

Libraries in the Early 21st Century
Vol. 2

Libraries in the Early 21st Century

De Gruyter Saur

Libraries in the Early 21st Century

Volume 2
An International Perspective

Edited on behalf of IFLA by
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Introduction

There are 196 countries in the world in 2012¹ and all of them have schools, colleges, and universities to educate their children. Many countries in the western world and in developing nations have excellent educational institutions with good libraries to support their academic programs. There are many excellent public and special libraries also in some western and other nations. On the other hand, many developing nations are behind in their efforts to improve libraries and introduce technology in their libraries. Recession and bad economic conditions since 2008 have made a deep impact on the progress of libraries all over the world but poor developing countries have suffered more than developed nations. They are struggling to catch up to serve the needs of their population in this information age of the twenty first century. There are many reasons for the slow progress of libraries – including wars and uprisings – in countries of Africa, Asia and Middle East; this can be seen in countries such as Afghanistan, Egypt, Iraq, Libya, Mali, Rwanda, Somalia, Syria and other nations. A few developing countries including Argentina, Brazil, China and India have made efforts to improve their libraries and have introduced technology because they want to make progress and improve literacy rate in their countries.

Volume 2 of *Libraries in the Early 21st Century: An International Perspective* includes chapters from many countries of all continents. Authors have discussed the progress made by their libraries including introduction of technology in the information age for the benefit of their children, students, scholars and other citizens. They have also discussed the progress their libraries will make during the next fifteen years. It will help library leaders and political leaders of all nations to discuss the ways to bring equality of access to information in all nations in the twenty first century.

I want to thank all authors who took time to do research and wrote chapters for the book, my daughter Mohini Sharma for her help in editing the manuscript and two graduate assistants Divya Sudireddy and Swathi Komatireddy for their help in preparing the manuscript for publication. I also want to thank the publisher and Dr. Alice Keller, Editorial Director of the De Gruyter/Saur for their guidance and for providing the finishing touches to the manuscript and preparing it for publication.

It is a comprehensive book with first hand and up-to-date information on libraries of many countries from all continents. It will help students and faculty

1 “The Number of Countries in the World.” About.com, geography. <http://geography.about.com/cs/countries/a/numbercountries.htm>. Accessed April 24, 2012.

of library schools all over the world to learn, understand, and gain knowledge about the development of libraries in many countries. It will help librarians to learn more about libraries in other nations, their strengths, and weaknesses. It will also help librarians of all nations to work together in the global village to bring much needed improvements in libraries all over the world.

June 2012

R.N. Sharma, Ph.D

Part 1

International Librarianship

1.1 OCLC: A Global Cooperative

Jay Jordan

Introduction

The Online Computer Library Center (OCLC) is a nonprofit, membership computer library service and a research organization serving the needs of all types of libraries in the world. It is dedicated to the public purpose of furthering access to the world's information and reducing library costs.¹ More than 72,000 libraries in 170 countries and territories around the world use the OCLC service to locate, acquire, catalog, lend, preserve, and manage library materials.² In addition, "researchers, students, faculty, scholars, professional librarians and other information seekers use OCLC services to obtain bibliographic, abstract and full text information, when and where they need it. OCLC and its members cooperatively produce and maintain WorldCat the OCLC Online Union Catalog."³ This chapter will discuss OCLC and international librarianship in several ways.

First, the structure, governance, growth and strategic direction of the OCLC cooperative. It then takes a look at OCLC's partnerships around the world. Finally, it examines the growth in the materials cataloged by the OCLC cooperative and how those materials are being made available to users throughout the world.

The Structure and Governance of OCLC

OCLC was founded in 1967 by the librarian Frederick G. Kilgour and the presidents of Ohio's colleges and universities in the United States. OCLC's mission was then, and is now, to further access to the world's information and to reduce the rate of rise of per-unit library costs.

In 1971, OCLC began providing online shared cataloging services to 54 Ohio academic libraries. The service made it possible for only one library to have to originally catalog an item. Other libraries would use the same

1 *OCLC Annual Report 2010/2011*, Dublin, Ohio, 2011: ii. http://www.oclc.org/news/publications/annualreports/2011/214629_usb_Annual_Report_2011.pdf.

2 OCLC Homepage, <http://www.oclc.org/us/default.htm>. Accessed February 9, 2012.

3 *OCLC Annual Report*, 2011: ii. http://www.oclc.org/news/publications/annualreports/2011/214629_usb_Annual_Report_2011.pdf.

information to catalog their materials. The savings in time and money were enormous. Word about this innovation in cataloging spread quickly, first across the United States, and then to other countries. By 1979, the OCLC computer network had been extended to libraries in all 50 states and one library in Canada. Ten years later, OCLC was in 38 countries. By 1999, OCLC was in 86 countries. In 2009 OCLC participants were in 171 countries.

2011 marked the 44th year of the OCLC cooperative. The original 54 libraries in Ohio participating in the cooperative had grown to be more than 72,000 libraries in 170 countries. It is interesting to note that in the 2008 financial year, revenues from libraries outside the U.S. were 22.8% of total revenues.

In the 2011 financial year, revenues from outside the U.S. were 25% of total revenues. So, OCLC is indeed becoming more global, and the governance of OCLC is becoming more global as well. Academic libraries have been one of the drivers of this international growth. Indeed they are the largest segment in the OCLC membership.

OCLC has about 1,200 employees worldwide, of which about 750 are located in Dublin, Ohio, USA. The rest are in 27 offices in ten countries. It operates eight engineering centers in Australia, Germany, the Netherlands, and the United Kingdom, as well as in the United States. OCLC also has three data centers, one in Dublin, Ohio and another 15 miles away in Westerville, Ohio. A data center in Europe opened in 2011. Two more data centers are planned for Australia and Canada in the next two years “These centers will employ state of the art technologies to ensure high levels of performance, reliability, scalability and cost effectiveness. Each center will provide service 24/7 and will be backed up by uninterruptible power systems and redundant heating, ventilation and air conditioning systems. Moreover, the new centers will enable OCLC to comply with data privacy requirements around the globe.”⁴

OCLC’s governance structure has evolved with the growth in international participation. OCLC is a membership cooperative. From 1978 until May 2009, there were three parts to the governance structure. First, there are members – they are libraries that use OCLC services and contribute to WorldCat or share resources with others in the network. These members elect delegates to a Members Council, and the Members Council in turn elects six members of a 15-member Board of Trustees.

There were 66 delegates on the 2008–2009 Members Council, including 16 delegates from outside the U.S. Thirty two delegates from outside the U.S. have served on the Council since 1978. The Members Council met for the last time on May 17–19, 2009. They completed most of the transition to

4 “Global Data Centers” in *OCLC Annual Report 2010/2011*: 4. http://www.oclc.org/news/publications/annualreports/2011/214629_usb_Annual_Report_2011.pdf.

the new governance structure, which includes winding down the Members Council and implementing regional councils in the Americas, Europe, the Middle East and Africa (EMEA), and Asia Pacific. In April 2010, the new Global Council of 60 delegates convened at OCLC for the first time. There were 22 delegates from outside the U.S. on the first Global Council. The annual plan identified key areas in which the OCLC Global Council could productively advise OCLC's strategic direction and development of services including WorldCat quality and sustainability, communication within the OCLC cooperation, cost sharing principles and models, collaboratively building web scale with libraries and OCLC's web services, and WorldCat in the global information environment.⁵ There was a Virtual Meeting of the Global Council on June 17, 2011 which concluded that the Council had met its goals and concluded the year with good record of achievements. It was decided to hold face to face meetings in November 2011 and April 2012 for discussions and interactions. The OCLC Global Council is certainly the voice of OCLC members.⁶

OCLC is making steady progress toward its goal of becoming a global library cooperative. The development since 1979 has been remarkable and following dates are testimony to the progress.

- 1979 – first non-U.S. participant
- 1989 – participants from 39 countries
- 1990 – first non-U.S. Members Council delegate
- 1993 – first non-U.S. Board member
- 1999 – participants from 86 countries
- 2006 – participants from 109 countries
- 2006 – first non-U.S. Members Council President
- 2007 – first Members Council meeting outside U.S. in Quebec City, Canada.
- 2012 – participants from 170 countries.

The OCLC Board of Trustees is structured so that a majority of the trustees are librarians or leaders in the library community. Only five of the 15 are elected from fields outside librarianship. And with only two exceptions, the Board chairs have all been academic librarians. Larry Alford, Chief Librarian, University of Toronto, Canada is the current chair of the OCLC Board of Trustees.

The new OCLC governance structure is partially in response to the growth of the OCLC cooperative. In the last 10 years, OCLC has gone from 30,000 to 72,000 participating libraries. The number of participants outside the U.S. has

5 Younger, Jenifer A., "OCLC Global Council – The Voice of OCLC members" in *OCLC Annual Report 2010/2011*: 36. http://www.oclc.org/news/publications/annualreports/2011/214629_usb_Annual_Report_2011.pdf.

6 Ibid.: 36.

grown from 3,200 to nearly 12,000. The new governance structure took effect on July 1, 2008. It is designed to extend participation in the OCLC cooperative to an increasing number of libraries and cultural heritage institutions around the world. As discussed earlier, the Members Council has transitioned into the Global Council, and the regional councils are now going forward in Asia Pacific, in Europe, the Middle East and Africa, and in the Americas. Jan Ison of the U.S. served as the first president of the OCLC Global Council, Berndt Dugall of Germany is serving council's President from 2011–2013, and ChewLeng Beh of Singapore who at present is Vice President/President elect will succeed Mr. Dugall and become president of Global Council in 2013. The governance of OCLC is indeed going global!

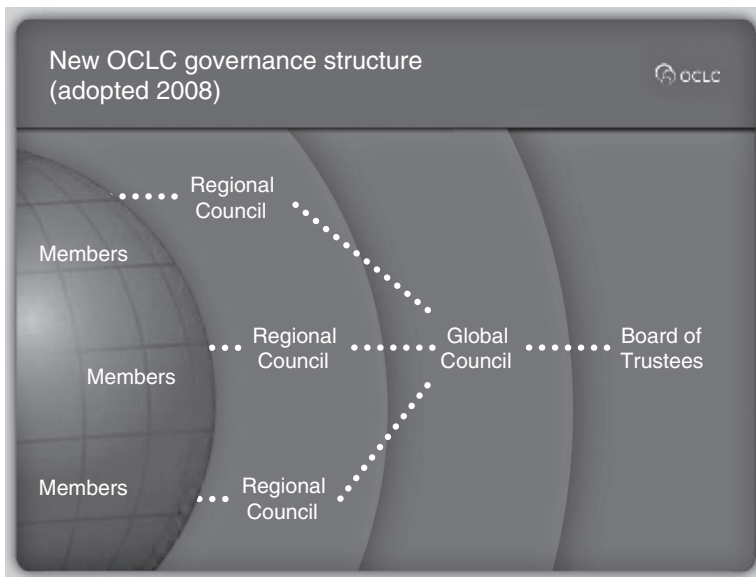


Figure 1: New OCLC governance structure: courtesy OCLC

OCLC's Strategic Direction

OCLC's strategic direction can be summed up as building web-scale for libraries and focuses on four broad objectives:

- create a compelling user environment
- make WorldCat Web Services a valued part of library operations
- increase OCLC's global relevance and position of trust
- create system-wide efficiencies in library management

These objectives complement each other. Together, they are taking the cooperative to the next-generation of OCLC services.

OCLC's first major initiative in creating a compelling user environment began in 2006 with WorldCat.org.

This search box made collections in OCLC member libraries visible on the Internet to people everywhere. The goal of OCLC is to have a person who is searching for information on the Internet using a search engine to end up in a library. WorldCat.org contains more than 531 million article records⁷ from sources such as the British Library, NLM, H.W. Wilson, MEDLINE, ERIC, GPO, and OCLC Article First. WorldCat has grown dramatically, and totals over 200 million bibliographic records and more than one billion holdings. And the number of records in languages other than English has also steadily increased, standing at 484 languages in 2011.⁸ WorldCat.org is experiencing steady growth, with millions of searches starting out on the Web and ending up in a library service. OCLC is clearly increasing the visibility of libraries on the Web.

It launched a pilot program in Canada and the United States in 2008 to bring WorldCat in to the mobile mainstream. It was extended to France, Netherlands, and the United Kingdom. Since its launch there have been 1.6 million views of WorldCat.org using more than 1000 mobile devices through June 2011. The most popular mobile devices used to access WorldCat.org were Apple iPhone, iPad, and iPod Touch, accounting for three-fourths of all views.⁹ A production version of WorldCat's local services optimized for mobile access was introduced in June 2011. It makes it possible for mobile users to discover items, see locations, shelf status, call numbers and levels of availability, place a hold, request the item or e-mail citations for content in their local libraries and in libraries worldwide. Any smart-phone or phone capable of running JavaScript or a Java-based Web browser, such as Opera Mini or Bolt, is supported.¹⁰ People can now use their mobile phones to access WorldCat Local, where 4G wireless downloads are 2,500 times faster than the original OCLC network. Wired networks are now 416,000 times faster.¹¹

OCLC developed the QuestionPoint virtual reference service with the Library of Congress and launched it in 2002. BiblioSés@me is another virtual reference service operated by French public libraries that uses QuestionPoint as its platform. Ask Scotland, a virtual reference service launched in June

7 Jordan, Jay, "To the membership" in *OCLC Annual Report 2010/2011*. Dublin, Ohio, 2011: 3. http://www.oclc.org/news/publications/annualreports/2011/214629_usb_Annual_Report_2011.pdf.

8 "WorldCat" in *OCLC Annual Report 2010/2011*. Dublin, Ohio, 2011: 14. http://www.oclc.org/news/publications/annualreports/2011/214629_usb_Annual_Report_2011.pdf.

