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Digitization initiatives: a reconnaissance of the global landscape

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DIGITIZATION INITIATIVES: A RECONNAISSANCE OF THE GLOBAL LANDSCAPE (TITLE NAME AMENDED).

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Abstract

Digitization has become quite a buzzword around libraries and library organizations. Conferences, symposia and workshops on digitization are becoming more popular and many general conferences feature a technology or digitization track.

A factor contributing to the popularity of digitization is that the technology required for basic digitization is very affordable. It is therefore not uncommon to find an under funded enthusiast doing excellent work, making content available through a free hosting service on the Internet and using only a simple digital camera and/or scanner, bought for a couple of hundred dollars.

The proliferation of local digitization initiatives great and small is noticeable, however, sometimes they are brought together to be presented to the internet user as a part of bigger initiatives. There are also the mega projects such as Google Book Search and the Open Content Alliance. When these examples (small localized projects and mega-projects) are viewed as the extremes on a continuum, there are a wide variety of initiatives, varying in scope, which can be found in-between.

Questions this paper attempts to answer are: What does the global digitization landscape look like? How well represented are the countries with developing economies? What is being done in non-Roman alphabet languages?

The initiatives are generally dealt with in a superficial way; the paper is meant to provide an overview in breadth rather than depth.

Keywords: digitization digital library

1. INTRODUCTION

Digitization has become quite a buzzword around libraries and library organizations. Conferences, symposia and workshops on digitization are becoming more popular and many general conferences feature a technology or digitization track.

A factor contributing to the popularity of digitization is that the technology required for basic digitization is very affordable. It is therefore not uncommon to find an under funded enthusiast doing excellent work, making content available through a free hosting service on the Internet and using only a simple digital camera and/or scanner, bought for a couple of hundred dollars. It is also quite common for the bigger university libraries and most national libraries in the Western World to have digitization programs.

These individual local digitization initiatives cannot be regarded as a strategy unless they are coordinated in some way, as AlouetteCanada (<http://www.alouettecanada.ca/home-e.php>) is doing. However, apart from these small local initiatives there are also the mega projects such as Google Book Search (<http://books.google.com>) and its competitor, the Open Content Alliance (<http://www.opencontentalliance.org>). When these examples (small localized projects and mega-

projects) are viewed as the extremes on a continuum, there are a wide variety of initiatives and strategies, varying in scope, which can be found in-between.

It seems that the popularity of digitization can also be ascribed to digitization being perceived as the ultimate solution to the challenges of preservation and access. An example of this is found in the vision statement of the Universal Digital Library:

“For the first time in history, all the significant literary, artistic, and scientific works of mankind can be digitally preserved and made freely available, in every corner of the world,” [Universal Digital Library, 2007].

In the same vision statement, digitization of paper material and the creation of digital libraries are heralded as the only financial viable option for the creation of “comprehensive archives of the considered works of man”. The author further states that in this way (through the creation of digital libraries) these works can be made permanently accessible to the “billions of people all over the world” [Universal Digital Library, 2007].

A side note to this statement is that billions of people without internet access will not have benefit.

1.1. STATEMENT OF THE PROBLEM

Digitization initiatives are driven by a variety of motives. Two of the most common reasons why materials are digitized are for preservation and for enhanced access. However, this paper is less focused on “why” than on “what”. Questions this paper attempts to answer are: What does the global digitization landscape look like? What is being done worldwide? How well represented are the countries with developing economies? What is being done in non-roman alphabet languages?

1.2. DELIMITATIONS

As digitization is the focus of this paper, digitally born material is outside the scope of the investigation. However, it is recognized that many digital libraries consist of archives of older material digitized from paper, as well as an ongoing initiative to host current, digitally born, material. In these cases the particular initiatives are not excluded from this study.

It is also the intention to emphasize digitized primary source material; again this researcher is faced with the reality that digitized versions of hard copy material are often presented along with digitally born material. For example where the older volumes of a journal were digitized and then presented along with the more recent (digitally born) volumes. In illustrating the point it is worth noting that *Chemical Abstracts Service* (CAS) has successfully digitized all its records back to Vol.1 (1907) and are now available online [Tenopir, 2007].

Even while an example from a commercial database is used to illustrate the point in the previous paragraph the intention is not to focus on commercial products.

From the literature it is obvious that digitization efforts are not limited to text based materials. Therefore the digitization of graphic and audio material is included in the study, even if it is not specifically focused on.

Digital continuity is achieved through a planned process of constantly migrating digitized material from older to newer technologies and falls outside the scope of this investigation.

1.3.METHODOLOGY

It is assumed that since digital libraries, as a phenomenon, are the product of digitization initiatives, the information needed to write this paper will be accessible on the Internet. Therefore the focus for acquiring information on digitization initiatives and digital libraries was on what could be retrieved through search engines, browsing the internet and exploring the professional literature.

2. THE SCOPE OF THE MATERIAL THAT NEEDS TO BE DIGITIZED

Arriving at a realistic answer to the question of how much material is available for digitization, requires a research project in itself. However, even if there is no definitive answer, there are some indicators to the amount of material (number of books etcetera) that are available for digitization. Digitization is not only about the creation of digital copies of monographs. There is a vast store of information that can be uncovered in personal correspondence, photographs and drawings and also oral histories.

