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Converging and diverging factors of LAMs paradigm in digital preservation with gap analysis from Indian perspective

Dr. Dinesh Katre
Head & Programme Coordinator
Human-Centred Design & Computing
C-DAC, Pune, India

Abstract

This paper emphasizes the need to address the “converging as well as diverging factors” of Libraries, Archives and Museums (LAMs) for expanding the scope of proposed convergence beyond integrated access. While thinking about this convergence we must maintain the role, focus, scope and identities of these disciplines rather than mixing and treating them as same thing referred by different terminologies. This is manifested in many generalized software solutions loosely claiming to manage archives, museums, libraries and repositories at the same time. The courses on museology, archives, library and information science offered in India and elsewhere are found to be at different phases of evolution in terms of integration of digital preservation methods. In Indian context, the gaps analysis of digitalization in libraries, archives and museums has been done and a set of actions are proposed to bridge this gap.

1. Converging and diverging factors in LAMs paradigm

Collection management, conservation, preservation, information science and access to users are the most common topics in the disciplines of library, archive and museum. Though, the adaptation of such common topics in the respective disciplines is quite different and has its own flavor. These apparently different disciplines began to converge more evidently with the proliferation of information technology in the wider and encompassing field of digital preservation. As museums started to digitize the artefacts, libraries started to collect e-books and archives started to preserve born digital data, they became part of digital preservation. Whether it is digital multimedia data, e-books, e-records or scientific data, it exists in bitstream form (Giaretta, 2011). The heterogeneous characteristics of collections in terms of a. materials, b. physical form,

c. nature of associated knowledge and d. users; separated the libraries from archives and archives from museums and vice versa. The “digital” or “bitstream conversion” of such collections made them “homogenous” at one level and therefore this possibility of convergence has captured everyone’s imagination. During such deliberations, we are usually overwhelmed by the “hype of convergence” and as a result we tend to merge and mix things rather indiscriminately. We tend to oversimplify and become blind to the diverging factors instead of resolving them. Therefore, in this paper, we would like to dwell upon the following research questions.

- **Which are the converging and diverging factors of LAMs paradigm?**
- **What is the Indian scenario with respect to this convergence?**

2. Related Work

Way back in 1995, EAD (Encoded Archival Description standard) was developed and tested for museums, libraries, and manuscript repositories to list and describe their holdings in a manner that would be machine-readable and therefore easy to search, maintain, exchange (Rinhart, 2003). Since then, collaboration between Libraries, archives and museums (or LAMs) has been a popular topic for panel debates and conferences (Zorich et al., 2008) from perspective of technical research. In this context as per the OCLC website, RLG Partners are conducting an investigation into library, archive and museum collaboration (2010). They are together trying to identify the intersecting aspects of LAMs. RLG Partners Social Metadata Working Group is exploring how the metadata described by the users in the social networks could be used to benefit LAMs convergence (Smith-Yoshimura, 2010). The proposed integration of LAMs is seen as a continuum of activities identified as contact, cooperation,

coordination, collaboration and convergence (Waibel et al., 2009). The deliberations on this topic are driven more by those interested in advancing the technology for such collaboration (in our opinion). Our intention is to say that it will be interesting to know the point-of-views of librarians, archivists, museologists and the vast majority of potential users

about how they would like to further this possibility. The efforts of this kind so far have largely raised theoretical issues and produced some experimental results in relation with 'interoperability' at metadata level (for integrated access to information). The convergence has been experimented only at the level of integrated access to LAMs.