9 "WorldCat Mobile" in *OCLC Annual Report 2010/2011*. Dublin, Ohio, 2011: 27. http://www.oclc.org/news/publications/annualreports/2011/214629_usb_Annual_Report_2011.pdf.

10 Ibid, 27.

11 "Year in Review: 40th Anniversary of WorldCat" in *OCLC Annual Report 2010/2011*. Dublin, Ohio, 2011: 8. http://www.oclc.org/news/publications/annualreports/2011/214629_usb_Annual_Report_2011.pdf.

2009, is based on Question Point. OCLC has also introduced the QWidget, which is a chat widget that gives libraries the ability to embed a snippet of HTML code throughout their Web pages and in a variety of environments such as Facebook or MySpace. The production version of the Web-scale management services (WMS) was introduced in 2010. In addition to Canada and the United States many libraries in Europe including the Netherlands and Norway have acquired the WMS.¹² In brief, OCLC is trying to take library services to where the users are and give them a compelling experience.

The second area of focus is Web services. Distributed services and Web services are technical terms that are resonating throughout the information industry. They are also part of OCLC's strategy to build Web-scale for libraries. OCLC has already implemented some Web services, such as xISBN, Identities and Terminologies. In 2008, OCLC invited a small group of developers from OCLC cataloging institutions in North America and Europe to use the WorldCat API, or Applications Programming Interface and become part of a Developers Network. This open-source, code-sharing infrastructure improves the value of OCLC data for all users by encouraging new Web Services use. The Developers Network has hosted two events for programmers and developers, one at New York Public and the other in Amsterdam. At each event they spent two days brainstorming and participating in coding mash-ups with a variety of systems and library services.

Frederick G. Kilgour founded the OCLC Office of Research in 1978, and it has been conducting research and sharing it with the library community ever since. OCLC Research staff has developed the work agenda, which includes managing the collective collection of the world's libraries, renovating descriptive and organizing practices, and architecture and standards. OCLC Research provides the OCLC cooperative with an infrastructure and interactive process for helping libraries, museums, and archives deal with the rapidly changing digital global community.

Since the merger of the Research Libraries Group (RLG) and OCLC in 2006, OCLC research scientists and RLG program officers have been working closely together on behalf of the library, museum, and archive communities. Titia van der Werf joined OCLC Research based in OCLC's Leiden office the Netherlands on January 1, 2012 as Senior Program Officer. She will coordinate and extend OCLC Research work throughout Europe and will have special responsibilities for interactions with OCLC Research library Partners there.¹³ Her appointment will further improve services and quality of OCLC Research.

There are currently 150 Research Library Partner institutions around the world. These institutions support the work of the Partnership through the payment of annual subscriptions and active staff engagement in a program of

12 Jordan, "To the membership" in *OCLC Annual Report 2010/2011*: 5.

13 Ibid.: 6.

work. Staff from the OCLC Research division coordinate and support the efforts of these affiliated institutions – libraries, archives, and museums committed to exploiting technology to make their collections accessible for research.

Virtual International Authority File

Another example of OCLC's global relevance and position of trust can be seen in a major international cooperative effort in the information age of the twenty-first century.

Virtual International Authority File (VIAF) was started in 2004 and the collaborative efforts of the Library of Congress, Deutsche National Bibliothek, Bibliothek National de France and OCLC Research will become an OCLC service in 2012. The Virtual International Authority File matches and links the authority files of national libraries and groups of all authority records for a given entry into a merged "Super" authority record. By linking disparate names for the same person or organization, VIAF provides a convenient means for a wider community of libraries and other agencies to repurpose bibliographic data produced by libraries serving different language communities.¹⁴ Thom Hickey, Chief Scientist of the OCLC Research is of the view that "VIAF has turned out to be a wonderful collaboration of major libraries around the world ... We expect VIAF to be an important feature in the infrastructure libraries depend on in the future."¹⁵ The long-term goal of the VIAF project is to include authoritative names from many libraries into a global service that will be freely available via the Web to users worldwide.

OCLC's Partnerships Around the World

In 2007, OCLC opened a representative office in Beijing, China. In 2005 Shanghai Library hosted the conference. In 2008, OCLC was host for the fourth China-U.S. Library Conference, which brought together 60 leaders from libraries, museums and archives in China and the U.S. for three days of presentations and meetings. It was an honor for OCLC to be able to host this prestigious scholarly conference. In October 2009 China hosted the fifth China-U.S. conference in Beijing. It was well organized and well attended.

The Jay Jordan IFLA/OCLC Fellows program provides early career development and continuing education for library and information science

14 "Virtual International Authority File" in *OCLC Annual Report 2010/2011*. Dublin, Ohio, 2011: 29. http://www.oclc.org/news/publications/annualreports/2011/214629_usb_Annual_Report_2011.pdf.

15 Ibid.: 29.

professionals from countries with developing economies. The program provides advanced continued education and exposure to a broad range of issues in information technologies, library operations, and global cooperative librarianship. Fellows participate in discussions with library and information science leaders, library visits, and mentoring programs. A total of 60 fellows from 33 countries have participated in the program since 2001.

The OCLC community is very proud of its association with IFLA and its presidents including Ellen Tise, who served as President of IFLA from 2009 to 2011. She also served as a delegate to the OCLC Members Council for three years from 2005–2008.

AMICAL is a consortium of 21 institutions of higher education located in 18 countries across Central and Western Europe, West and North Africa, the Middle East, Central Asia, and Russia. AMICAL is partnering with OCLC to offer consortial library services to participating members. AMICAL's development has been made possible through the generous support of the Andrew Mellon Foundation.

Facilitating the Discovery of Library Collections

OCLC's fourth area of focus is to create system-wide efficiencies in library management.

OCLC and Google are exchanging data to facilitate the discovery of library collections through Google search services. OCLC member libraries participating in the Google Book Search program may share their WorldCat-derived MARC records with Google to better facilitate discovery of library collections through Google. Links from Google Book Search to WorldCat.org will drive traffic to library OPACs and other library services.

Google shares data and links to digitized books with OCLC, making it possible for OCLC to represent the digitized collections of OCLC member libraries in WorldCat. This is another system-wide efficiency that benefits the entire cooperative.

Thanks to a new API released by Google in 2008, WorldCat.org users now have an easy, seamless way to view digitized books available in the Google Book Search collection, right on the WorldCat.org Web site. A Google Preview Button will appear in the record display when the text of a work – either excerpts for in-copyright works or full text for public domain materials – is available online. Visitors can click on the button to access the content within WorldCat.org via an embedded Google viewport. This is a great enhancement to the discovery process on WorldCat.org. Google's Book Search APIs represent an important advance in accessing the content scanned on behalf of libraries participating in the Google Book Search Library Project. Working together increases the presence of these libraries and their collections on the Web.

In 2000, ABES, the consortium of French university libraries, began using a CBS system developed by what was then OCLC PICA to build a French academic union catalog. It provides a French-language interface for both cataloging and interlibrary loans, was Unicode compliant and perhaps most significantly, is managed by ABES staff in Montpellier, France rather than OCLC staff in Dublin, Ohio, U.S.A.

WorldCat Growth

WorldCat has been creating system-wide efficiencies since August 26, 1971. As of June 30, 2011, WorldCat contained more than 235 million records and more than 1.74 billion location listings.¹⁶

In 2006, OCLC completed a four-year, \$100 million project to build a new technological platform, and all OCLC users have migrated to the new platform. The new technological platform consists of reusable components that can be embedded and integrated into local library applications. It supports not only MARC, but Dublin Core, FRBR, and other standards. Perhaps most important for international librarianship is OCLC's Unicode capabilities. This now supports 12 scripts: Arabic, Bengali, Chinese, Cyrillic, Devanagari, Greek, Hebrew, Japanese, Korean, Latin, Tamil, and Thai. This capability is key to involving more academic libraries around the world.

In 2008, OCLC batch-processed about 300 million records for loading of holdings into WorldCat. Overall, 34 national libraries have begun adding digital images, national files, and bibliographies to WorldCat by both batch loading and online contribution, exposing the richness of their collections to the worldwide library community.

In the 2011 financial year, libraries added almost 39 million records to WorldCat, bringing the total at June 30, 2011 to 235,822,950 records. It's interesting to note that it took the OCLC cooperative 31 years, from 1971 to 2002, to add the first 50 million records. WorldCat hit 100 million records in 2008, and since then libraries have added 135 million records. In February 2010, OCLC installed a new Automated WorldCat De-duplication system which has since merged some 7.1 million duplicate records. It must be added that the records added to the WorldCat go back to "Six millennia of records of recorded knowledge, from about 4800 BC to the present. A new record enters WorldCat every 1.2 seconds".¹⁷ It includes records in over 485 languages of the world, including English, German, French, Spanish, Japanese,

16 "Growth of Location Listings" in *OCLC Annual Report 2010/2011*, Dublin, Ohio, 2011: 15. http://www.oclc.org/news/publications/annualreports/2011/214629_usb_Annual_Report_2011.pdf.

17 "WorldCat" in *OCLC Annual Report 2010/2011*: 14.

Chinese, Russian, Portuguese, Persian, Hindi, Urdu, Greek, and many other languages. In addition it has 1.74 billion locations listings.¹⁸ In the 2011 financial year, WorldCat grew by 38.9 million records. Libraries used WorldCat to catalog and set holdings for 449.9 million items and arrange 9.6 million inter-library loan transactions. OCLC First Search Service users accessed WorldCat to conduct 58.0 million reference searches.¹⁹

Table 1: WorldCat records by format²⁰

Format	Total LC Records	Total Participants-input	Total LC-created Participants-input	Total Records
Books	7,951,474	179,696,532	1,773,954	189,421,960
Continuing Resources Format (serials)	656,480	8,653,049	53,536	9,363,065
Visual Materials	203,376	6,997,620	19,474	7,200,470
Maps	286,513	3,430,241	8,730	3,725,484
Mixed Materials	49,089	4,018,822	4,110	4,072,021
Sound Recording	333,724	8,039,789	64,044	8,437,557
Scores	100,219	5,479,080	56,759	5,636,058
Computer Files	9,567	7,933,787	2,981	7,946,335
Total	9,590,442	224,248,920	1,983,588	235,822,950*

*Reflects total unique records after duplicate detection resolution is complete

In April 2008, OCLC passed another landmark. There are now more records for materials in languages other than English in WorldCat than there are records for English language materials. WorldCat is indeed starting to resemble its name! As of June 30, 2011, there are 58.5% non-English records and 41.5% English languages records in WorldCat. Four hundred and eighty five languages are represented in the figures. It includes 14,089,964 e-books, 167,711,500 works, 235,822,950 manifestations (records) and the total physical holdings are 1,735,365,613. There are 53.8 million electric database records and 43.7 million digitalized local library content.²¹

18 "Growth of Locations Listing" in *OCLC Annual Report 2010/2011*, Dublin, Ohio, 2011.

19 Ibid.: 14.

20 *OCLC Annual Report 2010/2011*.

21 Ibid.: 14.

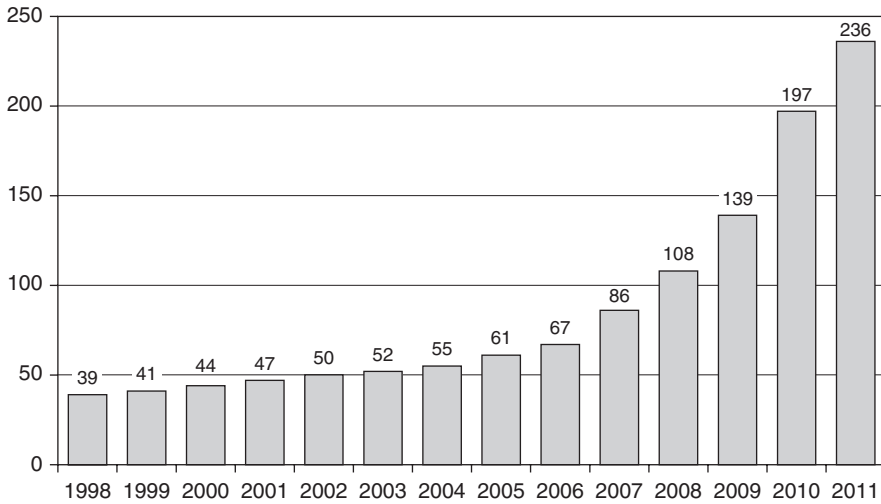


Figure 2: OCLC Annual Report 2010/2011: world growth since 1998

OCLC is building Web-scale for libraries, and it is being done on a global basis. Being a global library cooperative is not about exporting U.S.-based products.

OCLC's strategy is to leverage the knowledge, research, and experiences of its members around the world in order to build useful services, develop international standards, facilitate sharing of library resources and provide end-users with information when and where they need it.

As OCLC has become more global, academic libraries around the world have led the way. Effective globalization is localization on a wide scale, and localization is more than translation of interfaces. Effective globalization requires localization at every point of use. It is about providing access to non-English content. It is about building local alliances so that marketing, support, service, and market research is done locally. It is about joint development projects that utilize local technical resources. It is about partnerships to provide training and education with local language partners.

In 2008, JSTOR announced that it is going to be providing content free of charge to libraries in Sub-Saharan Africa now there is public domain data in WorldCat.org with links to Google Book Search and mobile phone access.

New WorldShare Platform

OCLC has released a new platform that will let its member libraries create, configure, and share a growing number of new services and web-based library applications. The new OCLC WorldShare platform, a shared technical infrastructure, will serve as the host for OCLC WorldShare management services

asa significant expansion of the Dublin, Ohio-based nonprofit's Web scale management service that was launched on July 11, 2011, after a year of testing by early adopters.²² OCLC WorldShare provides a web-based platform for collective innovation with shared services, integrated applications, and streamlined approaches to managing library work flows. In combination with WorldCat, WorldShare will support the work of libraries of all types to collaborate in new, more efficient ways, reduce operating costs, and provide greatly enhanced user experience. WorldShare helps world libraries connect in new ways to operate, innovate, and collaborate.