It seems that the amount of material to be digitized is declining or at least not growing. Calculations show that already in 1999, less than 7% of all information produced was produced outside the digital realm [Lyman, Varian, Dunn, Strygin & Swearingen, 2000]. It would be reasonable to assume that this percentage would have shrunk even more since. It is said that the number books produced since the invention of the codex is unknown [Toobin, 2007]. Nonetheless, the study by Lyman et al. [2000] estimated that at the time of the study, 1999, the world inventory of information consisted of:

- Books: 65 million original titles
- Amateur and professional photographs: 750 billion
- Motion picture titles: 300,000
- Scholarly journals titles: 348,600
- Mass-market magazines/tabloids titles: 697,000
- Newsletters titles: 348,600
- Individual pieces of mail (since 1790) 1,864 billion
- Newspaper titles: 76,425

The limitations of these estimates are recognized as no audio recordings whether in wax drums, 78/33/45 rpm gramophones, magnetic tape (reel-to-reel, four-track or eight-track) are included. These audio media are of particular importance in the area of oral histories. Recorded radio broadcasts of earlier years are often found in this medium as well. It must also be noticed that at the time of the inventory (1999) the migration to digital media has already started. In October 1982 Billy Joel was the first to release a song, *52nd Street*, on CD and by 1991 the Moving Picture Expert Group developed the MPEG-1 Audio Layer III (later to be called the MP3) [Media Management Group, 2007]. Digital Versatile Disc (DVD) technology was also developed in 1996 indicating that some of the inventory in 1999 was already in digital format, even if it was not included in the estimates [MMG 2007]. Maps and sheet music were also omitted from the inventory.

Taking cognisance of the masses of information to be digitized, while realising that not everything is worth digitizing, it is still a mammoth task requiring significant funding and support from governments and government agencies. There is also a need to raise the general level of awareness on the value and necessity of digitized collections. The *Resolution on Preserving our Digital Heritage*, adopted at the UNESCO general conference in October 2001 managed to put some emphasis on this issue. The resolution is applicable to both digitally born and retrospectively digitized materials [Van der Werf, 2002].

3. THE MEGA PROJECTS

The mega projects, and in particular the one launched by Google, grasped the attention and imagination of the masses. A general observation is that people either thought it was a great idea or opposed on various ground ranging from copyright concerns to fears of Big Brother controlling too much.

3.1. GOOGLE BOOK SEARCH

Google sees it as their business to organize the information of the world and make it universally accessible and useful. It is obvious that its mastery of the digital world, the internet, does not answer this vision. In 2002 Google quietly approached a number of major university libraries, proposing to digitize entire collections free of charge and to provide a digital copy of each item in the collection to the library, also at no cost [Toobin 2007]. Several university libraries partnered with Google in what was initially called Google Print Library Project but some, such as Harvard, Stanford and Oxford limited the project to items in the public domain [Kniffel & Flagg 2006]. However, others like Michigan, California, Virginia and Texas at Austin have no qualms about the scanning of copyrighted material [Kniffel & Flagg 2006].

In an effort to overcome the copyright difficulties it has signed contracts with nearly every major American Publisher in a program called Google Print for Publishers. This will link the user to the publisher's website and online shops when one of the publisher's books is called up [Toobin 2007].

The issue around the scanning of copyrighted works heated up significantly on October 19, 2005, when several leading publishers (e.g. Simon & Schuster, the Penquin Group and McGraw Hill) filed a lawsuit against Google [Toobin 2007]. It could be that the legal dilemma will be resolved in 2008 or if the case is appealed, sometime in the next decade [Toobin 2007].

Google is silent on the issue of cost. However, in 2005 Google announced a \$2.5 million project to scan 100,000 books, in the public domain, from the collection of the British Library [Toobin 2007]. Using that as a basis for calculating the cost of 32 million books (the number in the WorldCat database), it will take \$800 million. Not an insurmountable obstacle for a multibillion-dollar corporation.

It is difficult to estimate the timeframe required by Google to digitize the 32 million books and they are silent on how many books they have scanned up to now. The project to digitize seven million titles in University of Michigan Library will take an estimated six years [Toobin 2007], but given that Google has several teams digitizing at their partner libraries simultaneously and that it is continuously improving their proprietary scanning technology that already has enabled them to double their output several times [Toobin 2007], it could be that the goal will be reached within a decade or so.

3.2. OPEN CONTENT ALLIANCE

The Open Content Alliance (OCA) [2007] is an initiative in competition with Google Book Search and was conceived by the Internet Archive and Yahoo in early 2005. This initiative facilitates various scanning operations in the USA and overseas and is funded by Microsoft, Yahoo and the Alfred P. Sloan Foundation. Other partners in the alliance include the Boston Public Library, the American Museum of Natural History, John Hopkins University and many other companies and institutions [Toobin 2007]. The content of the OCA archive will be accessible through Yahoo.

The projects of the OCA are limited to material in the public domain and copyrighted works of which the owners have given explicit permission. This limits the activities of OCA

substantially as only about 20% of books are in the public domain [Toobin 2007]. The archive will be build with content from [OCA 2007]:

- European Archive
- Internet Archive
- National Archives (UK)
- O'Reilly Media
- Prelinger Archives
- University of California
- University of Toronto

The OCA is administered by the Internet Archive and organized in a number of Working Groups: the Metadata and Collaborative Collection Development Working Group, Digital Preservation Working Group and the Book Format Working Group [OCA 2007].

As with Google Book Search it is difficult to get numbers of how productive the OCA initiative has been. On September 28, 2007, it was reported by Andrew Albanese [2007] in the *Library Journal* that the Alliance now has 40 members and scanning centers in six cities, scanning up to 12,000 books per month.

In essence the OCA is a voluntary group relying upon interested parties to come forward and join the alliance, which is very different from the corporate model used by Google Book Search.