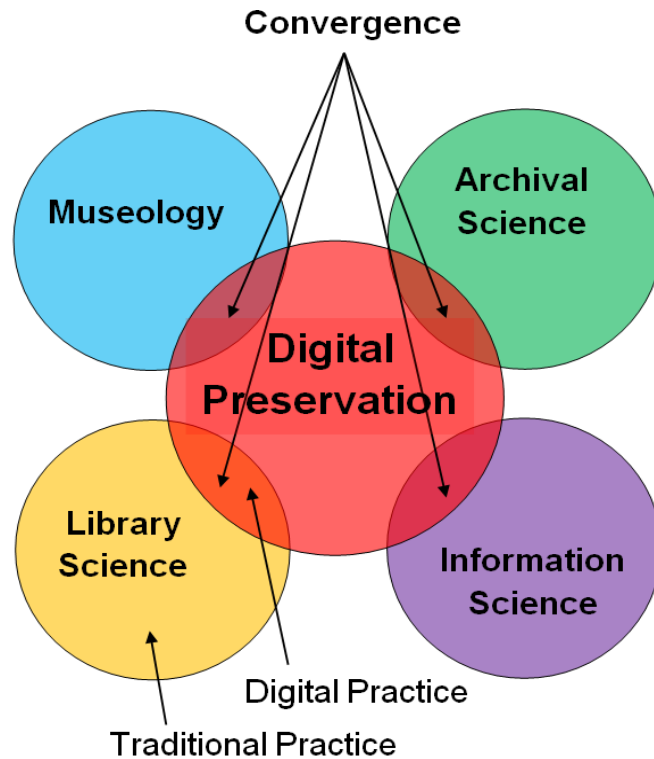


Figure 1. Converging and diverging factors of LAMs paradigm in the field of digital preservation

2.1 Digital convergence and the metaphorical concepts

There is a growing tendency to prefix traditional concepts with “digital” or “electronic”, which can sometimes lead to confusion. The table below provides clearer understanding of the digitally extended practices in LAMs paradigm. Our objective is not to define these terms but to

know the distinguishing aspects of the underlying activities for our better understanding. Some of the digitally extended procedures “facilitate” the traditional procedures in physical world and some are totally different with only “conceptual and metaphorical” similarity.

Traditional Activity	Digital Extensions	The distinguishing aspects
Library	Digital Library	Information systems to <i>manage</i> and <i>access</i> the collection of digitized <i>published</i> books, born digital e-books, <i>published</i> documents and e-media
Archive	Digital Archive	Information systems to manage the digitized <i>official</i> documents, electronic <i>official</i> records, digitized or e-media of <i>historical interest</i>
Museum	Virtual Museum	Information systems to manage and access the <i>collection</i> of digital surrogates, replicas and digital documentation of artifacts pertaining to <i>human heritage</i>
Record Keeping	Electronic Record Management	<i>Manage / maintain</i> the digital surrogates and <i>electronic official records</i>
Archeology	Digital Archeology	<i>Discovery, reading and interpretation</i> of data on <i>obsolete or damaged storage device</i> or media or technology and in <i>obsolete, unknown file formats</i>
Curation	Digital Curation	<i>Restoration</i> or <i>recovery</i> of lossy digital data or the <i>reconstruction</i> of digital replicas of broken physical artifacts #1
Restoration	Digital Restoration	Similar as curation.
Collection Management	Digital Collection Management	<i>No clear definition could be found on the Internet #2</i>
Preservation	Digital Preservation	<i>Archival, management, curation</i> of both digital surrogates and born digital data for <i>access over time</i> .
Repository	Trusted Digital Repository	<i>Reliable, long-term access</i> to managed <i>digital resources</i> to its <i>Designated Community, now and into the future</i> .

#1 The definition of curation in above table is proposed by us, which is more epistemological in nature (cure – curation – meaning restoration, recovery or healing). It avoids the synonymous or overlapping use of “digital curation” and “digital preservation” as practiced by many internationally. Internet is already flooded with several debates about the difference between curation, preservation and conservation.

#2 Although almost all digital library or digital archival or digital repository or digital collection management software claim to do “digital collection management”, we could not locate a clear definition of this term that categorically specifies the distinct steps, so as to mean “digital collection management. We did come across casual references to “collection management means things that a librarian does”, which in our opinion isn’t good enough for measuring the effectiveness of performance towards this activity.

It is obvious that Digital Libraries, Digital Archives and Digital Museums are beginning to converge into the larger field of digital preservation (while keeping out the traditional physical aspects of these fields), refer figure 1. How far are they converging between each other needs to be studied, as far as Indian scene is concerned. Presently the convergence is explored mainly at the level of “access” but in our opinion, the convergence at all possible levels should be explored, which are broadly classified as under-

- Education and professional practice
- Collection development and management
- Preservation
- Administration
- Sustenance

