the virtual library consortium

³⁵ “ACM Organization Grantees 2004.” Arts Council of Mongolia. n.d. Retrieved October 20, 2007. http://www.artscouncil.mn/file/ACM_Organizational_Grantees_2004.doc

³⁶ The website URL is <http://www.mongolheritage.mn/>, and it was indexed by the “Wayback Machine” in March 2005, May 2005, and July 2005.

should be reminded that the long term benefit of pooling resources is offering more cost-effective development and stability to their digital collections.

Individual creators, too, can benefit from having a place to share materials without having to incur heavy expenses associated with establishing a system independently. This is the appeal of web-applications such as blogs. Individual authors can quickly publish their thoughts without having to be burdened with issues of format, design, and maintenance of the application. The digital repository should be no different.

Establishing a Mongolian Digital Repository

This paper is intended to map out broad strategies and ideas for establishing a virtual library consortium with the purpose of creating a universally accessible digital repository of Mongolian materials. The American Center for Mongolian Studies already has three potential collections in the pilot phase of development that will become part of a digital repository. Instead of pushing forward alone, I view development of these collections as great opportunities to share knowledge and broaden the base of support for further developing the depth and breadth of a digital repository.

The information gathered from the four models I introduced in section one suggest that the virtual library consortium will need to be established with a lateral or bottom-up approach in mind, in which partners in the endeavor provide what they can when they can to the numerous aspects of making the project work. The American Center for Mongolian Studies has some technical skill, connections to international communities, and it operates in Mongolian and English. But, it cannot do it all, and it needs partners to share in the burden, as do other local libraries, in order to reap the benefits of an aggregated repository of knowledge.

The guiding principle of this project shall be universal inclusion, and the vision I introduced at the beginning of this paper will not come to fruition if this principle is neglected or forgotten. The vision is to create a universally accessible digital repository of Mongolian materials, and with effective leadership, building and sustaining local and international partnerships, and strategic use of available tools and resources it is an attainable goal.

Appendices

*List of Libraries Participating in the ACMS Library Surveys*³⁷

Library of Mongolian State University of Education
<http://www.msue.edu.mn>

Library of the Academy of Management
<http://www.aom.lib.mn> (domain inactive)

Library of the National University of Mongolia
<http://www.num.edu.mn>

Resource Center of the Open Society Forum
<http://www.forum.mn>

State Central Library of Mongolia
<http://www.mnlibrary.org>

Natsagdorj Library of Ulaanbaatar City
<http://www.mcl.edu.mn>

National Central Archives of Mongolia
<http://www.pmis.gov.mn/archives>

United Nations Information Shop
<http://www.un-mongolia.mn>

Institutes of the Academy of Sciences
http://www.mas.ac.mn/en/index.php?option=com_content&task=category§ionid=8&id=22&Itemid=45

Library of the Institute of Finance and Economics
<http://www.ife.edu.mn> (primary domain)

Library of Mongolian University of Science and Technology
http://www.must-library.edu.mn/web-page/index.php?top_id=1&id=1
OPAC: <http://opac.must.edu.mn/>

³⁷ Source:

http://www.mongoliacenter.org/index.php?option=com_content&task=blogcategory&id=23&Itemid=100

Table 1. Mongolian Library Web Pages Appearing in 20 Results for Keyword Searches Using Google (Performed 10/23/2007)

Google Search	Mongolian Library	Mongolian Archive	Mongolian Research	Mongolian Digital Resources	Mongolian Digital Collection	Номын сан	Монгол Архив	Судалгаа шинжилгээ	Дижитал эх үүсвэр	Цахим эх үүсвэр	Монгол Фонд	Total
American Center for Mongolian Studies	X			X		X						3
Library of Mongolian State University of Education						X						1
Library of the Academy of Management												
Library of the National University of Mongolia						X					X	2
Resource Center of the Open Society Forum									X		X	2
State Central Library of Mongolia	newsletter reference			newsletter reference	newsletter reference	X						1
Natsagdorj Library of Ulaanbaatar City	X					X						2
National Central Archives of Mongolia												
United Nations Information Shop												
Central Library of the Academy of Sciences						X					X	2
Library of the Institute of Finance and Economics												
Chinggis Khaan University								X				1
Library of Mongolian						X						1

Table 1. Mongolian Library Web Pages Appearing in 20 Results for Keyword Searches Using Google (Performed 10/23/2007)

Google Search	Mongolian Library	Mongolian Archive	Mongolian Research	Mongolian Digital Resources	Mongolian Digital Collection	Номын сан	Монгол Архив	Судалгаа шинжилгээ	Дижитал эх үүсвэр	Цахим эх үүсвэр	Монгол Фонд	Total
University of Science and Technology												
E-library						X						1
Top Ranked for Term	American Center for Mongolian Studies	Wikipedia.org	Manchester Metropolitan University, Research Trip to Mongolia	Harvard University Digital Resources for Chinese Studies	University of Wisconsin Milwaukee Newsletter	UB City Library	Russian Movie Archive (?)		IT Park	MGL Community Web Portal	Mongol Medee	
	library description page of old website	naming conventions for the wiki in Mongolian	Advertisement for research opportunity in Mongolia								Newspaper	

Table 2. Mongolian Library Web Pages Appearing in 20 Results for Keyword Searches Using Yahoo! (Performed 10/23/2007)

Yahoo! Search	Mongolian Library	Mongolian Archive	Mongolian Research	Mongolian Digital Resources	Mongolian Digital Collection	Номын сан	Монгол Архив	Судалгаа шинжилгээ	Дижитал эх үүсвэр	Цахим эх үүсвэр	Монгол Фонд	Total
American Center for Mongolian Studies	X	X	X	X	indirect reference Wikipedia entry	X						5
Library of Mongolian State University of Education						X						1
Library of the Academy of Management												
Library of the National University of Mongolia												
Resource Center of the Open Society Forum									X		X	2
State Central Library of Mongolia												
Natsagdorj Library of Ulaanbaatar City						X						1
National Central Archives of Mongolia												
United Nations Information Shop												
Central Library of the Academy of Sciences												
Library of the Institute of Finance and Economics												

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Yahoo! Search	Mongolian Library	Mongolian Archive	Mongolian Research	Mongolian Digital Resources	Mongolian Digital Collection	Номын сан	Монгол Архив	Судалгаа шинжилгээ	Дижитал эх үүсвэр	Цахим эх үүсвэр	Монгол Фонд	Total
Chinggis Khaan University												
Library of Mongolian University of Science and Technology						X						1
E-library						X						1
Top Ranked for Term	Library of Congress Asian Reading Room	Word Document, Serguy Rechenko document	Charles River labs	Rossetta Project	Library of Congress Asian Reading Room	E-library	Dayar Mongol	mn.dgmarket .com	Migma computers	E-knowledge Campus	Mongol Wikipedia	