4. THE GLOBAL LANDSCAPE

A project that seems less ambitious than Google Book Search and OAC but is global in scope is the Universal Digital Library (UDL) [2007]. On November 27, 2007, Lombardi reported that the Universal Digital Library now offers more than 1.5 million works, totally free of charge to the internet user.

This initiative, funded in part by the National Science Foundation, Carnegie Mellon and Bibliotheca Alexandrina, is under the directorship of Raj Reddy [Lombardi 2007]. It is led by Zhejiang University in China and the Indian Institute of Science in India, seven other Chinese and eight other Indian universities are also partners [Lombardi 2007]. The focus is on books in the public domain and those for which permission to digitize was provided by the rights holders.

Year	Books
1000 1700	629
1701 1750	484
1801 1850	6 307
1851 1900	40 055
1901 1920	53 491
1921 1940	183 711
1941 1960	153 827
1961 1980	67 548
1981 2000	392 556
2001 2007	119 603
Unknown	516 704
Total	1 534 915

Noteworthy aspects of the UDL include the fact that 971,594 items are in Chinese and that only 284,677 items, (see table) were published between 1000 to 1940. The implication of which is that most of the items in the UDL are not in the public domain [UDL 2007].

Another initiative, global in scope, is the Memory of the World (MOW) program by UNESCO [2007 a]. This is an international initiative launched in 1992 to preserve the documentary heritage of the world and to guard against collective amnesia. This program currently has projects identified in 60 countries, ranging from Albania to Venezuela and Azerbaijan to Canada. The projects are identified in the *Memory of the World Register* (http://portal.unesco.org/ci/en/ev.php-url_id=1678&url_do=do_topic&url_section=201.html) by an international Advisory Committee according to specific selection criteria. Statistics on the number of projects/documents/items are unfortunately not readily available. It must also be noted that some participating countries, like Australia for example (<http://www.amw.org.au>), have their own MOW websites.

A quite recent development is the announcement in a Library of Congress news release [2007 b] on October 17, 2007 that the Librarian of Congress, J. Billington, signed an agreement with UNESCO to build a World Digital Library (WDL) website. The purpose is to digitize and make accessible, rare and unique materials from libraries and other cultural institutions across the world. It was also announced that five other partners will join in establishing the World Digital Library: Bibliotheca Alexandrina, Egypt; the national libraries of Brazil, Egypt, and Russia and the Russian State Library. Already the prototype is available at <http://www.worlddigitallibrary.org>. The WDL will be available in six official languages [Anderson, 2007]. The cost of the project is unknown but a significant part of the WDL will be obtained from the American Memory program (see below) of which the start-up cost was \$60 million. It is expected that the WDL will begin offering content on its site in late 2008 or early 2009 [Anderson, 2007].

4.1. THE WESTERN WORLD

The Western World is well bestowed with numerous digitization initiatives. Appendix A shows many located in the USA, UK, Europe and Canada. The *UNESCO/IFLA Directory of Digitized Collections* [UNESCO, 2007], which cannot be regarded as an exhaustive list, lists 173 initiatives in Europe and North America.

One of the bigger projects in the United States is in the American Memory (<http://memory.loc.gov/>), an initiative launched by the Library of Congress as the flagship of the National Digital Library program. This project received more than \$60 million in support since 1994 and consists of more than 7 million items in more than 100 thematic collections [2007].

The European Digital Library (EDL) is the result of a recommendation adopted by the European Commission on August 24, 2006 and since November 13, 2006, a Member States Expert Group is monitoring the implementation in the member states [European Commission, 2007] (EU). Even if less than 1% of the collections of Europe's cultural institutions are available in digital format, the EDL will not start from scratch but will build on work already completed at 47 European national libraries [EU, 2007]. This is an example where smaller initiatives are brought together under one umbrella to present a coherent bigger collection to the user.

The concept for Canada's AlouetteCanada shows similarities with the EDL but intends to pull together even smaller collections, so small that (currently) "very few people know about where to find them" [Carlson, 2006]. It is developed as a portal site for a range of digitization projects at various colleges and museums.

It seems that the problem of almost invisible micro-projects is one that that the State University of New York at Buffalo is trying to solve in a similar fashion. It seems that they are trying to counter the “proliferation of idiosyncratic local digitization projects” found in various departments in the University by establishing UBdigit, a standardized repository [Fabian, 2006].

4.2. AFRICA AND THE DEVELOPING WORLD

The participation by the Bibliotheca Alexandrina in Egypt in the UDL has been mentioned in a previous section. The impression is that the digitization initiatives in Africa and by Africans are quite limited in number and scope, some of these, listed in the *UNESCO/IFLA Directory of Digitized Collections* [UNESCO, 2007 a], are:

- University of Natal, South Africa’s struggle for Democracy: Anti-Apartheid Periodicals, 1960 – 1990.
- Centre Aequatoria, Archives Aequatoria
- Ghana’s Highlife Music: A Digital Repertoire of Recordings and Pop Art.

However, there is hope that more digitization projects will be initiated in Africa e.g. by Aluka, a U.S.–based not-for-profit organization and the Library of Congress. The latter has initiated the digitization of the ancient manuscripts from the desert libraries of Timbuktu [United States Department of State Diplomatic Mission to Nigeria, 2007] as announced on March 05, 2007.