2.2 The diverging aspects of LAMs paradigm

Archival practice defines a collection as the unself-conscious by-product of the activities of a person or organization. Whereas, museum objects are treated as the 'thingness of the thing' including the physical properties such as material, dimension, and object or genre classification (Rinhart, 2003). Contrary to these the libraries are more transaction oriented and gather published materials. The difference between the roles defined for National Archives and Records Administration (NARA) and Library of Congress (LoC) are notable. NARA's primary purpose is to acquire, preserve, and make available for research the most valuable records of the federal government. Whereas LoC collects research materials in many

media and in most subjects from throughout the world, one of the world's largest providers of bibliographic data and products. As per the International Council of Museums (ICOM), museums are meant to acquire and conserve the heritage of humanity, including the wide variety of human cultural artifacts, specimens of plants and animals, such as botanical and zoological gardens, science centres for further study and enjoyment (Museums Australia, 2002). Having considered the characteristic differences among the Libraries, Archives and Museums, we would like to observe the following diverging factors that need to be considered -

- Course syllabus
- Data sharing / distribution rules
- Copyright
- Legal sensitivities associated with the materials
- Acquisition methods
- Type of data and file formats
- Methods of content creation
- Classification systems
- Methods of object description (metadata)
- Languages
- Digital preservation strategies
- Privacy and confidentiality
- Standards and practices
- Revenue sharing models
- Sustainability models
- Institutional / government policies
- Administrative systems and procedures
- User expectations (type of knowledge, user experience, usability, human-computer interaction design)

The explorations so far seem to consider unified metadata schema as the only factor of convergence for integrated access. Other than the technical aspects, mutually beneficial revenue sharing, knowledge sharing models and motivational incentives must be evolved and LAMs to converge.

3. All inclusive versus domain specific software solutions

There are many software solutions available which (in our opinion) make mixed claims to simultaneously address the needs of libraries, museums and archives. Omeka claims to web publish libraries, museums, archives. The Canadian Digital Collection Builder (DCB) is an open-source software tool that claims to make it simple for libraries, archives, and other heritage organizations. CollectiveAccess is also meant to integrate and web publish museums, archives and digital collections. These are primarily Dublin Core compliant cataloging systems for digital

files. People are using the terminologies such as archive, collection management, repository, curation and preservation interchangeably, loosely or simultaneously without fully catering to the underlying expectations, refer 2.1.

On the other hand, there are software solutions which make specific claims e.g. Greenstone is meant to build digital library collections only. CONTENTdm claims to be a collection management system. In Indian context, JATAN: Virtual Museum Builder developed by Human-Centred Design & Computing Group of C-DAC is specially designed for “Indian” museums. It is developed based on the understanding of socio-economic and local organizational needs. Such is a more reasonable approach to keep the expectations of users and maintain proper focus. We must do proper justice to the requirements and finer nuances of specialized disciplines like Library, Archive and Museum. While thinking about this convergence we must maintain the role, focus, scope and identities of these disciplines.

So far we have considered the technological scenario of convergence between LAMs. Now let us observe the current status of education in LAMs and the possibility of convergence at educational level.

We have referred the information and course syllabus as published by the respective institutes or university departments on their websites.

4. Overview of Museology, Archival, Library and Information Science education

4.1 Museology Education

Indian Scenario

Banaras Hindu University (BHU) offers Master of Arts course which unfolds over a period of 2 years. This course gives greater emphasis on regular topics of museology which include history of museums and collections, documentation, presentation and interpretation, management and administration, etc. Most notably, it also includes a topic in the 1st semester titled as computer application in museums. The breakup of this topic comprises of introduction to computers, e-mail, websites, multimedia, search and retrieval of information about museums around the world. National Museum Institute, New Delhi offers two year long Master of Arts in Museology course, which gives basic introduction to application of computers in museums. They also offer Ph.D. programme in Museology. M.A/ M.Sc. Degree Course of Study in Museology at University of Calcutta mentions about museum technology or use

of information technology in museums apart from the regular topics. One year long Post-graduate course in Museology & Conservation offered by Chhatrapati Shivaji Maharaj Vastu Sangrahalaya, Mumbai offers exposure to computerized and digital methodology of documentation in museums using the JATAN: Virtual Museum Builder system developed by C-DAC, Pune. Delhi Institute of Heritage Research and Management offers two courses which are namely Master in Archaeology and Heritage Management; and Master in Conservation, Preservation and Heritage Management. Both these courses provide some coverage to digital collection management or use of information technology in this field. Apart from these institutes, the Maharaja Sayajirao University, Baroda; Aligarh Muslim University, Uttar Pradesh; Jiwaji University, Gwalior, Madhya Pradesh and several other universities from various Indian states offer different variations of courses in museology.