Conclusion

Forty years after the start of online cataloging and the WorldCat database, member libraries all over the world and OCLC are still innovating, still exploring, still working together for the public good. The OCLC cooperative continues to be a grand experiment in global library cooperation. Working together, thousands of catalogers and librarians around the world have created an incomparable library resource for research and education.

22 Eberhart, George M. "OCLC Launches New World Share Platform" *American Libraries* 43 (January 2012): 18. http://americanlibrariesmagazine.org/news/12052011/oclc_launches_new_Worldshare_platform.

1.2 From ALA to IFLA: A Primer on International Librarianship

Robert Wedgeworth and R.N. Sharma

Introduction

Libraries have been part of the human civilization for centuries but their growth has been very slow in many countries for various reasons including illiteracy, wars, poverty, shortage of funds, and national policies. Until recently a majority of libraries in the world developed collections and stored them in the four walls of library buildings for the use of their patrons. There was very little cooperation among libraries within nations or beyond borders. Librarians and libraries had little interest in international librarianship until the twentieth century. In earlier times, many scholars visited well known libraries to learn and to do research. The famous libraries of the ancient world included the Taxila University and Nalanda University of India during the 700s BC and fourth century respectively and the Alexandria Library of Egypt in 297 BC. During the first quarter of the twentieth century, a few American and British librarians visited developing nations to guide librarians and libraries. They included Asa Don Dickinson and W.A. Borden of the United States and A.C. Woolner of the United Kingdom. There was no library association to push for international cooperation and development in the field of librarianship until 1926.

International Federation of Library Associations and Institutions (IFLA)

The IFLA is the oldest and largest association in the world devoted exclusively to the advancement of library and information activities. It is an independent, non-governmental organization based in The Hague, Netherlands, and holds consultative status in its area of expertise with UNESCO. It has regional offices in Pretoria, South Africa for African libraries and librarians, Singapore for Asia and Oceania, and Ciudad Universitaria, Mexico for Latin America and the Caribbean. Its members include library associations, corporations, libraries, and interested individuals.

The three pillars of IFLA activity adopted in 2004 are societal involvement, professional advancement, and membership benefits (www.ifla.org).

The IFLA's societal involvement includes its Freedom of Access to Information and Freedom of Expression (FAIFE) program, Copyright and Legal Matters (CLM) Program and its advocacy work within the World Summit on the Information Society (WSIS). Its professional advancement activities include Action For Development Through Libraries (ALP) program and its Preservation and Conservation (PAC) program for deteriorating library materials. Since 1994 the IFLA has involved its members directly and electronically in its conferences, workshops, and publications programs. These are the primary membership benefits, many of which are available to non-members as well.

The IFLA was formed in Edinburgh, United Kingdom on September 30, 1927, by a few European and American librarians led by Gabriel Henriot of France.¹ Thus a world union of library associations was formed for the first time in the history of librarianship. It had a small membership but bright future. Its first annual conference was held in Rome, Florence, and Venice in Italy in 1929. By 1939, only 41 countries including China, Egypt, India, Japan, Mexico, Palestine, and Philippines had joined IFLA.² Earlier in 1936 both China and India wanted to host the annual conference of the world organization but due to lack of funds, the IFLA decided to stay in Europe rather than go to Asia.³

The IFLA was not able to function during World War II but restored its activities in 1947 at Oslo, Norway with the help of a contribution of \$9,000 from the Rockefeller Foundation of the United States. This meeting was also attended by delegates from the International Federation for Documentation (FID) and the United Nations Education Scientific and Cultural Organization (UNESCO). An historic agreement was signed at this conference between IFLA and UNESCO for cooperation and financial help from UNESCO to the IFLA on a regular basis including for the IFLA's programs, meetings, and specific assignments.⁴ Both organizations agreed to "Further by all possible means the greatest freedom in the distribution and the exchange across national frontiers of publications, other materials of libraries [and] information about publications, etc."⁵

The IFLA was still dominated by European and North American librarians and library associations and was not a world association in the true sense. It did have problems attracting membership from poor and developing nations. Therefore, Pierre Bourgeois, President of the IFLA from 1951–1958, turned to S.R. Ranganathan of India for help. He was a true world librarian and the leader of the profession during 1950s and 1960s. Ranganathan suggested

1 Campbell, Harry C.: "IFLA's First Fifty Years: A Reprise." *IFLA Journal* 28(3) (2002): 107–117.

2 Ibid.: 109.

3 Ibid.: 109.

4 Ibid.: 111.

5 "A Brief History of IFLA 1927–2002." URL: www.ifla.org/III/75ifla/75index.htm. Accessed April 9, 2012.

that librarians from third world countries be given more responsibilities within the association and be appointed on to major IFLA committees including the Executive Board.⁶

He emphasized that it is very important to have cooperation and contributions of librarians from all countries to have a truly solid international library association. His suggestions did have an impact on the IFLA, and a few much needed changes were introduced for the benefit of international librarianship.

In 1976, libraries were allowed to enroll as institutional members of the association and its name was changed to the International Federation of Library Associations and Institutions (IFLA).⁷ In 1976 for the first time even individuals were allowed to join the IFLA as personal affiliates but without voting rights. "Commercial sponsors from business and information industry (known as corporate partners from 1999) were also admitted as members."⁸ There were certainly quantitative as well as qualitative changes in the IFLA during the last quarter of the twentieth century. It helped to attract more members from African and Asian nations including China, South Africa, Indonesia, and Malaysia. Else Granheim of Norway was elected as the first woman president of the IFLA in 1979 and served until 1985.⁹ The IFLA started holding its annual conferences outside Europe and North America under her leadership. Conferences were held in Manila, Philippines in 1980 and Nairobi, Kenya in 1984. Since then Delhi, India; Havana, Cuba; Istanbul, Turkey; Beijing, China; Bangkok, Thailand; Jerusalem, Israel; Buenos Aires, Argentina; San Juan, Puerto Rico in North Eastern Caribbean; Seoul, South Korea; and Durban, South Africa have hosted IFLA conferences. Singapore will host the conference in August 2013.

It helped librarians from host countries of third world and neighboring countries to attend IFLA conferences and have a first-hand experience of true international librarianship.

Christine Deschamps of France served as President of the IFLA from 1997–2003, followed by H. Kay Raseroka of Botswana. She was the first librarian from Africa to lead a true world library association from 2003–2005. Ellen R. Tise of South Africa was President of the IFLA from 2009–2011. The current president of the IFLA, Ingrid Parent of Canada, will serve from 2011–2013. She will be succeeded by Sinikka Sipila of Finland in 2013 and she will serve until 2015.

The IFLA's efforts to reach poor and developing countries were appreciated when it introduced a new program entitled "Advancement for Librarianship in

6 Ranganathan, S .R.: "IFLA-What it should be and do." *Libri* 5 (1954): 182–189.

7 Ibid.: 184.

8 Campbell, Harry C.: "IFLA's First Fifty Years: A Reprise." *IFLA Journal* 28(3) (2002): 114.

9 "75 years of IFLA." URL: www.ifla.org/III/75ifla/75index.htm.

the Third World” in 1986.¹⁰ It has helped to improve libraries, librarianship, and librarians in a few developing countries. Since the 1980s, the IFLA has paid attention to many other important aspects of international librarianship including copyright, freedom of access to information, preservation and conservation, international library lending, and standardization of bibliographic activities.¹¹ In 1993, the IFLA introduced a new IFLA link called “IFLANET” to keep its members and others informed about the activities of the association. It has certainly become a very successful and major tool for the operation of the federation.¹² English, French, Arabic, Chinese, German, Russian, and Spanish are the official languages of the IFLA. Members of the association “are entitled to express themselves in these languages at conferences, in meetings of professional and governing bodies and in correspondence to IFLA HQ. Within the limits of its resources, the IFLA provides official communications and form letters in these languages. The IFLA provides abstracts in these languages of articles published in the IFLA Journal. The IFLA attempts to provide interpretation of conference sessions in these languages, and to respond to correspondence addresses to IFLA HQ in these languages”.¹³ The IFLA has language centers in Alexandria, Egypt for Arabic; Beijing, China for Chinese; Dakar, Senegal for French in Africa; and Moscow, Russia for Russian.

“IFLA is the leading international body representing the interests of library and information services and their users. It is the global voice of the library and information profession.”¹⁴ At present, it has over 1500 members from 150 countries. It is an independent, international, non-governmental, not-for-profit organization with aims to promote high standards of provision and delivery of library and information services, encourage widespread understanding of the value of good library and information services, and represent the interests of IFLA members throughout the world.¹⁵

“The General Assembly of Members is the supreme governing body, consisting of delegates of voting Members. It normally meets every year during the annual conferences. It elects the President and members of the Governing Board. It also considers general and professional resolutions which, if approved, are usually passed to the Executive Committee and the Professional Committee for action as appropriate. The Governing Board is responsible for the managerial and professional direction of IFLA within guidelines approved by the Assembly. The Board consists of the President, the President-elect, 10 directly elected

10 Campbell, Harry C. “IFLA: Library Universality in a Divided World.” *IFLA Journal* 28(3) (2002): 118–135.

11 Ibid.: 119.

12 Ibid.: 119.

13 “Language Policy/IFLA.” URL: <http://www.ifla.org/language-policy>. Accessed March 12, 2012.

14 “More about IFLA.” URL: <http://www.ifla.org/en/about/more>. Accessed March 12, 2012.

15 Ibid.

Members [...] and 6 indirectly elected members of the Professional Committee [...], and the Chair of the Management of Library Associations Section.”¹⁶ The IFLA has certainly done a very good job of bringing librarians and libraries of world together to discuss various issues of international librarianship, and address needs of the profession. The American Library Association has been the IFLA’s major partner and supporter since its birth in 1927. It sends a large delegation to IFLA conferences every year. Many American Librarians serve on IFLA committees and present papers at IFLA conferences.

The American Library Association (ALA)

The American Library Association is the largest and oldest library association in the world with over 62,000 members in 2012. It was founded in 1876 in Philadelphia by Justin Winsor, Charles Ammi Cutter, Melvil Dewey, and others. “The Association has worked throughout its history to define, extend, protect and advocate for equity of access to information.”¹⁷ The ALA advocated for equal library service for all and passed an amendment in 1961 making it clear that individuals should not be denied library use because of race, religion, national origin, or political views.¹⁸ The Freedom to Read Foundation was created by ALA’s Executive Board in 1969, and the Black Caucus of the ALA was started in 1970.¹⁹

“ALA membership is open to any person or organization, though most of its members are libraries or librarians. Most members live and work in the United States, with international members comprising 3.5% of total membership.”²⁰ The ALA is governed by an elected council and an executive board. Policies and programs are administered by various committees and round tables. The official purpose of the association is “to promote service and librarianship”.²¹ *American Libraries* and *Booklist* are two magazines published by ALA. The association and its divisions hold the annual and midwinter meetings every year in different cities of the United States. “The ALA annual conference is notable for being one of the largest professional conferences in existence, typically drawing over 25,000 attendees.”²²

A committee on international cooperation was appointed by ALA in 1900 and its International Relations Office (IRO) was opened in October 1942 in

16 Ibid.

17 “American Library Association.” URL: http://en.wikipedia.org/wiki/American_Library_Association. Accessed March 13, 2012.

18 Ibid.: 2.

19 Ibid.

20 Ibid.: 3.

21 Ibid.

22 Ibid.: 5.

Washington, D.C with the help of a grant in the amount of \$101,000 from the Rockefeller Foundation. Both the U.S. State Department and the Rockefeller Foundation made grants to the IRO between 1942 and 1947 to supply library science literature to libraries overseas under the Books for Foreign Libraries project, and invite foreign librarians to the United States for study and observation of American library methods. The International Relations Office also served as an Information Center on professional matters to libraries all over the World.²³ The office was closed in 1947 and there was no further activity in the area of international librarianship until 1956.

The American Library association received two major grants from Rockefeller Foundation and the Council on Library Resources in the amount of \$491,350 and \$117,574 in 1956 and 1961 respectively. It helped in the reestablishment of the International Relations Office in Chicago (ALA headquarters), as well as in Washington, D.C. Both offices functioned actively during 1956–1971. Since 1972, the office has functioned with limited staff to help the International Relations Office and its activities.

The International Relations Committee (IRC) of ALA meets twice a year to discuss matters of interest to international librarianship. The Committee usually passes a few resolutions to support development or condemn human rights violations or wars, and honors a librarian every year for his/her contributions to librarianship. ALA also has an International Relations Round Table (IRRT). These active groups organize a few programs every year including a reception for foreign librarians attending the ALA annual conference. Many American libraries serve on various committees of the IFLA and present papers on many aspects of librarianship every year. Meetings and other activities of the IRRT are aimed at involving librarians in international work. Many foreign librarians attend ALA annual conferences and present papers on international librarianship. The IRC, on the other hand, advises the ALA on policy matters and often engages in discussion on issues and trends in international librarianship. The ACRL Slavic and Eastern European section is a specialist group focusing on library activities in that part of the world. The International Relations Committee of ACRL/ALA has also been very active in promoting international librarianship. It was instrumental in inviting four presidents of IFLA to speak at its meetings in recent years.