The former, Aluka, has made significant progress and has digitized 76 collections, consisting of 323 082 items working with 101 contributors in 31 countries, 14 of which are in Africa [Ithaka Harbors Inc., 2007]

Aluka deserves closer scrutiny because of the scope of its digitization activities [Ithaka Harbors Inc., 2007]: Aluka is an international collaborative initiative that offers their technology platform to its partners/contributors, enabling them a means of offering access to their collections to an international audience without having to develop their own technology. Aluka was incubated by Ithaka (<http://www.ithaka.org>) and is a sister organization to Portico (<http://portico.org>) and the National Institute for Technology and Liberal Education (NITEL) (<http://www.nitle.org>). Aluka is also an affiliate of JStor (<http://www.jstor.org>) and ArtStor (<http://www.artstor.org>); all three receives administrative services from Ithaka.

Latin America and the Caribbean seems to have little activity as far as digitization initiatives are concerned as the *UNESCO/IFLA Directory of Digitized Collections* [UNESCO, 2007 a] lists only two initiatives for this area while the *Memory of the World Register* [UNESCO, 2007 b] provides the following statistics on digitization initiatives in the region:

Argentina 2
Barbados 1
Bolivia 1
Brazil 1
Chile 2
Columbia 2
Cuba 1
Mexico 7
Nicaragua 1
Peru 1
Trinidad and Tobago 3
Uruguay 1
Venezuela 3

Again it must be mentioned that the scope of these initiatives are unknown.

4.3. ASIA PACIFIC

As with many other aspects of modern society, China has become a force to take notice of with respect to the digitization of material. Even if they started relatively late with the establishment of digital libraries, China has done so very systematically and the government led process, is reported to have developed in stages [Wei, 2005]: Collection of information on digital libraries – 1995 to 1996; Research and experimentation on digital libraries – 1997 to 2000; Preparation for the construction of the China Digital Library – 2000 to 2002. In 2005 [Wei] the following numbers were reported in connection with the progress made in the digitization of various items:

- 1.1 million books
- 450 million images of documents (interpreted to mean pages)
- 12,000 journals
- 600 newspapers

The development of digital libraries in China is interesting because it was orchestrated by the government [Wei, 2005], from China's Pilot Digital Library, funded by the State Development Planning Commission, to the Knowledge Grid Digital Library System, the China Digital Library Application System and the China Digital Library Standard Project. It seems that by first laying a theoretical foundation, developing application software and standards they have managed to make good progress. Once the system they devised was up and running: 40 – 60% of books published between 1949 and 2000 and 65 – 70% of the existing journals were digitized by 2005 [Wei, 2005].

The Digital Library of India (DLI) (<http://dli.iit.ac.in>) is deserving of some attention, with a collection of digitized books from 1850 – 1951 of which 36 373 books are in the roman alphabet and 7,224 in non-roman alphabet (as on April 08, 2005) [<http://dli.iit.ac.in/status/lw.html>]. However it should be pointed out that there are indications that the content of the DLI overlaps with the collection of the UDL. It seems that the content of the DLI is duplicated in the UDL.

Since many non-roman alphabet languages are found in Asia it may be appropriate to include a broader look at what is being digitized in these languages in this section. According to the *Memory of the World Register* [UNESCO, 2007 b] the following projects, in non-roman alphabet countries, are either in progress or scheduled for some time in the future:

China 5
India 4
Indonesia 1
Iran 2
Korea 6
Kazakhstan 2
Malaysia 3
Pakistan 1
Philippines 3
Sri Lanka 1
Tajikistan 1
Thailand 1
Uzbekistan 2

Since the scope of each project is unknown there is no way to tell how substantial they are; however, the impression is that items in non-roman languages are not being digitized in similar volume to that of languages in the roman alphabet. The exceptions may be Chinese, Japanese, Korean (the *UNESCO/IFLA Directory of Digitized Collections* lists 15 initiatives in Japanese) and possibly the Indian languages such as Sankrit.

In the list above it is indicated that Korea has the most (6) projects. In a 2005 report by Jung-Sim Kim it is reported that some 96,000 volumes of rare books have already been digitized at the time in the National Library of Korea. Priority has been given to pre-1659 old and rare materials. However, a visit to the National Digital Library on March 17, 2008 shows huge progress: 23,151 antique books, 186,553 articles from government gazettes and 918,597 articles from pre 1945 newspapers were digitized.

Australia and New Zealand seem to be on par with Europe and North America with numerous digital libraries and digitization initiatives mentioned in Appendix A. The National Library of New Zealand (2008) features no less than 10 digital collections on its first page, ranging from The Transactions and Proceedings of the Royal Society of New Zealand (1868 - 1961) to the Māori magazine : Te Ao Hou (The New World) which was published from 1952 to 1975. On its website it is stated at <http://www.natlib.govt.nz/about-us/current-initiatives/nz-digital-content-strategy/view> that : "The National Library is the lead agency for New Zealand's Digital Content Strategy, 'Creating a Digital New Zealand'. The strategy aims to chart a course for a content-rich digital New Zealand, where New Zealanders are actively engaged in creating, discovering, sharing and using content in a digital form."

Similarly, the National Library of Australia (2008) website indicates a rich program of digitization with tools such as policies and guidelines developed to support these efforts. The expectation is that local presenters from these two countries will inform delegates fully on these developments.

5. CONCLUSION

This quite superficial look at the global digitization landscape has brought to light a convoluted picture. Many of the local digitization initiatives are affiliated to or brought in under the umbrella of bigger initiatives. Also, information about projects and initiatives is inaccurate and inconsistent. An example is the *University of Natal, South Africa's struggle for Democracy: Anti-Apartheid Periodicals, 1960 – 1990*, as listed in the UNESCO/IFLA Directory of Digitized Collections [UNESCO, 2007] (which in itself is part of the *Memory of the World* project) and is part of *Digital Innovation South Africa's* [DISA, 2007] collections list, where it is listed as two separate collections: DISA 1 – Freedom Struggles 1950-1994 and DISA 2 – Southern African Freedom Struggles, c. 1950-1994. DISA is also affiliated to Aluka where it is called *Digital Imaging South Africa* [Ithaka Harbors Inc, 2007 b].

