

Digital curation: Opportunities and perspectives for libraries of Kyrgyzstan

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In the digital age libraries have huge opportunities to provide resources for the community through new and innovative technologies. Information technologies play an important role in a long-term preservation of scientific and cultural heritage of knowledge and documents which are the important prerequisite for successful development of information community. These technologies allow libraries not only to be developed creating digital collections and repositories (open archives), but also to disseminate information through Internet thus extending the meaning of freedom of information and access to knowledge. One of the approaches to preservation of cultural heritage and broad access to information resources of libraries are digitized resources and web content. But quick dissemination of information technologies will cause the activeness of preservation of digital heritage in the world. The report introduces with USA and other countries libraries experience on creation, management and preservation of digital assets (digital curation); determines the main stages of life-cycle of digital objects; and views the opportunities and perspectives of digital curation development in the libraries of our country.

The libraries are able to provide broad access to resources for community through new and innovative technologies.

New technologies implementation has not only changed the approach to the formation and library resources structure but also contributed to storage, search and information dissemination. Using technologies, libraries are able to create electronic catalogs, electronic resources and databases (bibliographic and full-text). Electronic resources have become new high quality types of information medium that help to enhance effectiveness and quality of service for modern library users.

Besides this, information technologies play a key role in a long-term storage of scientific and cultural heritage of knowledge and documents which are the principal prerequisite for information community development. These technologies help libraries not only in development by creation of digital collections and repositories (open archives) but also in information dissemination through Internet thus extending the meaning of information freedom and access to knowledge.

One of the ways of cultural heritage preservation and broad access to library information resources is digitization of cultural materials and resources for better access to them, and web-content creation. Many libraries of the world have started cultural heritage digitization. Documents digitization facilitates the better arrangement, sorting and information search in collections, and a long-term storage of information in a digital form [1].

Library of Congress of USA has been digitizing own collections for 15 years, which are accessible on-line since 1994, through “American Memory” web-site (American Memory) (<http://memory.loc.gov/ammem/index.html>). The Collection includes photographs, manuscripts, maps, sound materials, videos, books, rare editions which can be found only in the Library of Congress.

Digital Library of Georgia (<http://dlg.galileo.usg.edu/?Welcome/>) jointly with the Georgia libraries, archives and museums provide an access to cultural and historical resources of Georgia. The Library content consists of text (manuscripts, letters, diaries) and published (books, brochures, photographs, maps), and works of art, artifacts, audio and video materials, architectural plans and schemes and microfilms.

Digital Library of Yale University (<http://digitalcollections.library.yale.edu/>) includes collection of rare books and manuscripts.

The *World Digital Library* (<http://www.wdl.org/>), was established in April 2009, which contains the most valuable sources on history and culture of different nations, unique literary works from all over the world, including, USA, Great Britain, France, Russia, China, CIF countries, etc. These days the Library includes

more than 1200 documents and is presented by the broad range of digitized materials, including rare books, manuscripts, photographs, maps, drawings and audio-video materials.

But by quick spread of information technology leads to the fact that preservation of digital heritage has become actually throughout the world. Digital systems for administrative and research activities have been implemented more and more in the world. A lot of information is presented in a digital format, the content of which includes books, articles, manuscripts, reports, methodical and teaching materials, conference materials, presentations, dissertations, including students' papers, electronic publications, computer programs, multimedia, bibliographic editions (guides, reviews, etc.), bibliographic records, photographs, maps, audio-video files, databases, educational objects including e-mail, blogs, social networks, websites, web-photo albums and web-pages which changes own contents in the course of time.

Quickness of the evolution of digital world violates the traditional method of information preservation. The generation of platforms, software and software tools change each other in a quick way. Therefore, information materials may be inaccessible in ten years because of their incompatibility to new information systems. Obsolescence of software and hardware bring to the information and functional files loss in their original format [2].

There are three main reasons which make digital materials inaccessible:

1. damage of medium which contains the materials;
2. obsolescence of software which makes impossible to read digital files;
3. development of new computer systems and peripheral devices which will not be able to process older materials [2].

The solution of the problem of digital objects preservation assumes to work out new approaches, methods, strategies, regulations and activities that provide safety and access to digital materials.

In this connection, world library community has taken several initiatives for digital materials preservation.

In USA preservation of digital materials usually is interpreted as materials life-cycle management from their creation, dissemination, access, storage, use and retrieval use.

Creation, management and preservation of digital objects mean *digital curation*.

Digital curation is "the active management and preservation of digital resources ... for present and future generations of users" [3]. Digital curation is the management and preservation of digital objects during life-cycle of teaching and academic interests of community.

Life-cycle of digital assets consists of several phases.