Global Forces

At the end of World War II in 1945, the U.S. was the wealthiest and most powerful country in the world. Most areas of the world welcomed charitable educational and cultural assistance from this country. However, there are many

23 Correspondence from International Relations Office/ALA, March 7, 2007.

more sources of charitable and educational assistance, during the twenty-first century available to librarians interested in international librarianship including from developing countries. Although most former colonies have become independent nations, trade and cultural ties still bind former French and British colonies to France and the U.K. Some years ago during a lecture at a Nigerian university a student asked Robert Wedgeworth “Are American universities as good as those in Britain?” Since the question was in the context of long-standing political and cultural ties between the U.K. and Nigeria, the response was, “it depends on the course of study, but a look at the home institutions of Nobel Prize winners may provide a clue!”

In addition to trade and cultural ties, for the foreseeable future, economics and technology will be the dominant forces driving library development, especially in developing countries. Investments in basic technology infrastructure and training to accelerate the use of information and communications technologies to address health, education, and business needs are among the most frequently requested types of assistance. Libraries are increasingly recognized as important “early adopters” in the drive to spread the use of information and communications technologies. The advent of integrated library systems (ILS) and the development of public advocacy programs in the United States have greatly increased opportunities to engage in international library development in countries that wish to introduce or expand these programs. UNESCO, the World Bank, individual countries as well as private foundations like the Bill and Melinda Gates Foundation and the Carnegie Corporation are prominent in funding all of these types of projects.

ALA and IFLA

Robert Wedgeworth’s involvement with the International Federation of Library Associations and Institutions (IFLA) came after he became ALA Executive Director in 1972. He attended the IFLA Conference in Grenoble, Switzerland in 1973 and observed that there were very few Americans participating in the conference. At that time IFLA was a small, mostly Western European association with a sprinkling of participants from Africa, Asia, and Latin America. He had considerable experience in international library activities, but it had been exclusively related to the acquisition and exchange of library materials, through international contacts with library exchange partners and international booksellers. During the 1970s, the booksellers used to be a principal interface between U.S. librarians and their international counterparts.

However, at the Grenoble Conference, it was not difficult to recognize that if American librarians were to play a more prominent role in international library activities, IFLA was the arena for it. Aided by Bob Vosper, IFLA’s first Vice President and Director of the UCLA Libraries, and by Leo Weins, President of the H.W. Wilson Co. and a prominent sponsor of IFLA, Wedgeworth became

acquainted with the influential leaders in IFLA. Upon return, it was recommended to the ALA leadership that American librarians should become more active in IFLA to reflect the influence ALA has on library activities worldwide. The growth of ALA's influence and involvement in IFLA led to Wedgeworth's election as President of IFLA in 1991 and re-election in 1995. It was only the second time in the 64 year history of the IFLA that an American was elected as President of the Association.

Challenges of International Librarianship

We live in a world of over seven billion people, where almost a billion adults, mostly women, lack adequate literacy skills to function in a modern society; in a world in which there is a vast divide separating the "haves" from the "have-nots;" in a world in which there are increasing restrictions on access to information even as the media saturates us with it; and in a world where the new frontier is the Internet where balancing the rights of copyright holders with the right to access to copyrighted works by users raises complex difficulties; despite all this, there is an enormous set of opportunities for librarians and information specialists.

Adult and children's library specialists are sorely needed to assist as developing countries expand access to libraries as a basic component to advancing literacy levels. Systems specialists are in high demand to assist in the acquisition and installation of local and national ILS programs. Training librarians to understand and support international guarantees for access to information and freedom of expression is a major challenge. Training in library advocacy at local regional and national levels is increasingly in demand. There are also many opportunities to observe how library and information services function in other countries.

Benefits of International Librarianship

Involvement in international library activities certainly expands personal knowledge and skills. It broadens professional and social networks and exposes you to other languages and cultures. It strengthens the global network of libraries and individual professionals in addressing critical needs. But most of all, it can lead to a lifetime of fulfilling accomplishments.

As we move increasingly into a multicultural, asynchronous, global library community it will require renewed efforts, new technical competencies and abilities to navigate uncharted waters. New and exciting adventures await those who are prepared to assess new opportunities, who focus more on the journey than on the destination, and who readily acknowledge that they have as much to learn as they have to teach.

Conclusion

In the information age of the twentyfirst century, it is easier for librarians to get involved in international librarianship. It is important to join IFLA to learn, work as a team with professionals from other countries through committees, attend annual conferences, present papers, and interact with IFLA members from 150 other countries. It will make all willing librarians better professionals and strengthen the profession of international librarianship. The Jay Jordan/IFLA/OCLC Early Career Development Fellowship Program can help young librarians from developing countries to get involved in IFLA. It introduces fellows to many issues in information technology and many aspects of global cooperative librarianship. The program was started in 2001 and has been very successful. Sixty six fellows from the libraries of 33 developing nations have been trained under this program.²⁴

“The destiny of librarians and libraries lies in the hands of library and information professionals and through regional and international cooperation. We will be able to shape it for the better. The greatest excitement of the future is that we can shape it.”²⁵ Getting involved in IFLA will certainly help all librarians to achieve the goal of making IFLA a true international library association in the twenty-first century with membership from all countries of the world. Cooperation and joint efforts of library associations, library leaders, and librarians from all nations can help to achieve the goal in the near future.

24 “The Jay Jordan/IFLA/OCLC Early Career Development Fellowship Program.” URL: <http://www.oclc.org/community/careerdevelopment/fellows/default.htm>. Accessed March 14, 2012.

25 “International Librarianship and International Cooperation. A reality or erroneous Belief.” URL: <http://www.kmafrica.com/blog/International.librarianship.and.International.Cooperation.A.reality.or.erroneous.belief%3F>. Accessed March 13, 2012.

1.3 Technology Enabling Universal Access to World Heritage: Implications for Libraries¹

Ching-chih Chen

Introduction

From 2002–2006, the NSF/International Digital Library Program (IDLP) supported a major global digital library of cultural, historical, and heritage image collections, called *Global Memory Net (GMNet)*, directed by Dr. Ching-chih Chen. It was launched for universal access in late 2006 at <http://memorynet.org>. This gateway to world culture and heritage was and continues to be very well received and with very little marketing effort and banking on the power of the Internet, members of the general public and scholars from over 4,192 cities in 142 countries have used the site (see Figure 1 for the homepage of GMNet) in the past five years.

The success of *GMNet* with its flexible and powerful Linus-PHP-MySQL i-M-C-S (integrated Multimedia Content-based System) prompted a partnership with UNESCO's World Heritage Center (WHC). This partnership, under the leadership of Dr. Chen, with a multi-year Memorandum of Understanding (MoU), was signed between WHC and Simmons College, Boston, Massachusetts, USA in November 2006.

This MoU is a fitting display of WHC's interest and enthusiasm in the research and development activities of Dr. Chen. It has led to the development of *World Heritage Memory Net (WHMNet)* since 2007, which provides universal access to the World Heritage Sites in a way not possible before. "The World Heritage Center considers this an important project with great potential to enhance the humanities for universal access and enrichment through the use of emerging technologies," commented Francesco Bandarin, Director of the WHC in 2007.

¹ The World Heritage Memory Net is a mega-project in partnership with UNESCO's World Heritage Center started in 2007. It has been a topic of numerous keynote and invited speeches given by the author in various parts of the world. This article covers much of the basic background information from these talks given by the author in the last two years. Several of the most recent ones are listed in footnote 4.

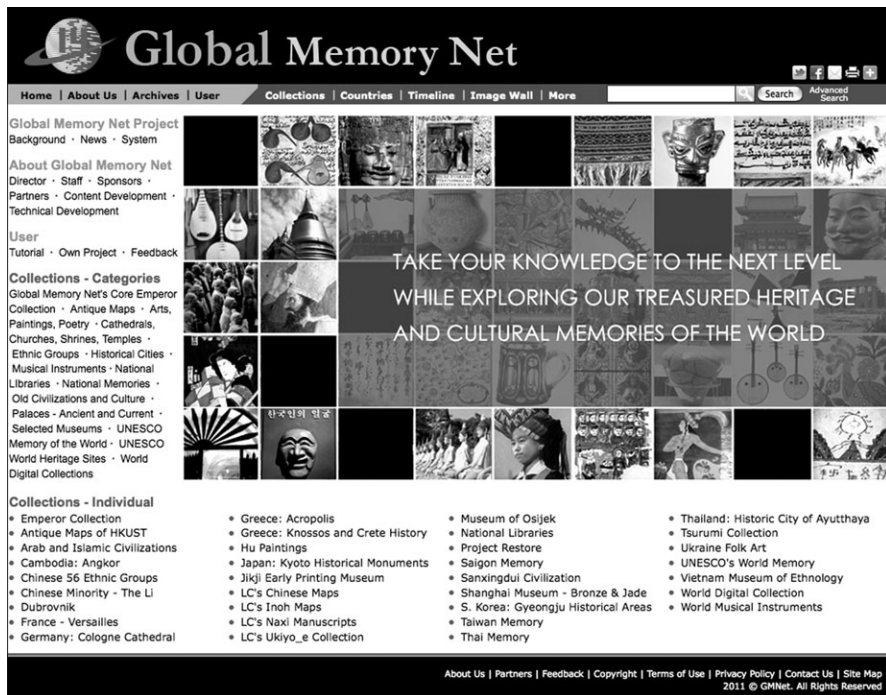


Figure 1: Current homepage of *GMNet*

The *WHMNet* leverages the results of previous highly successful multi-year R&D projects supported by the US National Endowment of Humanities on the development of interactive videodiscs in presenting an incredible period of Chinese history (the period of the First Emperor of China) in the mid-1980s to early 1990s and by the US National Science Foundation from 2002 in using innovative multimedia technology developed for *Global Memory Net* (*GMNet*). We expect that *WHMNet* will reach a much greater global audience with its much enhanced multimedia and multilingual capabilities, as well as its new approaches in engaging users. *WHMNet* hopes to enhance the humanities for universal access and enrichment through World Heritage Sites by using cutting-edge information technologies, and thus contribute to the promotion and awareness-raising of the UNESCO's 1972 Convention.

With intensive R&D efforts extending capabilities far beyond those of the *GMNet*, *WHMNet* was officially launched on April 29, 2011², which has greatly promoted a better knowledge of World Heritage properties and increased awareness of everyone's duty to protect them.

2 For UNESCO World Heritage Center's news on *WHMNet*, see <http://whc.unesco.org/en/news/740>.

This paper will provide an overview of what is now an invaluable web-based knowledge base on World Heritage with immeasurable potential, which hopes to motivate more dynamic and digital activities of a similar nature among libraries, archives, and museums. The conceptual ways of presenting multilingual and multimedia information will have considerable implications for libraries, which we hope to further elaborate.

How Does *WHMNet* Work?

With limited amounts of time and space, it is difficult to provide an adequate overview of such a huge project. Thus, only the bird's eye view can be provided in the following with the help of abundant graphics. "A picture is worth a thousand words," thus the graphics will help us to decrease substantially the detailed narratives, and to enhance readers' conceptual appreciation of the kind of information access this flexible system is able to provide and which is not possible elsewhere.

Currently, initial multimedia and multilingual data of all 936 sites as of July 2011 have been processed and uploaded to our server. The current MySQL database already consists of over 15,000 records in about 103 languages and 41,550 images of these 936 sites. In addition, there are many videos, some sound tapes, and many unique document files.

Figure 2 shows the current homepage of *WHMNet*. This graphic, together with that of Figure 1, can serve as good PowerPoint slides showing most of the multimedia and multilingual cultural and heritage resources that are available for instant access at a simple click of the mouse.

Our web-based knowledge base aims at providing users with an incredible general experience first. As already stated, while we have enormously rich multimedia resources, we don't want our users to access them only through a stiff and inflexible traditional database approach. Thus, for exploring our amazing world on this *World Heritage Memory Net* site, we want to engage our users from the very start, making them look first at what we have and what we can provide them. We want their first experience to be immersive and exciting, leading them to explore further, and gain more knowledge of this world on their own. This made interface design a very challenging task.

To achieve this, the current homepage invites users to explore their world heritage by offering them an overview of the many features of the Site. They are able to see, explore, and discover the world through at least four different very visually oriented approaches, specifically highlighted in the center column of the homepage.



Figure 2: Current homepage of *WHMNet*

1. Videos – we have created 27 introductory videos of various lengths, which offer sample images by region or country from our sites so that the users can instantly be visually attracted to whatever they choose to see and enjoy first. By viewing the videos, users also gain knowledge on names and keywords of various sites. For each site, we provide two to three images.
2. 360 degree panophotographies – we are able to provide users truly immersive and interactive experience of about 270 World Heritage Sites in collaboration with Tito Dupret of <http://patrimonium-mundi.org>. Users feel that they are physically there!
3. Maps – our users can pan over the entire world and visualize the density of World Heritage Sites in different parts of the world with indication of categories (cultural, natural, mixed, and sites in danger), as well as select any particular one for quick viewing.
4. Timeline – the 936 World Heritage Sites of the 153 countries are locatable by a timeline of their existence extending from the late centuries BC to the present, except for those natural sites which have existed for millions of years. Again, one can select any particular one for quick information.

After these explorations and discoveries, one can then zero in for more specific information on any chosen World Heritage Site of interest. This is very much

in line with what was expressed at a keynote speech of Ben Shneiderman delivered at a *humanities+digital: visual interpretations* conference, May 20–22, 2010 and organized by *hyperstudio* at MIT. Shneiderman said that the Visual Information Seeking mantra – overview first, zoom and filter, then details-on-demand – was a compact way of conveying the lessons from designing interactive exploration tools for statistical data. But this principle turns out to be broadly applicable to a range of information searching situations.³

Navigable Information Accessible on the Homepage

One can see from the current homepage (Figure 2) that all 936 sites can be accessed collectively or by site/region/continent/country from both the top navigational bar as well as from a listing on the left navigational panel. The right panel provides news, a Site of the Day, forthcoming research activities such as visualization, and current searching activity by means of a tag cloud which is linked in real-time to the terms most frequently linked to the searches performed by the users at that time.