A trend to gather smaller initiatives under one umbrella to make them more visible and also to provide (more) content to the bigger initiative is observed. It is peculiar that some initiatives such as EDL and AlouetteCanada have no intention of doing any digitization as part of the initiative itself, but rely solely on the legwork being done in smaller projects and initiatives.

In all there seems to be no surprises, North America, Europe, New Zealand and Australia are showing good progress in digitization while Africa, Latin America and most of Asia seem to be lacking with Japan, Korea and China being the exceptions.

There also seem to be no realistic way, in the time frame available to produce this essay, to estimate the progress made in digitizing the information inventory of the world as discussed on the earlier part of this article.

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Appendix A.

A SAMPLE LIST OF THE MORE POPULAR AND WELL KNOWN DIGITAL LIBRARIES RESULTING FROM DIGITIZATION INITIATIVES

[75th Anniversary of the Free Library of Philadelphia - http://libwww.library.phila.gov/75th/](http://libwww.library.phila.gov/75th/) Special collection of over 225 texts and images covering local architecture, history and African American architects.

[AGF Library - http://groups.msn.com/AGFLibrary/](http://groups.msn.com/AGFLibrary/) Contains mainly religious and mythological books and texts with some multimedia files, using a bulletin board format.

[Alexandria Digital Library Project - http://www.alexandria.ucsb.edu/](http://www.alexandria.ucsb.edu/) Digital map collections at the University of California Santa Barbara.

[Aluka - http://www.aluka.org](http://www.aluka.org) A digital library of scholarly resources from and about Africa consisting of digitized documents, slides, pictures, artefacts etc. More than 300 000 items in 76 collections

[American Journeys - http://www.americanjourneys.org/](http://www.americanjourneys.org/) A digital library of more than 18,000 pages of eyewitness accounts of North American exploration. A collaboration between the Wisconsin Historical Society and National History Day.

[American Memory - http://memory.loc.gov/](http://memory.loc.gov/) Site hosted by the Library of Congress as a gateway to online collections of the history and culture of the USA, totaling more than 7 million digital items.

[Berkeley Digital Library SunSITE - http://sunsite.berkeley.edu/](http://sunsite.berkeley.edu/) Program information, resources, and access to digital collections of the University of California at Berkeley.

[Bibliotheca Universalis - http://www.kb.nl/gabriel/bibliotheca-universalis/](http://www.kb.nl/gabriel/bibliotheca-universalis/) Portal to major works of worldwide cultural and scientific heritage comprising text, images and sound.

[Brigham Young University Digital Media Library - http://www.lib.byu.edu/online.html](http://www.lib.byu.edu/online.html) The public access interface of this online resource allows browsing or searching of university publications, including theses and the Mormon Studies Index.

[British Library Images Online - http://www.imagesonline.bl.uk/](http://www.imagesonline.bl.uk/) Search, order and purchase items from the thousands of images from the library's collections.

[California Digital Library \(CDL\) - http://www.cdlib.org/](http://www.cdlib.org/) Provides access to scholarly materials, databases of journal article abstracts, and reference databases for the University of California. The CDL also builds collections and provides public access to cultural heritage materials.

[Canada's Digital Collections - http://collections.ic.gc.ca/](http://collections.ic.gc.ca/) Collections include over 600 web sites covering Canadian history, geography, science, technology and culture, ranging from national treasures to local history.

[Carrie Electronic Library - http://www.ku.edu/carrie/texts/carrie_books/](http://www.ku.edu/carrie/texts/carrie_books/) Collection of full-text electronic academic works related to Asian studies.

[Center for Retrospective Digitization - http://gdz.sub.uni-goettingen.de/search-entry.shtml](http://gdz.sub.uni-goettingen.de/search-entry.shtml) Access to the digital collections at the Lower Saxony State and University Library Göttingen, Germany, including the Gutenberg Bible, travel literature and North Americana from the 18th and 19th centuries, DIEPER (Digitized European Periodicals), historical materials, and Goethe illustrations.

[Central and Eastern European Online Library \(CEEOL\) - http://www.ceeol.com](http://www.ceeol.com) A paid subscription service providing access to articles, scholarly journals, electronic books and re-digitized documents from cultural and scientific publications related to central and eastern Europe.

[CHILDE Project - http://www.bookchilde.org/](http://www.bookchilde.org/) Children's Historical Literature Disseminated throughout Europe is a project, funded under the European Commission's Culture 2000 program, which has created a collection of images from early children's books.

[Colorado Digitization Project - http://www.cdpheritage.org/](http://www.cdpheritage.org/) A collaborative initiative to provide access to the unique collections of Colorado's archives, historical societies, libraries, and museums.

[Digital Archive for Chinese Studies \(DACHS\)](http://www.sino.uni-heidelberg.de/dachs/) - <http://www.sino.uni-heidelberg.de/dachs/> Based at the Institute of Chinese Studies at the University of Heidelberg (Germany), the collection includes websites, e-journals, films, snapshots of discussion boards, and single documents covering social and political subject matters.