International Scenario

International Council of Museums (ICOM) offers the curricula guidelines for the museum professional development (ICOM, 2008). Apart from the standard museology topics, it includes a section that covers use of information technology, briefly elaborated by sub-topics like e-mail, websites, multimedia formats and database management.

Most museology courses in India and elsewhere do not provide any coverage or sufficient coverage (if they do) to digital collection management and modern digital preservation methods. Pre-digital syllabus of museology must incorporate the post-digital tools and technologies.

4.2 Archival Education

Indian Scenario

One year Diploma Course in Archives and Records Management is offered by the School of Archival Studies, National Archives of India, New Delhi, at professional level. They also offer many short term courses separately focusing on archives management, records management, reprography, conservation, etc. Dr. Bhimrao Ambedkar Vishva Vidyalyaya, Agra offers the Post Graduate Diploma in Archival Studies and Museology, which is for 2 years duration. Broadly the first two semesters focus on archival studies and the later two semesters cover the museology aspect. This course does not mention anything about use of computers. Centre for Heritage Studies, Kochi, Kerala state offers one year Post Graduate Diploma in Archival Studies. Apart from above courses, as reported on various websites PG Certificate in Archives, Gujarat Vidyapith; PG

Diploma in Archives Keeping, Annamalai University; PG Diploma in Archival Science and Manuscriptology, Osmania University; and many other courses of similar nature are available in India.

International Scenario

Society of American Archives (SAA) provides guidelines for Graduate Programme in Archival Studies, which emphasize on Digital Records and Access Systems, and particularly the use of Information Technology for the management of archives along with the core archival knowledge. The curriculum recommended by SAA also includes a major section on interdisciplinary knowledge which includes exposure to technical topics like human-computer interaction, database management, information architecture, website design and creation, metadata encoding, markup languages and programming for archivists. USA also has organizations such as Academy of Certified Archivists, Institute of Certified Records Managers (ICRM). The Society of Archivists, United Kingdom provides information and linkages to various courses and continuing education programmes for professional development in archives administration and records management offered by the universities in UK. For example, Centre for Archival Studies, LUCAS, at University of Liverpool, UK offers several courses related to archives and records management which offer some coverage for Digital records: their nature, use and preservation in the information society. The Society of Archivists, UK along with Digital Preservation Coalition (DPC) has been organizing numerous roadshows across UK to create awareness about the importance of digital preservation.

As per our observation, In India there are very less number of archives and record keeping courses if compared with Museology courses. It is surprising, as all government offices and organizations in the country are supposed to have the posts for record keepers. These courses are still not providing coverage to use of information technology, digital archiving and digital preservation methods. However, at international level, organizations like NARA or SAA are leading the digital preservation scenario.

4.3 Library & Information Science Education

Indian Scenario

Unlike the Museology and Archival courses which start mostly at P. G. Diploma level, the Library Information Science has well evolved in India. There

are undergraduate, postgraduate and Ph.D degrees in LISc. As per Chandrashekhara et al, in India about 125 universities and research institutions are offering Ph. D. programmes in Library and Information Science (2009). It is found that several Master programmes of LISc in Indian universities already claim to give proper coverage to topics like Library Automation and Networking, Information Technology Application and Digital Library. However, many debates and discussions are ongoing about overhauling the curricula for LISc to incorporate the advanced topics emerging from the information explosion due to Internet. The library professionals need to prepare themselves to face various paradigm shifts due to transition from paper to electronic media as the dominant form of information, dissemination, storage and retrieval (Dasgupta, 2009).

International Scenario

The LISc courses are available at various levels in terms of undergraduate, post-graduate, Ph.D. and certified professional courses focusing on various specializations. One comes across post-graduate level courses focusing separately on library science and information science. The information science courses are giving coverage to advanced topics like digital collection management, knowledge organization and representation, information architecture, search and retrieval, digital rights, human-computer interaction, usability, social media, data / digital curation, digital preservation and access, etc.

It is obvious from the above study that the museology, archival and library science courses are at different phases of evolution in terms of integration of digital methods. This is common to India and at international level barring some exceptions. The LAMs courses in India need to incorporate digital methodologies as applicable in their respective domains or there could be a common course specially focusing on digital preservation methods which could fuse the requirements of LAMs together.