In addition to providing background information about *WHMNet*, its development, history, staff and archival information, the left panel's main focus is on providing quick access to the World Heritage Sites by region, country and sites by designated type. For example, when one chooses "The World" under the regions category on the left panel, the next screen shows the 153 countries with available World Heritage Sites alphabetically listed on the left column of screen, as shown in Figure 3, and all 936 sites which the World Heritage Committee considers as having outstanding universal value are arranged alphabetically on the center column of Figure 3.

This page also includes a geographical map of the 936 sites, based on UNESCO/WHC's classification, which are classified as:

- Cultural – 725 sites (marked with yellow dots)
- Natural – 183 sites (marked with green dots)
- Mixed (both cultural and natural) – 28 sites (marked with half yellow and half green), and
- Heritage In Danger – A few of the above combinations (marked in red dots are sites in danger).

Thus, the World Heritage Sites are appropriately indicated with symbols of the types of sites on the map as shown in the right column of Figure 3. On the map, one can move the pane horizontally left and/or right to view all the sites in the

3 Shneiderman, Ben. "Visual Overviews for Cultural Heritage: Interactive Exploration for Scholars in the Humanities, Arts, and Beyond," a keynote speech given at the *humanities+digital: visual interpretations conference*, May 20–22, 2010, organized by *hyperstudio* at MIT. p. 15 of the *Meeting Program*.

world, or select any specific site for further exploration. One can also go to the map for the full-screen geographic view.

It is worth mentioning that the World Heritage Committee meets each year in late June to decide on new sites to be inscribed. Thus, it is expected that in early July each year, there will be additional sites to be added, and we shall make every effort to include them as soon as possible.



Figure 3: World Heritage Sites of 153 countries are shown by country, name of site and geographical map

A Quick Glimpse of the World Heritage Sites

If one has no idea what information he/she can expect to find on the 936 sites in the world, then the two buttons – “Image Gallery” and “Random Images” under the Map of Figure 3 can be of great help to the user. “Image Gallery” will bring out all the 41,550 images of these 936 sites currently available on the server in the order of image acquisition or organization, as shown in Figure 4. Browsing these many images from one page to the other with each page (or screen) displaying 20 images at a time can be a very tedious, time-consuming, and inefficient process. In this case, the “Random Images” feature will serve the users well! It will randomly provide images of these 41,550 images, so that one’s knowledge on the World Heritage Sites will increase dramatically from a few simple clicks of the button because each image will also be shown with the title of the site.

Each site page additionally offers links to relevant textual resources where the user can further obtain additional needed books, articles, images, videos,

and web-based materials relevant to a chosen site. This “one-stop” approach will enable a user to find literally anything, in print or online, which they are looking for. For example, the instant link to the OCLC WorldCat will provide users access to library resources from over 170 countries. One can also instantly search Internet resources such as Google Image, Google Scholar, Google Video, Internet Archives, etc.

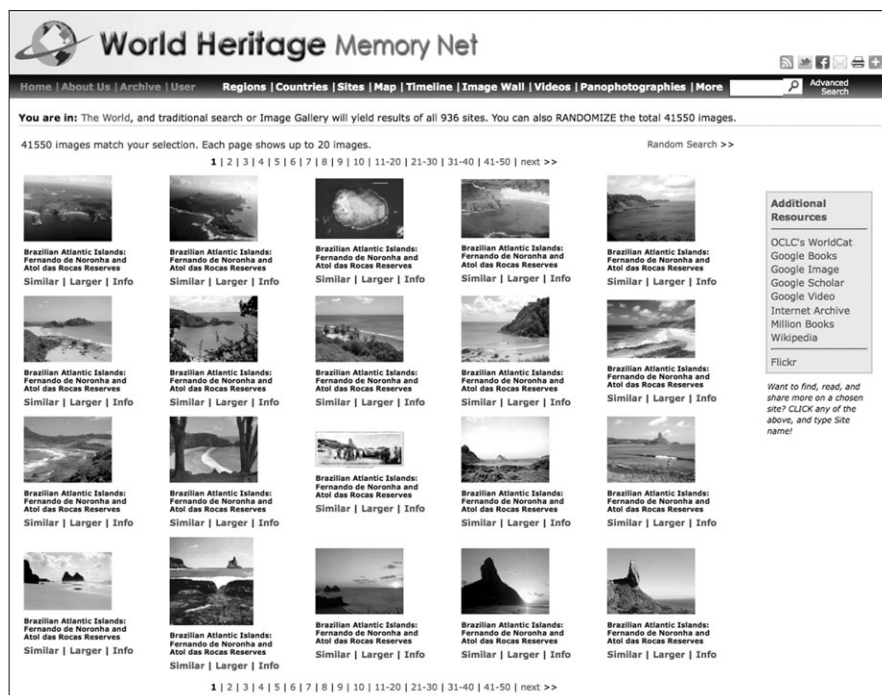


Figure 4: Random images of the current 41,550-image collection are shown with titles of the sites; one is given the choice of finding similar images, enlarging the image icons, or getting the site information for any chosen image

Once an image of interest is spotted, one can find images of similar color and shape in all World Heritage Sites by choosing “Similar,” as shown in Figure 4. For example, if a Roman column in Italy was chosen, then similar columns in various parts of Europe, Africa can be shown quickly. One’s knowledge on this Roman column can then be expanded quickly. A click on “Larger” will enlarge the chosen image and the zooming can be performed easily but the ratio of enlargement depends largely on the resolution of that image.

One other quick view of the World Heritage Sites randomly is the image wall (Figure 5), which can be accessed from the top navigational bar. When the cursor hovers over individual thumbnail images, the user is provided with country and site information, which will enhance their ability to search. When the thumbnail is selected, a larger image appears and the descriptive

information provides the name of the site, a brief description, and the image rights information related to that image. A user can also search on the image wall by site name, country, keyword, and instantly only relevant information is highlighted and everything else is dimmed.



Figure 5: The image wall, accessible from the top navigational bar

Selecting a Specific Site and What Can One Find?

To enhance the readers' appreciation of the diversity and richness of the resources, instead of selecting one specific site and going through the entire process, we shall show three selected sites and describe the featured multimedia information which the user is able to obtain. These sites are:

1. China's Great Wall
2. India's Taj Mahal
3. Jordan's Petra

For these sites, the user selects Asia > China or Asia > India or Middle East > Jordan. As shown in Figure 6, the user can instantly see the 41 World Heritage Sites in China displayed with the map locations and types of sites indicated when China is selected. Similarly when India is chosen, the 28 World Heritage Sites in India are displayed instantly, and Jordan's four sites are shown when Middle East > Jordan is clicked.

You are in: Asia -> China, and traditional search or Image Gallery will yield results in China

China

Countries	Sites (WHC No.):
Afghanistan	<ul style="list-style-type: none"> Ancient Building Complex in the Wudang Mountains (208)
Azerbaijan	<ul style="list-style-type: none"> Ancient City of Ping Yao (812)
Bangladesh	<ul style="list-style-type: none"> Ancient Villages in Southern Anhui — Xidi and Hongcun (1082)
Cambodia	<ul style="list-style-type: none"> Capital Cities and Tombs of the Ancient Koguryo Kingdom (1133)
China	<ul style="list-style-type: none"> China Dancuo (1335)
India	<ul style="list-style-type: none"> Classical Gardens of Suzhou (813)
Indonesia	<ul style="list-style-type: none"> Dazu Rock Carvings (812)
Japan	<ul style="list-style-type: none"> Fujian Tulou (1133)
Kazakhstan	<ul style="list-style-type: none"> Historic Centre of Macao (1116)
Korea, Democratic People's Republic of	<ul style="list-style-type: none"> Historic Ensemble of the Potlari Palace, Ulsan (707)
Korea, Republic of	<ul style="list-style-type: none"> Historic Monuments of Dengfeng in "The Centre of Heaven and Earth" (1395)
Kyrgyzstan	<ul style="list-style-type: none"> Huanglong Scenic and Historic Interest Area (838)
Laos	<ul style="list-style-type: none"> Imperial Palaces of the Ming and Qing Dynasties in Beijing and Shenyang (429)
Malaysia	<ul style="list-style-type: none"> Imperial Tombs of the Ming and Qing Dynasties (1006)
Mongolia	<ul style="list-style-type: none"> Jiuzhaiguo Valley Scenic and Historic Interest Area (837)
Nepal	<ul style="list-style-type: none"> Kaiping Diaolou and Villages (1112)
Pakistan	<ul style="list-style-type: none"> Longmen Grottoes (1035)
Philippines	<ul style="list-style-type: none"> Lushan National Park (718)
Sri Lanka	<ul style="list-style-type: none"> Mausoleum of the First Qin Emperor (441)
Tajikistan	<ul style="list-style-type: none"> Mogao Caves (440)
Thailand	<ul style="list-style-type: none"> Mount Emel Scenic Area, Including Leshan Giant Buddha Scenic Area (779)
Turkey	<ul style="list-style-type: none"> Mount Huangshan (547)
Turkmenistan	

Category of site

- [Cultural site](#)
- [Natural site](#)
- [Mixed site](#)

Site inscribed on the List of World Heritage in Danger

- [Cultural site](#)
- [Natural site](#)
- [Mixed site](#)

[Random Images](#)
[Image Gallery](#)

You are in: Asia -> India, and traditional search or Image Gallery will yield results in India

India

Countries	Sites (WHC No.):
Afghanistan	<ul style="list-style-type: none"> Agre Fort (251)
Azerbaijan	<ul style="list-style-type: none"> Ajanta Caves (242)
Bangladesh	<ul style="list-style-type: none"> Buddhist Monuments at Sanchi (824)
Cambodia	<ul style="list-style-type: none"> Champanee-Pavagach Archaeological Park (1104)
China	<ul style="list-style-type: none"> Chhatrapati Shivaji Terminus (formerly Victoria Terminus) (445)
India	<ul style="list-style-type: none"> Churches and Convents of Goa (234)
Indonesia	<ul style="list-style-type: none"> Elephanta Caves (244)
Japan	<ul style="list-style-type: none"> Ellora Caves (243)
Kazakhstan	<ul style="list-style-type: none"> Fatehpur Sikri (255)
Korea, Democratic People's Republic of	<ul style="list-style-type: none"> Great Living Chola Temples (250)
Korea, Republic of	<ul style="list-style-type: none"> Group of Monuments at Hampi (241)
Kyrgyzstan	<ul style="list-style-type: none"> Group of Monuments at Mahabalipuram (249)
Laos	<ul style="list-style-type: none"> Group of Monuments at Pattadakal (239)
Malaysia	<ul style="list-style-type: none"> Humayun's Tomb, Delhi (232)
Mongolia	<ul style="list-style-type: none"> Kaziranga National Park (237)
Nepal	<ul style="list-style-type: none"> Keoladeo National Park (340)
Pakistan	<ul style="list-style-type: none"> Khajuraho Group of Monuments (240)
Philippines	<ul style="list-style-type: none"> Mahabodhi Temple Complex at Bodhi Gaya (1059)
Sri Lanka	<ul style="list-style-type: none"> Manas Wildlife Sanctuary (138)
Tajikistan	<ul style="list-style-type: none"> Mountain Railways of India (844)
Thailand	<ul style="list-style-type: none"> Nanda Devi and Valley of Flowers National Parks (331)
Turkey	<ul style="list-style-type: none"> Qutb Minar and its Monuments, Delhi (222)
Turkmenistan	<ul style="list-style-type: none"> Red Fort Complex (231)
Uzbekistan	<ul style="list-style-type: none"> Rock Shelters of Bhimbetka (928)
Vietnam	<ul style="list-style-type: none"> Sun Temple, Konârak (246)
	<ul style="list-style-type: none"> Sundarbans National Park (432)
	<ul style="list-style-type: none"> Taj Mahal (223)
	<ul style="list-style-type: none"> The Jantar Mantar, Jaipur (1338)

Category of site

- [Cultural site](#)
- [Natural site](#)
- [Mixed site](#)

Site inscribed on the List of World Heritage in Danger

- [Cultural site](#)
- [Natural site](#)
- [Mixed site](#)

[Random Images](#)
[Image Gallery](#)

You are in: Middle East -> Jordan, and traditional search or Image Gallery will yield results in Jordan

Jordan

Countries	Sites (WHC No.):
Bahrain	<ul style="list-style-type: none"> Petra (316)
Iran	<ul style="list-style-type: none"> Quseir Amra (327)
Iraq	<ul style="list-style-type: none"> Um er-Rasas (Kastrom Mefra) (1062)
Israel	
Jordan	
Lebanon	
Oman	
Saudi Arabia	
Syria	
Yemen	

Category of site

- [Cultural site](#)
- [Natural site](#)
- [Mixed site](#)

Site inscribed on the List of World Heritage in Danger

- [Cultural site](#)
- [Natural site](#)
- [Mixed site](#)

[Random Images](#)
[Image Gallery](#)

Figure 6: Sites of China, India, and Jordan

When China's Great Wall or India's Taj Mahal or Jordan's Petro is Chosen

As shown in Figure 7, when one clicks on the site name of "The Great Wall," or "Taj Mahal," or "Petra," one is instantly offered the basic metadata and descriptive information in multiple languages. In addition, for each site, links are made also to available video, sound, documents (in PDF format), 360 degree panographical tour, and WHC's official site for other additional information. "Image Gallery" can be linked to all the relevant images of the site.