[Digital Innovation South Africa \(DISA\)](http://www.disa.ukzn.ac.za:8080/disa/index.jsp) - <http://www.disa.ukzn.ac.za:8080/disa/index.jsp> DISA is a non-profit making initiative for co-operation among research libraries and archives in Southern Africa. The aim of DISA is to make Southern African material accessible to scholars and researchers worldwide. DISA undertakes digital imaging projects in Southern Africa.

[Digital Library Network for Engineering and Technology \(DLNET\)](http://www.dlnet.vt.edu) - <http://www.dlnet.vt.edu>
A collaborative effort by the American Soc, for Engineering Education, the Institute of Electrical and Electronics Engineers, Inc. Iowa State University and Virginia Tech to provide a platform for posting, reviewing and accessing learning resources in Engineering and Technology.

[Digital Library of Information Science and Technology \(DLIST\)](http://dlist.sir.arizona.edu/) - <http://dlist.sir.arizona.edu/>
Developed by the School of Information Resources and Library Science and the Arizona Health Sciences Library at the University of Arizona using Open Archives Initiative compliant software.

[Digital Library Project](http://digital.library.upenn.edu/) - <http://digital.library.upenn.edu/> A University of Pennsylvania selection of digital library collections, exhibits, and finding aids prepared by digital librarians. Site includes information on tools and technology.

[Digital Projects at the University of Illinois](http://www.library.uiuc.edu/digproj/digproj.html) - <http://www.library.uiuc.edu/digproj/digproj.html>
Information and access to the digital collections at the University of Illinois at Urbana-Champaign.

[Digital Research Library \(DRL\)](http://digital.library.pitt.edu/) - <http://digital.library.pitt.edu/> Text-based collections, photographs, map images, finding aids, databases, audio-visual material, and bibliographic catalogs of collections to aid the research of scholars, faculty, and students at the University of Pittsburgh.

[Digital Resources & Exhibitions](http://library.case.edu/ksl/research/eresources.html) - <http://library.case.edu/ksl/research/eresources.html> Special collections at Case Western Reserve University, including medieval manuscripts and items from the US 1930s Works Projects Administration era.

[Digital South Asia Library](http://dsal.uchicago.edu/) - <http://dsal.uchicago.edu/> Materials related to South Asia, including maps, statistics, photographs, and official publications.

[eCUIP : The Digital Library Project](http://ecuip.lib.uchicago.edu/) – <http://ecuip.lib.uchicago.edu/> A browsable and searchable digital library of materials for K-12 teachers and students.

[Ethnomathematics Digital Library](http://www.ethnomath.org) - <http://www.ethnomath.org> Collection of links and papers covering the interaction of mathematics and culture, with emphasis on the indigenous mathematics of the Pacific region.

[Everglades Digital Library](http://cwis.fcla.edu/ed/) - <http://cwis.fcla.edu/ed/> Access to the digital collections at Florida International University. Relates to the south Florida environment.

[Hill Museum & Manuscript Library - Vivarium](http://www.hmml.org/vivarium/) - <http://www.hmml.org/vivarium/> Vivarium is the home of digitized manuscripts, art, rare books, photographs, audio, video, and other resources from two Benedictine monastic and educational communities in central Minnesota.

[ibiblio](http://www.ibiblio.org) - <http://www.ibiblio.org> A collaboration of the Center for the Public Domain and The University of North Carolina - Chapel Hill to provide public domain material, organized by subject and Universal Decimal Classification including journals, ebooks and a special collection of Linux programs and documentation.

[Illinois Alive - http://history.alliancelibrarysystem.com/IllinoisAlive/](http://history.alliancelibrarysystem.com/IllinoisAlive/) Includes text and images about agriculture and business; early Illinois authors; and issues facing minorities, immigrants, and women. Also includes an introduction to 19th century Illinois.

[Illuminated Books - http://www.illuminated-books.com](http://www.illuminated-books.com) Illuminated and illustrated books scanned for online viewing. Collection consists of books from the 1800's to the 1920's.

[Images from the Heritage Collection of the State Library of Tasmania http://images.statelibrary.tas.gov.au/](http://images.statelibrary.tas.gov.au/) A searchable database of images from the Heritage Collection of the State Library of Tasmania, Australia.

[Indiana University Digital Library Program - http://www.dlib.indiana.edu/](http://www.dlib.indiana.edu/) Provides access to text, images, maps and audio collections as well as virtual exhibits. The site includes information on digitization projects and links to further resources.

[International Children's Digital Library - http://www.childrenslibrary.org/](http://www.childrenslibrary.org/) Multicultural digital library of outstanding children's books.

[Internet Archive - http://www.archive.org/](http://www.archive.org/) A digital library of internet sites and other cultural artifacts in digital form. Includes a text archive of digitized books from Canadian libraries, Carnegie Mellon University, and Project Gutenberg.

[Internet Moving Image Archive - http://www.archive.org/details/movies](http://www.archive.org/details/movies) A collection of hundreds of short films in MPEG-2 format

[IntraText Digital Library - http://www.intratext.com/](http://www.intratext.com/) A multilingual, open access and XML-based digital library offering texts and corpora in 36 languages from religions, humanities, and research.

[Inventory of Canadian Digital Initiatives - http://www.collectionscanada.ca/initiatives/index-e.html](http://www.collectionscanada.ca/initiatives/index-e.html) Provides descriptions of Canadian information resources, including general digital collections, resources centered around a particular theme, and reference sources and databases.

[Iran Virtual Library - http://www.irvl.net/](http://www.irvl.net/) Nonpartisan archive of social, political, economic and cultural documents on Iran. Edited by Prof. F. Nemani, at the South Bank University, London.