5. Virtual Museums, Digital Libraries and Digital Archives in India

As Rinhart (2003) mentions that in 1995, the museums in US did not have their websites. In India, we continue to have this situation in 2010, as there are very few museums which have their websites. In this context, C-DAC's pioneering contribution in developing and deploying the JATAN: Virtual Museum Builder system at 4 leading museums is

notable. This system is running in the following museums –

- Chhatrapati Shivaji Maharaj Museum, Mumbai
- Raja Dinkar Kelkar Museum, Pune
- Salar Jung Museum, Hyderabad
- Victoria Memorial Museum, Kolkata (upcoming)
- C-DAC has also developed the Heritage Information system for Heritage Conservation Society (HCS) of MMRDA, Mumbai which archives the information of heritage monuments.

It is important to note here that an internationally accepted standard for the metadata description of heritage monuments and clustered monuments is essential.

Human-Centred Design and Computing Group at C-DAC Pune presented its vision of cross-museum collaboration for collective metadata enrichment (refer figure 2.) and distributed search across homogeneous virtual museums (refer figure 3.) during the Grid Garuda Partner's Meet organized by C-DAC Bangalore (Katre, 2005). Since then, during past 5 years, C-DAC has setup the testbed of four virtual museums in India. However, these museums are still reluctant to publish their collections on Internet due to lack of funds and copyright fears.

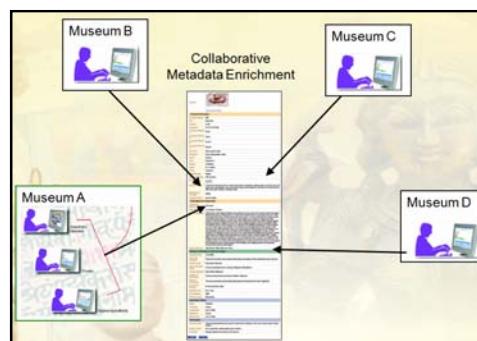


Figure 2. Cross-museum collaboration for metadata enrichment

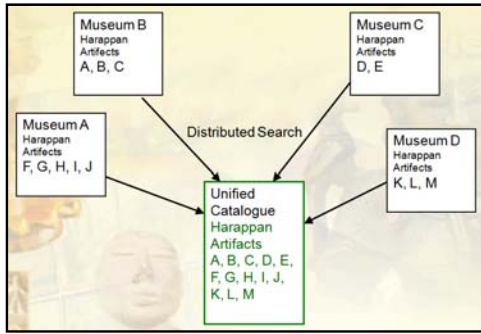


Figure 3. Distributed search across homogeneous virtual museums

As per the “National Study Report on Digital Preservation Requirements of India” prepared by C-DAC (Katre et al. 2010), most of the audio, video, films and government archives in India are in the process of digitization of their collections. The digital catalogues with proper descriptive metadata are being prepared. However, contrary to museums and archives in India, many digital libraries (e.g. Digital Library of India by IISc, Banaglore and C-DAC Noida) and library networks (e.g. DELNET, INFLIBNET) have already come into existence.

The Centre of Excellence for Digital Preservation at HCDC Group C-DAC Pune is planning to join hands with National Archives of India (NAI) and Indira Gandhi National Centre for Arts (IGNCA) for digital preservation of government records and cultural heritage data.

6. Bridging the gap from Indian perspective

Based on the observation of libraries, archives and museums in India, a set of actions are suggested for progressing towards the possibility of convergence.

- Incorporate “digital preservation” in the curriculums of course syllabus for libraries, archives and museums
- Evolve a separate integrated course on “digital preservation” for LAMs professionals and practitioners.
- Establish a network of institutions or channels through which the integrated course on “digital preservation” for LAMs could be made available for the practitioners across India.

- Develop common interoperability standards (with local adaptations and international alignment both)
- Develop specialized software solutions for building digital museums, digital archives, digital libraries and repositories to address the local user requirements in Indian socio-economic context.
- Our first priority should be to develop and sustain some digital museums, digital archives and digital libraries with shared objectives and interests.
- Achieve convergence between homogenous entities first and heterogeneous entities as the next logical step (E.g. converge museums with museums or archives with archives first and then LAMs to build further on this success)
- Department of Culture and Department of Information Technology, Government of India together must encourage and proactively support the modernization of museums, archives and libraries with the possible convergence as its long-term objective. Proper ecosystem for nurturing and sustaining the digital preservation life cycle is essential (Katre, 2009)
- A professional society or a forum needs to be created, which could consolidate the LAMs professionals in India together.