Home | About Us | Archive | User Regions | Countries | Sites | Map | Timeline | Image Wall | Videos | Panophotographies | More Advanced Search

You are in: Asia -> China -> The Great Wall, and traditional search or Image Gallery will yield results of this site only

The Great Wall

Site number: 438
Type of site: Cultural
Date: 220 B.C.
Date of Inscription: 1987
Location: Asia, China, Liaoning, Jilin, Hebei, Beijing, Tianjin, Shanxi, Inner Mongolia, Shaanxi, Ningxia
Video: Videos from The First Emperor of China by Ching-chih Chen

Image Gallery
 Up to 75 images are shown here. Click on each for more details or on Image Gallery for more images.

Six official UN languages: Arabic, Chinese, **English**, French, Russian, Spanish
Other languages: Albanian, Basque, Bengali, Breton, Bulgarian, Catalan, Croatian, Czech, Danish, Dutch, Esperanto, Estonian, Farsi, Finnish, Galician, Georgian, German, Greek, Hebrew, Icelandic, Indonesian, Italian, Japanese, Korean, Kurdish, Lithuanian, Macedonian, Malay, Malayalam, Min Nan, Norman, Norwegian-bokmål, Norwegian-nynorsk, Occitan, Polish, Portuguese, Serbian, Slovak, Swedish, Tamil, Thai, Turkish, Ukrainian, Vietnamese, Welsh

Description: To form a united defence system against invasions from the north in c. 220 B.C., under Qin Shi Huang, sections of earlier separate fortifications were joined together. The construction persisted until the Ming dynasty (1368-1644), at which time the Great Wall became the world's largest military structure. The site's historic and strategic magnitude is matched only by its architectural significance. --WHCNet paraphrase from the description at [WHC Site](#), where additional information is available. For 360 degree imaging of this site, click [here](#).

The Great Wall of China (Simplified Chinese: 长城; Traditional Chinese: 長城; pinyin: Chángchéng; literally "Long wall") or (Simplified Chinese: 万里长城; Traditional Chinese: 萬里長城; pinyin: Wànlǐ Chángchéng; literally "The long wall of 10,000 li (里)") is a series of stone and earthen fortifications in China, built, rebuilt, and maintained between the 5th century BC and the 16th century to protect the northern borders of the Chinese Empire during the rule of successive dynasties. Several walls, referred to as the Great Wall of China, were built since the 5th century BC, the most famous being the one built between 220 BC and 200 BC by the first Emperor of China, Qin Shi Huang. That wall was much farther north than the current wall, built during the Ming Dynasty, and little of it remains. The Great Wall is the world's longest human-made structure, stretching over approximately 6,400 km (4,000 miles) from Shanhai Pass in the east to Lop Nur in the west, along an arc that roughly delineates the southern edge of Inner Mongolia. It is also the largest human-made structure ever built in terms of surface area and mass. --Wikipedia. Text is available under the Creative Commons Attribution-ShareAlike License. For 360 degree imaging of this site, click [here](#).

Source: <http://whc.unesco.org/en/list/438>
Source2: <http://patrimonium-mundi.org/438>
Source3: <http://memorynet.org>
Reference: 1. UNESCO World Heritage Center, Site Page. 2. patrimonium-mundi.org: World Heritage sites in panophotographies Site Page. 3. Ching-chih Chen's Global Memory Net.

World Map


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You are in: Asia -> India -> Taj Mahal, and traditional search or Image Gallery will yield results of this site only

Taj Mahal

Site number: 252
Type of site: Cultural
Date: 1631-1648
Date of Inscription: 1983
Location: Asia, India, Uttar Pradesh, Agra District



13

Image Gallery
Up to 75 images are shown here. Click on each for more details or on Image Gallery for more images.

Six official UN languages: Arabic, Chinese, **English**, French, Russian, Spanish
Other languages: Aragonese, Basque, Bengali, Bosnian, Bulgarian, Catalan, Croatian, Czech, Danish, Dhivehi, Dutch, Esperanto, Estonian, Farsi, Finnish, Galician, Georgian, German, Hebrew, Hindi, Hungarian, Icelandic, Indonesian, Italian, Japanese, Kannada, Kurdish, Lithuanian, Malay, Nepali, Norwegian-bokmål, Norwegian-nynorsk, Occitan, Oromoo, Polish, Portuguese, Romanian, Serbian, Slovak, Slovenian, Swedish, Tamil, Turkish, Ukrainian, Urdu, Vietnamese, Welsh

Description: The Taj Mahal is an immense mausoleum of white marble which was constructed in Agra between 1631 and 1648. Built by order of the Mughal emperor Shah Jahan in memory of his favourite wife, the site is the jewel of Muslim art in India and a masterpiece of the world's heritage - widely admired across the globe. --WHMNet paraphrase from the description at [UNESCO Site](#), where additional information is available. For 360 degree imaging of this site, click [here](#).

The Taj Mahal (Devanagari: तज महल, Nastaliq: تاج محل), a mausoleum located in Agra, India was built under Mughal Emperor Shah Jahan in memory of his favorite wife, Mumtaz Mahal. The Taj Mahal (also "the Taj") is considered as the finest example of Mughal architecture, a style that combines elements from Persian, Turkish, Indian, and Islamic architectural styles. In 1983, Taj Mahal became a UNESCO World Heritage Site and was cited as "the jewel of Muslim art in India and one of the universally admired masterpieces of the world's heritage." While the white domed marble mausoleum is most familiar, Taj Mahal is an integrated complex of structures and were completed around 1648. Ustad Ahmad Lahauri is generally considered as the principal designer of Taj Mahal. --Wikipedia. Text is available under the Creative Commons Attribution-ShareAlike License. For 360 degree imaging of this site, click [here](#).

Source: <http://whc.unesco.org/en/list/252>
Source2: <http://patrimonium-mundi.org/252>

Reference: 1. UNESCO World Heritage Center, Site Page. 2. patrimonium-mundi.org: World Heritage sites in panophotographies Site


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You are in: Middle East -> Jordan -> Petra, and traditional search or Image Gallery will yield results of this site only

Petra

Site number: 326
Type of site: Cultural
Date: Prehistoric
Date of Inscription: 1985
Location: Middle East, Jordan, Ma'an Governorate



1

Image Gallery
Up to 75 images are shown here. Click on each for more details or on Image Gallery for more images.

Six official UN languages: Arabic, Chinese, **English**, French, Russian, Spanish
Other languages: Bosnian, Bulgarian, Catalan, Croatian, Czech, Dutch, Esperanto, Farsi, Finnish, German, Indonesian, Italian, Japanese, Kurdish, Norwegian-bokmål, Polish, Portuguese, Swedish, Turkish, Vietnamese

Description: Positioned inbetween the Red Sea and the Dead Sea this Nabataean caravan-city, inhabited since prehistoric times, was a significant crossroad between Arabia, Egypt and Syria-Phoenicia. Surrounded by mountains, Petra is half-built, half-carved into the rock, and hence is pierced with passages and gorges. A place where ancient Eastern traditions merge with Hellenistic architecture, it is one of the world's most celebrated archaeological sites. --WHMNet paraphrase from the description at [WHC Site](#), where additional information is available. For 360 degree imaging of this site, click [here](#).

Petra (from πέτρα "petra", rock in Greek; Arabic: البتراء, Al-Batrā) is an archaeological site in southwestern Jordan, lying on the slope of Mount Hor in a basin among the mountains which form the eastern flank of Arabah (Wadi Araba), the large valley running from the Dead Sea to the Gulf of Aqaba. It is famous for having many stone structures carved into the rock. The long-hidden site was revealed to the Western world by the Swiss explorer Johann Ludwig Burckhardt in 1812. It was famously described as "a rose-red city half as old as time" in a Newdigate prize-winning sonnet by John William Burgon. Burgon had not actually visited Petra, which remained accessible only to Europeans accompanied by local guides with armed escorts until after World War I. The site was designated as a UNESCO World Heritage Site in 1985 when it was described as "one of the most precious cultural properties of man's cultural heritage." --Wikipedia. Text is available under the Creative Commons Attribution-ShareAlike License. For 360 degree imaging of this site, click [here](#).

Source: <http://whc.unesco.org/en/list/326>
Source2: <http://patrimonium-mundi.org/326>

Reference: 1. UNESCO World Heritage Center, Site Page. 2. patrimonium-mundi.org: World Heritage sites in panophotographies Site Page.

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Figure 7: Instant showing of descriptive information on the chosen site in multiple languages as well as site links to videos and 360 degree panographical tour, as well as an image gallery

Instant Multilingual Access

For all sites, the six official languages of the UN – Arabic, Chinese, English, French, Russian, and Spanish – are available, as to other languages, the number differs from a few to the maximum of over 50 languages as in the case of “The Great Wall” as shown in the upper portion of Figures 7 and 8. One can instantly obtain the multilingual information by clicking on the language. Figure 8 shows the Chinese description for “The Great Wall,” Figure 9 the Tamil for “The Taj Mahal,” and Figure 10 the Arabic for “Petra.”



Figure 8: Switching metadata from English to Chinese for “The Great Wall”

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Advanced Search

You are in: Asia > India >> தஞ் கடூரம், and traditional search or Image Gallery will yield results of this site only

தாஜ் மஹால்

Site number: 252

Type of site: Cultural

Date: 1631-1648

Date of Inscription: 1983

Location: ஆசியா, இந்தியா




Image Gallery

Up to 75 images are shown here.
Click on image for more details or on
Image Gallery for all images.

Six official UN languages: Arabic, Chinese, English, French, Russian, Spanish
Other languages: Aragonese, Basque, Bengali, Bosnian, Bulgarian, Catalan, Croatian, Czech, Danish, Dhivehi, Dutch, Esperanto, Estonian, Farsi, Finnish, Galician, Georgian, German, Hebrew, Hindi, Hungarian, Icelandic, Indonesian, Italian, Japanese, Kannada, Kurdish, Lithuanian, Malay, Nepali, Norwegian-Icelandic, Norwegian-Nynorsk, Occitan, Oromoo, Polish, Portuguese, Romanian, Serbian, Slovak, Slovenian, Swedish, Tamil, Turkish, Ukrainian, Urdu, Vietnamese, Welsh

Description: தாஜ் மஹல், இந்தியாவின் நான்குபக்கங்களில், உலக அளவில் புகழ்பெற்ற தொன்மை. இது ஆக்ஸிஸ் எனப்படுகிறது. முழுமையில் பரிசீலிக்கப்படாத இடத்தில், ஒரு நாள் நகரில் புகழ்பெற்ற ஆக்ஸிஸ் கட்டிடப்பட்டுள்ளது. இது காணும் சிவனாக உலகப் புகழ் பெற்றது. ஒரு உலக அறிவுகளில் புதிய புகழ்பெற்ற தாஜ் மஹல் புகழ்பெற்றதைத் தெரிவிக்கிறது. இக் கட்டிடம் குமாபாய் மன்னர்களால் வாங்கப்பட்டது, இதுவே மௌரியர் இரண்டாம் குந்தர் நினைவாக 22,000 பரிசீலிக்கப்பட்டதாகும். 1631 முதல் 1654ஆம் ஆண்டுக்கு இடையில் கட்டப்பட்டது. மேலும் இடத்தில் பரிசீலிக்கப்பட்டது புகழ்பெற்றது. இரண்டாம் குந்தர் நினைவாக உலகப் புகழ் பெற்றது. இத்தகைய அறிவுகள் வகை வகைக்கப்பட்டது ஆய்விக்கப்பட்டது. [மேற்கோள் --Wikipedia. Text is available under the Creative Commons Attribution-ShareAlike License. For 360 degree imaging of this site, click [here](#).

Source: <http://whc.unesco.org/en/list/252>

Source2: <http://patrimonium-mundi.org/252>

Reference: 1. UNESCO World Heritage Center, Site Page. 2. patrimonium-mundi.org: World Heritage sites in panophotographies Site Page.

World Map




Figure 9: Switching metadata from English to Tamil for “Taj Mahal”

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Advanced Search

You are In: Middle East -> Jordan -> البتراء , and traditional search or Image Gallery will yield results of this site only

البتراء

Site number: 326

Type of site: قلاني

Date: قبل التاريخ

Date of Inscription: 1985

Location: الشرق الأوسط


Image Gallery
*Up to 75 images are shown here.
Click on each for more details or on
Image Gallery for more images.*







Six official UN languages: Arabic, Chinese, English, French, Russian, Spanish
Other languages: Bosnian, Bulgarian, Catalan, Croatian, Czech, Dutch, Esperanto, Farsi, Finnish, German, Indonesian, Italian, Japanese, Kurdish, Norwegian-Bokmål, Polish, Portuguese, Swedish, Turkish, Vietnamese

Description:
تقع مدينة البتراء بين البحر الأحمر والبحر الميت على سفح الجبال والتي كانت مأهولة منذ ما قبل التاريخ، كانت في العصور القديمة مقلدًا مهمًا من مصر وسوريا الفينيقية وشبه الجزيرة العربية ، و من أشهر المواقع التاريخية البتراء . البتراء مشيّدتها والحضارة لها الأثر في الحضارة داخل مزيج الجبال التي تشرفها الحرات والاعمار، وهي تشكلت بها لتجارة القوافل الشرقية القديمة مع الهندسة اليونانية القديمة . البتراء وكانت تسمى مدينة بارثينية على الأثر في القرن الثاني 262 م . جدير بالذكر أن العرب من القرن الرابع الهجري الذي يسمى بين المدن مدينة عظيمة . تعتبر البتراء من أهم المواقع الأثرية في الأردن وفي العالم ولهم عدد وحيد جداً في المعالم مؤرخاً تاريخ بالكرات التي في السلسلة اعلمها لحيات الدنيا السبع وهي عبارة عن مدينة كاملة ضوئية في الصحراء الوردي (ومن هنا جاء اسم بئر وتعني باللغة اليونانية الشمس) والبتراء وتعتبر أيضاً مدينة البتراء الحديثة تمتد إلى قلب الصحراء التي شكلت ونماذ، وهي مدينة أشبه ماتكون بالقلاع. بُنيت البتراء في العام 400 قبل الميلاد وجعلها منها عاصمة إمبر(1). وعلى مقربة من المدينة يوجد جبل هارون الذي يعتقد أنه يضم قبر النبي هرون عليه السلام والتابع للصحابة التي خرجت موسى بعصاه الصخر فقهرت، وأخبرنا البتراء بتاريخ 27/2007 كإحدى من عجائب الدنيا السبع الجديدة . WHMNet عارات من الوصف في الموقع في التراث العالمي (المصدر 1) : مدينة بترا مخدرات البتراء. تقويم 360 درجة اتجاه : اشراف قيس مصدر 2.