[Kentucky Virtual Library - http://www.kyvl.org/](http://www.kyvl.org/) Online catalogs and databases, online tutorial and help with internet-based research, a virtual reference desk, and access to Kentuckiana digitized collections, serving Kentuckians and supporting the Kentucky Commonwealth Virtual University.

[Kibbutz Sasa Virtual Library - http://lib.sasa.org.il/](http://lib.sasa.org.il/) Online bibliographical and image search service in Hebrew only, which also retains an "expert searcher" for locating online sources of information.

[Korea Knowledge Portal - http://www.knowledge.go.kr/html/english/index.html](http://www.knowledge.go.kr/html/english/index.html) The web site is designed to promote digitized national knowledge and information, it is developed and operated by Korea Agency for Digital Opportunity and Promotion.

[Library of California - http://www.library.ca.gov/loc/](http://www.library.ca.gov/loc/) Details the Library's services to local libraries, state and local government and the public as well as links to California Research Bureau papers online, Latter Day Saints publications, the California Library Directory and other useful information.

[Library of Virginia Digital Library Program - http://www.lva.lib.va.us/whatwehave/index.htm](http://www.lva.lib.va.us/whatwehave/index.htm) Provides access to multiple databases and millions of digital images of text, photographs and maps pertaining to the history and culture of Virginia.

[Life in Western Pennsylvania 1840 -1970 - http://www.lifeinwesternpa.org](http://www.lifeinwesternpa.org) Historic photographic collection provided by the library and archives of the Hist. Soc. of West. Pennsylvania. The site also covers the local history of photography and information on the care and handling of photographs.

[Medieval Illuminated Manuscripts - http://www.kb.nl/kb/manuscripts/](http://www.kb.nl/kb/manuscripts/) Presents the collection of the Dutch Royal Library and the Museum Meermanno-Westreenianum in The Hague. Highlights and database with images and backgrounds.

[Mylib's Knowledge Portal - http://www.mylib.com.my/](http://www.mylib.com.my/) A portal to on-line dictionaries and reference works. Some emphasis on Malaysian society.

[Nalanda Digital Library - http://www.nalanda.nitc.ac.in](http://www.nalanda.nitc.ac.in) Based at the National Institute of Technology, Calicut in India. Open access is provided to selected collections of published papers, PhD theses, student projects, research reports, course materials, ebooks, e-texts and Perl scripts.

[National Gallery of the Spoken Word \(NGSW\) - http://www.africandl.org/index.html](http://www.africandl.org/index.html) The National Gallery of the Spoken Word is a project funded under the Digital Library Initiative II spearheaded by the National Science Foundation. The NSGW is creating a fully-searchable digital library of spoken word collections spanning the 20th century.

[National Science Digital Library \(NSDL\) - http://nsdl.org/](http://nsdl.org/) Comprehensive source for science, technology, engineering and mathematics education. Funded by the National Science Foundation.

[Networked Digital Library of Theses and Dissertations \(NDLTD\) - http://www.ndltd.org/browse](http://www.ndltd.org/browse) Catalog of theses and doctoral dissertations hosted by Virginia Tech contributed by some 176 universities and 27 institutions worldwide. Some entries may include abstracts and/or full-text attachments.

[New York Public Library Digital Gallery - http://digitalgallery.nypl.org/](http://digitalgallery.nypl.org/) Provides access to over 275,000 images digitized from the library collections, including illuminated manuscripts, historical maps, vintage posters, rare prints and photographs, illustrated books, and printed ephemera.

[New Zealand Digital Library \(NZDL\) - http://www.sadl.uleth.ca/nz/cgi-bin/library](http://www.sadl.uleth.ca/nz/cgi-bin/library) Based at the Univ. of Waikato, New Zealand. The site contains text, image and audio-visual collections; including historical documents, humanitarian and development information, and bibliographies, literary works, and magazines.

[NICI Virtual Library - http://www.vlibrary.org](http://www.vlibrary.org) The National Institute for Community Innovations is based in Montpelier, Vermont and provides a subscription service for access to dictionaries, e-books, card catalogs, periodicals, and researched internet resources.

[NLS Digital Library - http://www.nls.uk/digitallibrary/index.html](http://www.nls.uk/digitallibrary/index.html) Special collections held by the National Library of Scotland including: The Murthly Hours medieval manuscripts, Experiences of War, Maps of Scotland, First Scottish Books, Scottish Decorative Bookbinding and more.

[North Carolina History and Fiction Digital Library - http://www.lib.ecu.edu/ncc/historyfiction/](http://www.lib.ecu.edu/ncc/historyfiction/) Collection includes 200 texts and maps pertaining to the history of 29 counties in eastern North Carolina and works of fiction that relate to some of those counties. Historic soil surveys and maps with zooming capability are a unique feature of the site.

[NYPL Digital Library Collections - http://www.nypl.org/digital/](http://www.nypl.org/digital/) Collections provided by the New York Public Library covering Black culture and experience, history, literature, maps, prints, and more.

[Online Publications at the University of Stuttgart \(OPUS\) – http://elib.uni-stuttgart.de/opus/](http://elib.uni-stuttgart.de/opus/) Collection of theses, dissertations, preprints, proceedings and full-text documents published in pdf format by staff and students of the University. Site in German and English.

[Original Sources - http://www.originalsources.com/](http://www.originalsources.com/) Electronic library with works from history, the social sciences, philosophy, literature, and religion. Fee required for access.

[Perseus Digital Library - http://www.perseus.tufts.edu/](http://www.perseus.tufts.edu/) An evolving collection of resources for the study of the ancient world, including archaeology, atlas, texts and translations, text tools and lexica.