1. *Conceptualization*: idea and planning of digital object creation, including data collection and methods of data storage.
2. *Creation*: production or creation of a digital object and determination of administrative, descriptive, structural and technical archival metadata.
3. *Access and use*: access to digital objects for users (open access or limited through password access).
4. *Appraisal and selection*: appraisal of digital objects which need long-term storage and restoration. At the same time it is necessary to follow certain selection criteria written in documental manuals and regulations, and in accordance to legal requirements.
5. *Utilization*: removal of digital objects systems that are not recommended for long-term storage and restoration. It is necessary to follow directions of special manuals, regulations and in accordance with the legal norms.
6. *Allocation*: transmission of digital objects to an archive, an electronic repository, a data processing center or some kind of following the requirements written in manuals, regulations and in accordance with the legal norms.

7. *Digital objects preservation activity*: taking appropriate measures to provide long-term digital objects preservation.
8. *Reappraisal*: return of digital objects that were not approved for further appraisal and reselection.
9. *Storage*: data storage according to the standards.
10. *Access and reuse*: warranty and access provision of digital objects for users for first and further (reuse) use. At the same time some materials can be in open access, when others require password.
11. *Reformation of digital objects*: creation of a new digital object [4].

In order to preserve the digital heritage, electronic archives (repository) have been created which receive and store digital objects. Institutional repositories are expanded throughout the world which contain preprints (including not peer-reviewed), post-prints (peer-reviewed, published academic works of university and academic institutions scientists), books, articles, dissertations, including students papers and reports, methodical and teaching materials, conference materials, presentations, software, multimedia, bibliographic editions, images, audio-video files, databases and educational resources.

Software platform for archives can be open software like DSpace (DSpace Foundation), EPrints (EPrints Free Software), Fedora (Fedora Commons), ETD-db (Virginia Tech University Libraries), Greenstone (New Zealand Digital Library Project), CONTENTdm (OCLC) and others.

For digital objects preservation in their original format, libraries use such standards like PDF, XHTML, TXT for text documents; TIFF (TIFF4.0, TIFF5.0, TIFF6.0), GIF (GIF87a), JPEG, JPEG2000 for images; FLV, MPEG, MPEG-2, AVI for video materials; Wave, MP3 for audio materials.

For example, *OCLC (Online Computer Library Center)* is the biggest digital archive in the world (<http://woldcat.org/>), which contains more than 150 million bibliographic records and 30 million digital documents.

The digital Archive of State Illinois (<http://www.idaillinois.org/>) includes books and documents about life and political career of Abraham Lincoln and provides access to historic materials of the state and other important collections which can be found in libraries and museums collections. In order to purchase such content for the archive, the Library of State Illinois provides grants for libraries and museums for digitization of their collections and access to them through Internet.

The North Carolina University in Chapel Hill created Carolina Digital Library and Archives (CDLA) in 2007 (<http://cdla.unc.edu/>), software platform of which is CONTENTdm – open software. Digital library and archives using modern information and Internet technologies create digital collections by digitizing rare documents and cultural values and provide a long-term management and preservation of them. Digital collections are created to support academic activities of scientists, students and librarians of the University and out of it to assist academic communication in general providing open access to resources. Beside this, CDLA is the advisory center on digital projects and programs development and management, and innovation promotion in the field of research in network.

CDLA content includes digital materials not only from the University library collection, but also the materials which are the result of collaboration between the University faculty and partners of the digital library. The content includes important text collections, postcards reflecting the history, literature and culture of southern states of America. The archive is widely represented by a collection of photographs from 1797 to 1955, reflecting the history of North Carolina [5].

CDLA successfully implemented a number of projects on digitization of cultural heritage and preservation of digital resources. Digital collection of works by Thomas Watson (Thomas Watson) (1856-1922), a prominent populist politician, lawyer and author, contains digitized photographs, texts of his correspondence and other documents are available through the project "Digital collection of works by Thomas Watson» ("The Thomas E. Watson Papers Digital Collection "<http://www.lib.unc.edu/dc/watson/>).

“History of Carolina: Virtual Museum of History University” (“The Carolina Story: A Virtual Museum of University History” - <http://museum.unc.edu/>) is a digital collection, which contains materials about the rich bicentennial history of one of the oldest U.S. universities. Collection in the Library of southern U.S. states Literature” (“Library of Southern Literature” - <http://docsouth.unc.edu/southlit/>) includes a variety of literary works of the American South published before 1924. The Collection opens early texts about America written by British discoverers. Online collection of more than 3000 historical maps from 1500-ies until 2000, was created within the framework of the “Maps of North Carolina” Project (“North Carolina Maps” - <http://www.lib.unc.edu/dc/ncmaps/>).

Digital Slavic and East European Collection of the University of North Carolina (<http://www.lib.unc.edu/cdd/crs/international/slavic/collections/index.html/>) is one of the most unique collections in the country, containing rare documents on Russian and East European history (books, magazines, photographs, postcards, etc.), digitized materials André Savine Collection of Russian emigration.

New types of materials appear in the digital world. Web sites contain files of different types (text, images, audio, etc.). But the problem is that web sites are constantly changing and being updated, and superseded materials disappear. For example, several libraries have developed the web sites selection and maintaining strategy, applying to them the concept of "publication". Libraries tend to maintain access to those which could potentially have a lasting cultural value among the different web materials [6].