Source: <http://whc.unesco.org/en/list326>

Source2: <http://patrimonium-mundi.org/326>

Reference: UNESCO World Heritage Center, Site Page. 2. patrimonium-mundi.org: World Heritage sites in panophotographies Site 1. Page

World Map



Figure 10: Switching metadata from English to Arabic for “Petra”

Instant Multimedia Access

Figures 7 and 8 also show that in addition to the multilingual descriptive information on “The Great Wall” site, for example, various associated multimedia information can also be instantly retrieved and displayed.

- The site content screen includes a sliding image browser showing all images of the site, which can be quickly browsed and explored by flowing freely either left or right, and then a specific image can be selected for enlargement, as shown in Figure 11.
- By clicking on “Image Gallery,” an image collection on the chosen site can be viewed either in the order of images pre-organized or randomly. A user can also select an interesting image and ask for similar images of the same color or shape by clicking “similar,” or enlarging the image by clicking “larger,” as shown in Figure 12 on the images of Petra.
- Relevant video, sound clips, etc. can also be instantly retrieved when available and clearly indicated, as shown in Figure 8 for the video from *The First Emperor of China* produced by Ching-chih Chen on The Great Wall.
- In collaboration with Tito Dupret of patrimonium-mundi.org, when the URL link is indicated, the user can take a 360 degree panographical tour of the site by clicking the URL as shown in Source 2 for all three sites on Figure 7. This provides the user an incredible experience as if he/she is standing on the top of The Great Wall, the fascinating man-made military structure, or standing in front of the magnificent Taj Mahal, the universally admired immense mausoleum of white marble, or touring the unforgettable Petra with its elaborate built and monumental rock-cut tombs and temples.

Geo- and Temporal-Retrieval Capabilities

In addition to the whole array of features described above, more geo- and temporal-retrieval capabilities are available as already mentioned earlier in this paper. In fact, users are directed to look at and explore these features at the overview level at the homepage of *WHMNet* as shown in Figure 2. We shall elaborate only slightly more on these features in this section. Figure 13 shows how one can go to browse the world map and click on any site of interest for further information on the upper map search, or select the country of interest from the countries listed in the lower screen of the country search. The 936 sites from 153 countries are all there! When using the country search, it should be noted that countries in black are those countries with no World Heritage Sites inscribed by WHC. Only those in brown have.

In addition to geographical access to the World Heritage Sites, temporal access is also available. This is an important feature because the 936 sites

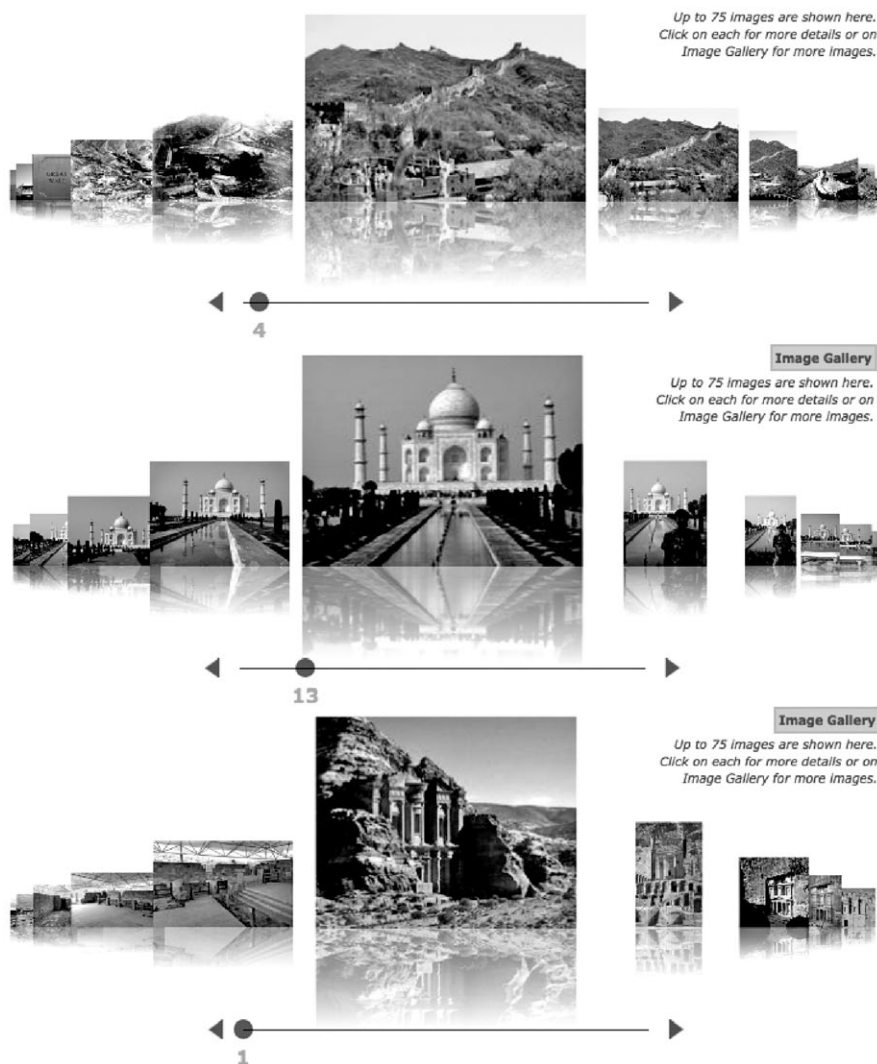


Figure 11: Image flows of The Great Wall, Taj Mahal, and Petra

range from those prehistoric ones that are millions of years old, to sites of the twentieth century, such as the Sydney Opera House in Australia, or even the twenty-first century. On *WHMNet*, one is able to horizontally browse through time, and select the sites of interest, and then obtain quick descriptive information instantly. Figure 14 shows that the “Historic Centre of Lima” site starts around 1700. Note that the basic UNESCO WHC’s descriptive information is paraphrased here. In general, we have placed emphasis on those

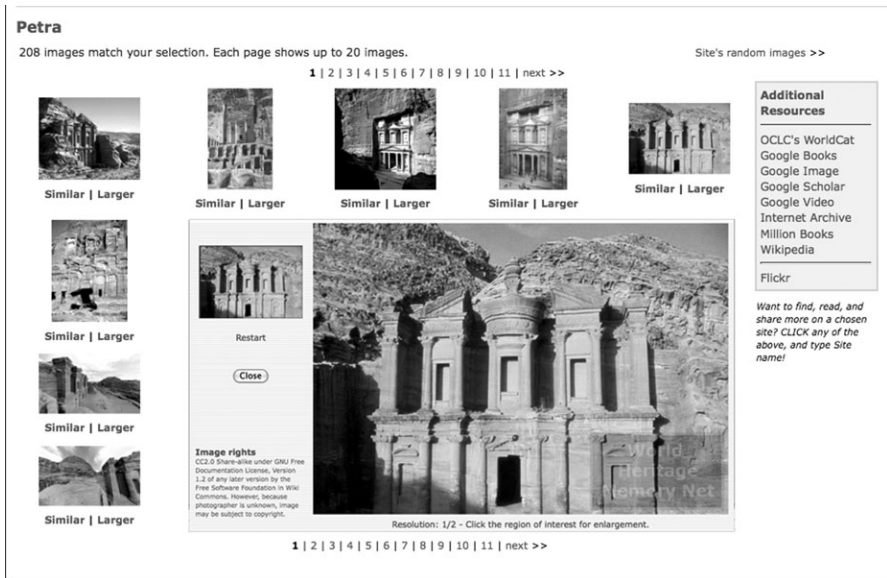


Figure 12: Image gallery provides 208 images on Petra, each of which can be enlarged with dynamic watermark

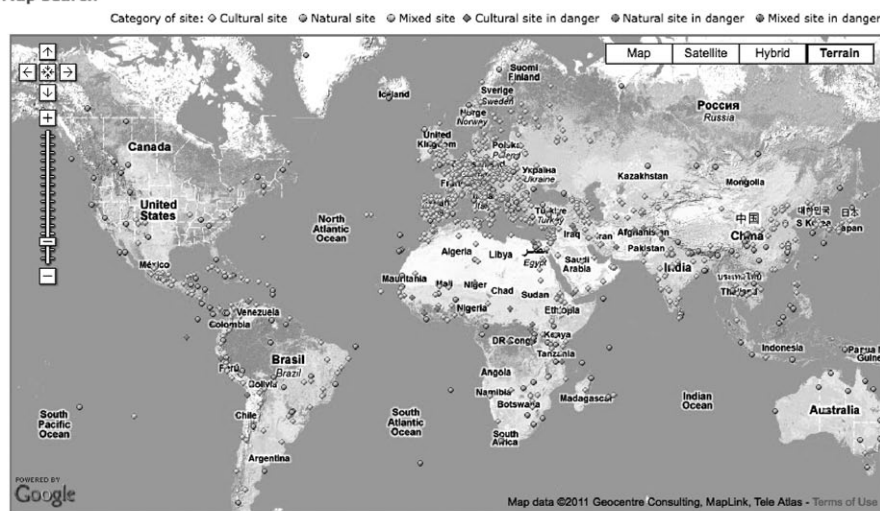
sites no older than 300 BC. Thus, “natural” sites are not included for the obvious reason that they are much older than 300 BC and date back to millions of years ago.

In addition to articles written by the author,⁴ readers are also referred to articles on both *GMNet* and *WHMNet* on Wikipedia for more information:

4 Chen, Ching-chih, *World Cultural Heritage Is One Click Away: Lecture Series* since March 2010:

- “World Culture and Heritage is One-Click Away! Have We Fully Explored the Potentials of New Media and Technology?” Invited Plenary talk for “New Media, Culture and Technology,” on August 19, 2011 at *The First Young Investigator Conference: “Leadership, Innovation, Growth” of the EITC (Emerging Information & Technology Conference)* at Harvard University, Cambridge, MA.
- “World Heritage Is Only Click Away: Enjoy Luxembourg and Sites Around It and Around the World!” was a Banquet Speech given on July 20th at the *9th International Plant Cold Hardiness Seminar (9IPCHS)* in Luxembourg, July 17–22, 2011.
- “From *Global Memory Net* to *World Heritage Memory Net*: A New Digital Model for Exploring Our Amazing World, History, and Culture” was an invited talk given at the National Central Library, Taipei, Taiwan, April 22, 2011.
- “From *Global Memory Net* to *World Heritage Memory Net*: A New Digital Model for Exploring Our Amazing World, History, and Culture,” was an invited speech given at the National Chengchi University, Taipei, Taipei, Taiwan, April 21, 2011.
- “*World Heritage Memory Net* and its System’s Potential for Taiwan’s Indigenous Cultural Heritage,” was an invited speech given at the San-di-men Cultural Park of the National Council of Indigenous Populations of Taiwan in Pingtung, Taiwan, April 16, 2011.

Map search



Search Sites by Country

A - C

Afghanistan • Albania • Algeria • Andorra • Angola • Antigua and Barbuda • Argentina • Armenia • Aruba • Australia • Austria • Azerbaijan • Bahamas • Bahrain • Bangladesh • Barbados • Belarus • Belgium • Belize • Benin • Bermuda • Bhutan • Bolivia • Bosnia and Herzegovina • Botswana • Brazil • Brunei Darussalam • Bulgaria • Burkina Faso • Burundi • Cambodia • Cameroon • Canada • Cape Verde • Central Africa Republic • Chad • Chile • China • Colombia • Comoro Island • Congo, Democratic Republic of the • Congo-Brazzaville • Cook Islands • Costa Rica • Côte d'Ivoire • Croatia • Cuba • Cyprus • Czech Republic

D - K

Denmark • Djibouti • Dominica • Dominican Republic • East Timor • Ecuador • Egypt • El Salvador • Equatorial Guinea • Eritrea • Estonia • Ethiopia • Faroe Islands • Fiji • Finland • France • Gabon • Gambia • Georgia • Germany • Ghana • Greece • Greenland • Grenada • Guatemala • Guernsey • Guinea • Guinea-Bissau • Guyana • Haiti • Honduras • Hungary • Iceland • India • Indonesia • Iran • Iraq • Ireland • Israel • Italy • Jamaica • Japan • Jordan • Kazakhstan • Kenya • Kiribati, Republic of • Korea, Democratic People's Republic of • Korea, Republic of • Kuwait • Kyrgyzstan

L - Q

Laos • Latvia • Lebanon • Lesotho • Liberia • Libya • Liechtenstein • Lithuania • Luxembourg • Macedonia • Madagascar • Malawi • Malaysia • Maldives • Mali • Malta • Marshall Islands • Martinique • Mauritania • Mauritius • Mexico • Micronesia, Federal States of • Moldova • Monaco • Mongolia • Montenegro • Morocco • Mozambique • Myanmar (Burma) • Namibia • Nauru • Nepal • Netherlands • New Caledonia • New Zealand • Nicaragua • Niger • Nigeria • Niue • Norway • Oman • Pakistan • Palau • Panama • Papua New Guinea • Paraguay • Peru • Philippines • Poland • Portugal • Qatar

R - Z

Romania • Russia • Rwanda • Saint Kitts and Nevis • Saint Lucia • Saint Vincent and the Grenadines • Samoa • San Marino • Sao Tome and Principe • Saudi Arabia • Senegal • Serbia • Seychelles • Sierra Leone • Singapore • Slovakia • Slovenia • Solomon Islands • Somalia • South Africa • Spain • Sri Lanka • Sudan • Suriname • Swaziland • Sweden • Switzerland • Syria • Taiwan • Tajikistan • Tatarstan • Thailand • Togo • Tonga • Trinidad and Tobago • Tunisia • Turkey • Turkmenistan • Tuvalu • Uganda • Ukraine • United Arab Emirates • United Kingdom, England • United Kingdom, Northern Ireland • United Kingdom, Scotland • United Kingdom, Wales • United Republic of Tanzania • United States of America • Uruguay • Uzbekistan • Vanuatu • Vatican • Venezuela • Vietnam • Western Sahara • Yemen • Zambia • Zimbabwe

Figure 13: Accessing World Heritage Sites geographically; Upper: World Heritage Sites are geographically marked with appropriate “type” symbols; lower: countries are alphabetically arranged; those in brown have World Heritage Sites

- World Heritage Memory Net, http://en.wikipedia.org/wiki/World_Heritage_Memory_Net
- Global Memory Net, http://en.wikipedia.org/wiki/Global_Memory_Net

Usage and further development

Use of WHMNet

In the short seven months from the public launching of *WHMNet* in April 29, 2011 to the end of November 2011, Google Analytics shows that *WHMNet* has been used by citizens from 1,692 cities in 130 countries (See Figure 15).