[Questia - http://www.questia.com/](http://www.questia.com/) Paid subscription service that provides access to a large online collection of books and journal articles in the humanities and social sciences, plus magazine and newspaper articles.

[Sagnanetið - http://sagnanet.is/](http://sagnanet.is/) Saganet project by the National and University Library of Iceland and Cornell University with the association of the Árni Magnússon Institute in Iceland to provide the entire range of Icelandic family sagas and other works published before 1900 online.

[SAILOR: Maryland's Public Information Network - http://www.sailor.lib.md.us/](http://www.sailor.lib.md.us/) Provides public information for citizens of and visitors to Maryland, including resources for health, business, education, and history.

[San Fernando Valley History Digital Library - http://digital-library.csun.edu/](http://digital-library.csun.edu/) An image database of historically significant documents, manuscripts, photographs and related graphic materials of the San Fernando Valley. Administered by the State Librarian of California.

[Simon Fraser University Library Electronic Document Centre - http://edocs.lib.sfu.ca/](http://edocs.lib.sfu.ca/) Promotes access to knowledge created at Simon Fraser Univ. and makes some of the Library's unique holdings available to a wider audience.

[St Laurentius Digital Manuscript Library - http://laurentius.lub.lu.se/](http://laurentius.lub.lu.se/) A collection of scanned images of medieval manuscripts comprising 67 volumes, ranging from the 10th century to the 1640s provided by Lund University Library in Sweden.

[TAEVIS Online Home Page - http://www.taevisonline.purdue.edu/](http://www.taevisonline.purdue.edu/) Tactile access to education for visually impaired students. A collection of 2,500 tactile diagrams covering college-level course. In either Braille or low-vision format, for sale to subscribers.

[The Digital Reading Room \(DRR\) - http://library.athabasca.ca/drr/](http://library.athabasca.ca/drr/) An Athabasca Univ. Library project. It offers a digital solution for course readings and supplementary materials. It has been designed to accommodate a range of formats, including online journal articles, electronic books, audio or video clips, web sites and learning objects.

The First Person da Thefirstperson

[The Gateway to Northwestern Ontario History - http://www.nextlibrary.com/tbpl/home.html](http://www.nextlibrary.com/tbpl/home.html) Collection includes photographs, books, drawings and artifacts. Site in English with French version under development.

[The Online Archive of California - http://www.oac.cdlib.org/](http://www.oac.cdlib.org/) This union database of manuscripts and images from institutions across California is comprised of over 5,000 archival finding aids encoded using Encoded Archival Description standard. Part of the California Digital Library.

[UK Web Archiving Consortium - http://www.webarchive.org.uk](http://www.webarchive.org.uk) Aimed at the broad research community and is systematically attempting to create an archive of social, historic and culturally significant web-based material from the UK domain.

[Universal Digital Library http://tera-3.ul.cs.cmu.edu/ulibaboutus.htm](http://tera-3.ul.cs.cmu.edu/ulibaboutus.htm). Collection of more than 1.5 million books published between 1000 – 2007 representing 19 languages.

[University of Chicago Digital Library Activities - http://www1.lib.uchicago.edu/cgi-bin/nand/search/diglist?search-keywords-0=*&search=::CONFIG::defsearch](http://www1.lib.uchicago.edu/cgi-bin/nand/search/diglist?search-keywords-0=*&search=::CONFIG::defsearch) Text, image, audio and special collections in the humanities and the arts.

[University of Michigan Digital Library Production Service - http://www.umdl.umich.edu/](http://www.umdl.umich.edu/) The Digital Library Production Service was formed in 1996 to provide infrastructure for campus digital library collections, including both access and delivery of collection content.

[University of Tennessee Digital Library Center - http://diglib.lib.utk.edu/dlc/](http://diglib.lib.utk.edu/dlc/) Promotes the growth of a collection of digital content for the University community and the State of Tennessee.

[University of Tennessee-Martin Andy Holt Virtual Library - http://www.utm.edu/vlibrary/vlhome.shtml](http://www.utm.edu/vlibrary/vlhome.shtml) Focus is on the humanities and fine arts, with access to local and world library catalogs, electronic journals, databases, virtual reference desk and digitized documents.

[University of Texas System Digital Library - http://www.lib.utsystem.edu/](http://www.lib.utsystem.edu/) Supporting the learning and research needs of the U of T Telecampus and U of Ts System students and faculty on campus and at a distance.

[University of Wisconsin Digital Collections - http://uwdc.library.wisc.edu/](http://uwdc.library.wisc.edu/) List of collections, and links to collections at various UW branches.

[Uysal-Walker Archive of Turkish Oral Narrative \(ATON\) - http://aton.ttu.edu/](http://aton.ttu.edu/) Collection of written (PDF) and spoken (MP3) texts in several Turkic languages at Texas Tech University.

[Victorian Women Writers Project - http://www.indiana.edu/~letrs/vwwp/](http://www.indiana.edu/~letrs/vwwp/) A collection of text, essays, and fiction written during the Victorian period, by women writers.

[VIVA, The Virtual Library of Virginia - http://www.vivalib.org/](http://www.vivalib.org/) Information on this library consortium of shared digital collections.

[Washington State Digital Library Resources - http://digitalwa.statelib.wa.gov/](http://digitalwa.statelib.wa.gov/) Text, image, archive and local history collections. Site includes best practice guide and Digital Imaging Initiative project pages.

[Worthington Memory - http://www.worthingtonmemory.org/](http://www.worthingtonmemory.org/) Online history scrapbook of Worthington, Ohio.