7. Conclusion

Indian libraries, archives and museums are still not ready for such convergence. Just like the way some digital libraries have come up, some virtual museums and digital archives must be developed on priority. We need to consider the converging as well as diverging factors of LAMs for expanding the scope of convergence. The gaps identified from the Indian perspective need to be bridged on priority.

8. References

Chandrashekhara M., Ramasesh C.P. (2009). Library and Information Science Research In India, Asia – Pacific Conference on Library & Information Education & Practice, 2009, pp 533-537.

Curricula guidelines for the museum professional development, International Council of Museums (ICOM), 2008.

Retrieved from -

<http://icom.museum/what-we-do/professional-standards/professions.html>

- Dasgupta A. (2009). Preparing Future Librarians in India : A vision for LIS Schools of Indian Universities in the 21st Century, World Library Information Congress, 75th IFLA General Conference and Assembly, Milan, Italy, 2009.
- Fritzergerald B. (2009). On the Common-Wealth of Libraries, Archives and Museums: Reinventing the Graduate Degree Program in Museology, April 2009.
- David Giaretta (2011). Advanced Digital Preservation, Published by Springer Verlag, 2011.
- Guidelines for a Graduate Program in Archival Studies, Society of American Archivists (SAA)
<http://www2.archivists.org/gpas/curriculum/information-technology>
- Karen Smith-Yoshimura (2010). Social Metadata for Libraries, Archives, and Museums, OCLC Research, On behalf of the RLG Partners Social Metadata Working Group, DLF Fall Forum 2010-11
- Katre Dinesh (2010). National Study Report on Digital Preservation Requirements of India, Volume - I Recommendations for National Digital Preservation Programme, ISBN: 978-81-909383-1-0, July 2010.
- Katre Dinesh (2009). Ecosystem for Digital Preservation in Indian Context: A Proposal for Sustainable and Iterative Lifecycle Model, In Proceedings of Indo-US Workshop on International Trends in Digital Preservation, March 2009, Pune, India, pp. 137-141.
- Katre Dinesh (2005). Grid-enabling of JATAN: Virtual Museum Builder, 1st Grid Garuda Partner's Meet, C-DAC Bangalore, December 2005.
- Katre D (2004). Pragmatic and Usable Approach for Digital Library Initiatives in India, Proceedings of International Conference on Digital Libraries (ICDL), New Delhi, India, Volume I, pp. 41-48.
- Michael Seadle and Elke Greifeneder (2007). Defining a digital library, Emerald, Library Hi Tech, Vol. 25 No. 2, 2007, pp. 169-173.
- New definition of museums by Museums Australia (2002).
 Retrieved from -
<http://home.vicnet.net.au/~museaust/insite/ncmuseum.pdf>
- Richard Rinehart (2003). MOAC - A Report on Integrating Museum and Archive Access in the Online Archive of California, Volume 9 Number 1, D-Lib Magazine, January 2003.
- Rajesh Singh (2010). Restructuring Library and Information Science Curriculum, June 2010
 Retrieved from -
<http://knol.google.com/k/restructuring-library-and-information-science-curriculum#>
- Susan M. Allen (2002). Nobody Knows You're a Dog (or Library, or Museum, or Archive) on the Internet: The Convergence of Three Cultures, 68th IFLA Council and General Conference, August 18-24, 2002.
- The Society of Archivists, United Kingdom
<http://www.archives.org.uk/careerdevelopment/archivesandrecordsmanagementqualifications.html>
- Waibel, Günter and Ricky Erway (2009). "Think Global, Act Local – Library, Archive and Museum Collaboration." *Museum Management and Curatorship*, 24,4.
 Retrieved from -
<http://www.oclc.org/research/publications/library/2009/waibel-erway-mmcc.pdf>.
- Weech T., Gaus E. (2009). Teaching Digital Collections Management: Issues and Priorities for the Future, Proceedings of INFUTURE2009: "Digital Resources and Knowledge Sharing", pp 541-548.
- Zorich D., Waible G., Erwy R. (2008). Beyond the Silos of the LAMs: Collaborating Among of Libraries, Archives and Museums, OCLC Research, September 2008.