Google Analytics' in-page data show that all elements of our homepage design are well-used for the intended purpose as shown in Figure 16. Specifically the four center squares highlight features of our sites, and all of them enjoy relatively high use:

Tour the World	12%
360 degree panophoto-graphies	17%
Exploring World Heritage Sites	20%
Travel the time-lines	2.7%
Digging in	7.4%

-
- “World Cultural Heritage Is One Click Away: So Can World Agricultural Heritage,” Talk given at the National Agricultural Library, Silver Spring, MD, March 26, 2010.
 - “Technology Enabling and Universal Access to World Heritage: Challenges and Potentials: The Cases of *Global Memory Net* (全球記憶網) and *World Heritage Memory Net* (世界遺產記憶網).” An invited speech given at National Tsinghua University, Hsinchu, Taiwan, March 12, 2010.
 - “Culture and Technology Integration (文化與科技整合的新形象): *The Cases of Global Memory Net* (全球記憶網) and *World Heritage Memory Net* (世界遺產記憶網).” An invited speech given at National Normal University, Taipei, Taiwan, March 11, 2010.
 - “A New Look of Culture and Technology Integration (文化與科技整合的新形象): *The Cases of Global Memory Net* (全球記憶網) and *World Heritage Memory Net* (世界遺產記憶網).” A special event speech given at National Center for Traditional Arts, Yilan, Taiwan, March 9, 2010.
 - Chen, Ching-chih. “Cultural Heritage and Digital Libraries: The World and Universal Access.” A keynote speech at the *International Conference on Arts Venue Planning and Management*, Kaohsiung, Taiwan, November 9, 2009.

Chen, Ching-chih. “Broad-based Societal Implications of IT Development: A case-presentation on the convergence of IT and large-scale digital content on world culture and heritage.” A keynote speech at the *EITC Conference*, MIT, August 6, 2009.

Chen, Ching-chih. “*World Heritage Memory Net*: Instant access to 145 countries’ 878 World Heritage sites with cutting-edge technologies,” an invited speech at Sichuan University, Chengdu, China, July 6, 2009.

Chen, Ching-chih. “*World Heritage Memory Net*: Instant access to 145 countries’ 878 World Heritage sites with cutting-edge technologies,” a keynote speech as well as Opening Keynote at the *14th Congress of Southeast Asian Librarians*, Hanoi, Vietnam, April 21–22, 2009.



Figure 14: Timeline retrieval of the “Historic Centre of Lima” site

It has also revealed all kinds of other interesting data such as:

Time on Page	1:38 minutes
Bounce Rate ⁵	23.19%
Language Used	English (51.2%)
Operating Systems used	Windows (64.0%)
Browser Used Firefox	(43.4%)

It has been estimated that the number of webpages is at least 8.45 billion pages (Friday, 2 December, 2011), as shown in <http://www.worldwidewebsite.com>. Some other estimates went as high as 21 billion. While no one is sure of the exact number, yet it is reasonable to expect that over 10 billion are currently available and the number is increasing daily.

⁵ According to Wikipedia, bounce rate is an Internet marketing term used in web traffic analysis. It represents the percentage of visitors who enter the site and “bounce” (leave the site) rather than continue viewing other pages within the same site.



Figure 15: How use of *WHMNet* has spread all over the world between April 29 and December 1, 2011

Thus, we are encouraged to find that according to Alexa.com⁶, as of December 1, 2011, *WHMNet*'s Alexa traffic rank globally is 170,602, and U.S. rank is 130,757. Alexa also has the ability to compare usage between and among specific websites. According to Alexa's site comparisons, *WHMNet*'s usage already exceeds that of many major world digital libraries.

Alexa's statistics also show statistics compatible to those of Google Analytics described above, such as: the daily page views per user on the *WHMNet* was six pages, estimated daily time on site for *WHMNet* was between 5 and 20 minutes, and the bounce rate was less than 25%, which is attractively low. Thus, our relatively high page views, long daily time, and low bounce rate show that once visitors arrive at *WHMNet*, they stay for significant periods of time, view multiple pages and do not leave the site after only short stay. These are all good indicators of the usability and value of *WHMNet*.

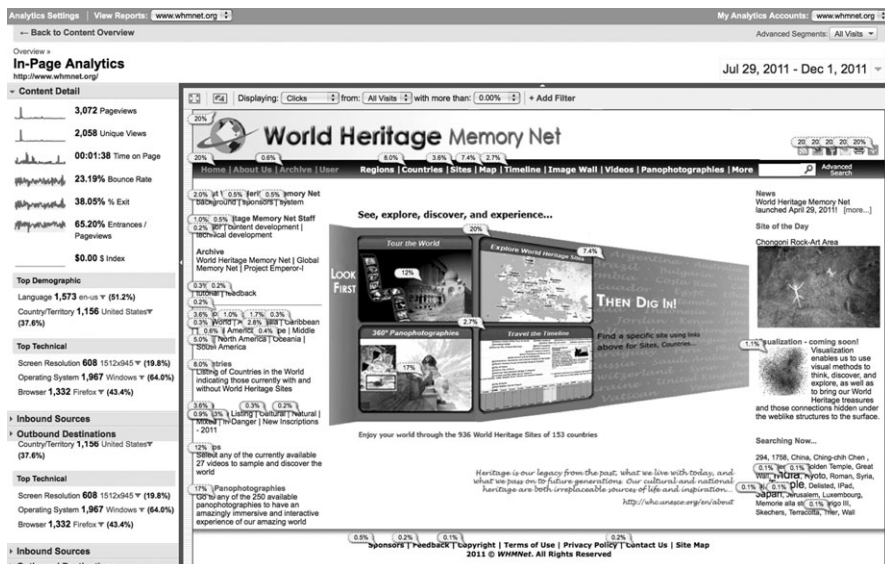


Figure 16: Google Analytics's In-Page statistics of *WHMNet*

Further Development: Visualization

Digital humanity has come of age. Visualization technology can be most effective in platforming humanistic inquiry. At the *humanities+digital*: *visual*

6 Alexa claims on its website that "Alexa is the leading provider of free, global web metrics. Search Alexa to discover the most successful sites on the web by keyword, category, or country. Use our analytics for competitive analysis, benchmarking, market research, or business development. Use Alexa's Pro tools to optimize your company's presence on the web."

interpretations conference, held at MIT on May 20–22, 2010, all keynote speakers like Johanna Drucker of UCLA, Ben Shneiderman of University of Maryland,⁷ Martin Wattenberg of Flowing Media, and Lev Manovich of UCSC, articulated in their own ways that despite the challenges, visual knowledge representation can immerse users in a seamless beautiful environment while exploring and experiencing the subject from many different angles.⁸ For *WHMNet*, though, we have been thinking about visualization for some time. While we already have all 936 World Heritage Sites well presented in a global map with type of sites properly identified and with very useful historical timelines, there are a lot more things we can do since we have not fully leveraged our enormously rich multimedia data and resources.

It is time to explore some real uses of what Shneiderman calls a “visual information seeking mantra.” There are many definitions for the word “mantra,” but simply it is a “powerful tool” or “a tool for power.” For the former definition, how can we use visual methods to think, discover, and explore, as well as to bring our world heritage treasures and those connections hidden under the weblike structures to the surface? For the latter definition, how can we use visualization to empower our users?

In Gudrais’ 2010 article,⁹ she narrows down any complex networks to two basic elements of nodes and links (also called ties). She writes:

But as the numbers of nodes and links increase, the number of possible configurations grows exponentially. Likewise, there are innumerable possibilities for what a node and a link can represent ... Structurally simple, yet analytically incredibly complex, networks hold the answers to so many questions.

A more succinct introduction to complex networks can be found in Newman’s 2010 book.¹⁰ Newman also defines a network, “in its simplest form, a collection of points joined together in pairs by lines.” The points are nodes and the lines are links or edges. He further said that “many objects of interest in the physical, biological, and social sciences can be thought of as networks” and his book shows that “thinking of them in this way can often lead to new and useful insights.”

Thus, *WHMNet* is in the process of collaborating with expert(s) in this important area to look for these new and useful insights. While the results are very preliminary, we can already share with the readers our computer-generated global image of the 890 World Heritage Sites based on our 2009 data as shown in Figure 17 where the sites are displayed with their links or

7 Shneiderman, Ben. “Visual Overviews for Cultural Heritage: Interactive Exploration for Scholars in the Humanities, Arts, and Beyond.”

8 *humanities+digital: visual interpretations conference*, May 20–22, 2010, organized by hyperstudio at MIT. Meeting Program: 14–15.

9 Gudrais, Elizabeth. “Networked: Exploring the weblike structures that underlie everything from friendship to cellular behavior,” *Harvard Magazine*, May–June 2010: 44–50.

10 Newman, Mark E. J. *Networks: An Introduction*. Oxford: Oxford University Press, 2010.

connections or relations in a very complex network system with ability for us to zoom in any aspect of it.

On this image, the brown nodes are the World Heritage Sites, and the blue nodes are keywords taken from the *WHMNet*'s image list. Links denote that a site has an image that is tagged with the connected keyword. The node size is dependent on degree: the more links, the larger the node. Link color depth depends on link frequency: the darker the keyword, the more images per site it. Thus, from Figure 16, we can see that the network is very dense, which means that the keywords used to describe the images are very broad ones (which we are aware of), or our World Heritage Sites are quite aggregated with a lot of data gathered together.

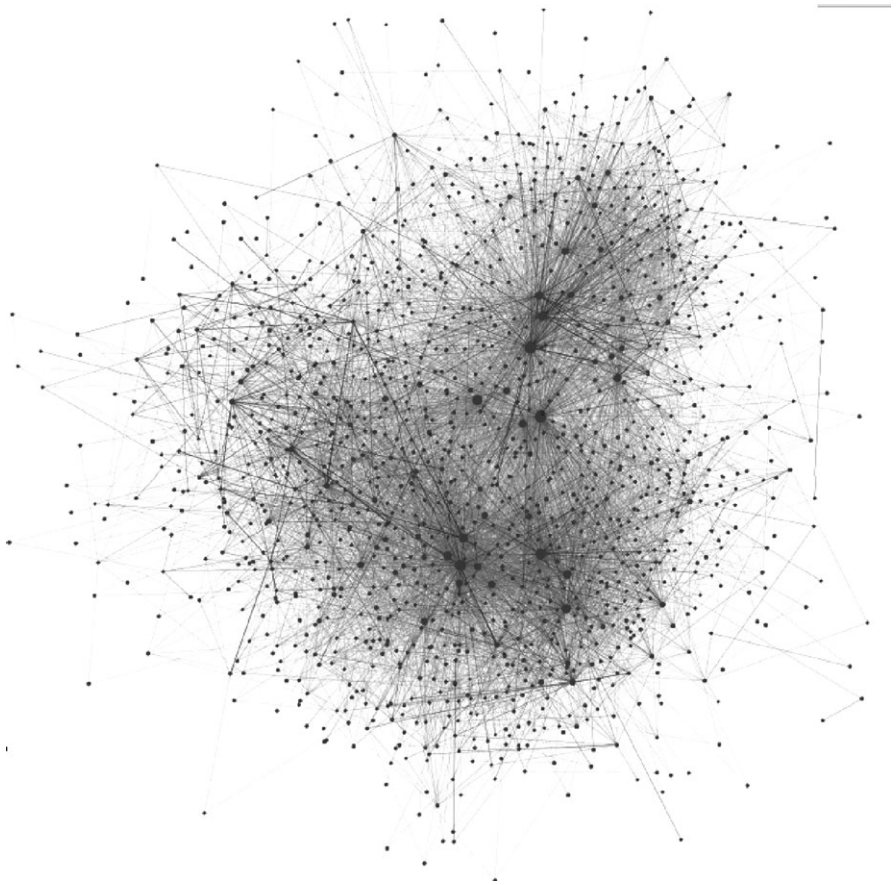


Figure 17: The global image of the 890 World Heritage Sites based on WHMNet's sets of description data of 2009. Image courtesy of Maximilian Schich, www.schich.info