The most famous project on archiving web sites is the project "Pandora" National Library of Australia (<http://pandora.nla.gov.au/>). PANDORA (Preserving and Accessing Networked Documentary Resources of Australia) is a web archive, which includes sites dedicated to Australia or related topics that are important for the country. But this material must be written by an Australian. The document selection criterion in a web archive is the content of the material, which may be of interest for scientific research for a long time. The main goal of this initiative is to preserve the material posted on web sites which after a time would be lost forever.

Preparation of librarians in the field of digital curation, i.e. specialists-curators to manage and preserve digital objects draws much attention in the library world. Over the last ten years we can observe a huge increase in professional opportunities in the field of digital information. These opportunities require a diverse set of skills to implement, manage and solve a number of procedures and tasks required throughout the life cycle of digital objects from their creation, dissemination, access, storage, use, reuse, and output.

In the UK DiCCurr Centre (<http://www.dcc.ac.uk/>) is an advisory, training center for digital curation. DiCCurr Professional Institute of the University of North Carolina in Chapel Hill (<http://ils.unc.edu/digccurr/institute/>) develops training plans and programs on digital curation, which are used by departments of information and library sciences and computer sciences for training of specialists on management of repositories (archives) of digital objects [7].

With the support of the Council on Library and Information Resources (CLIR) <http://www.clir.org/> and the Institute of Museum and Library Services (<http://www.ims.gov/>), librarians of United States and other countries could participate the training on professional education improvement in management and preservation of digital objects.

Opportunities

This period of development of information technology in libraries of Kyrgyzstan is characterized by creating their own digital collections, such as bibliographic (creation of electronic catalogs, union catalog of books and analytical papers), abstracts, factual and full-text databases, using information on CD-ROM,

DVD, Internet technologies. For example, the National Library of KR creates "Kyrgyzstan" - a catalog of national bibliography in a digital format. .

Recognizing the fact that more and more readers use Internet to access the global information, the libraries of our republic have begun to actively create digital collections through digitization of its own funds and creation of digital libraries.

Digital libraries in Kyrgyzstan has begun their formation since 2004 and have been created in the National Library of Kyrgyzstan, the American University in Central Asia, Kyrgyz State Technical University named after I.Razzakov, Kyrgyz-Russian (Slavic) University, Issyk-Kul State University, Jalalabad State University, Central Scientific Medical Library, "Manas" Kyrgyz-Turkish University, Kyrgyz State Medical Academy by now. Open software like Dspace and Dlibrary, WEB IRBIS 64 are used as a software platform.

Within the framework of the "Network of Heritage" Project, the national Library of KR has digitized various episodes of early editions of the epic "Manas" and transferred to the electronic media CD-ROM with its further replication in many libraries of the world.

Realization of the idea of the modern gateway to the variety library services and information resources are the Web-sites developed by the libraries of our country, such as the National Library of KR (<http://www.nlkr.gov.kg/>), SPTL (State Patent and Technical Library) of KR (<http://gptbkr.to.kg/>), AUCA Library (<http://library.auca.kg/>), KRSU Library (<http://www.krsu.edu.kg/Rus/EduBibl.htm/>), Manas KTU (<http://library.manas.kg/>), KSTU Library (<http://www.libktu.aknet.kg>) and other libraries. The web sites include electronic catalogs, supported task-oriented databases. Due to the rich meaningful content, regular update, considered structure and easy navigation the libraries web sites are considered to be authoritative and reliable sources of information.

In 2006, American University of Central Asia created an open archive (repository) which reflects the intellectual richness of the University- dissertations and theses, AUCA editions, published articles of academics, faculty and staff, teaching materials, students papers and other materials (<http://elibrary.auca.kg/>).

The main aims of the archive are to provide open access to AUCA scientific potential, present electronic environment for distance learning of students, to make popular high quality researches and courses at the University, and long-term preservation of the materials. The software program of the repository is Dspace.

Successful implementation results of the first AUA repository in Central Asia have become favorable impact for the creation of a corporate repository of scientific works of scientists of Kyrgyzstan and Central Asia (<http://krad.bik.org.kg/>). The main goal of the portal is to develop e-science environment and provide open access to scientific publications, scientists of Kyrgyzstan and Central Asia through the creation of a corporate electronic database (repository), making it accessible through Internet and provide free and open access to scientific resources (<http://oel.bik.org.kg/>). This resource is aimed at creation of scientifically significant electronic collection of works of scientists of Kyrgyzstan and Central Asia. Currently, the repository database contains and stores 256 full-text documents (5 theses, 5 monographs, 17 articles) of scientists of Kyrgyzstan, Kazakhstan and Tajikistan in the Russian and Kyrgyz languages on economic, medical, technical, historical, natural and other sciences

By efforts of academic libraries of "Kirlibnet Association" (<http://www.kyrlibnet.kg>) created open archives (<http://arch.kyrlibnet.kg/>), which contains a collection of full-text abstracts of dissertations (104), dissertations (34) Diploma Projects (1) and more than 3000 articles from the Messengers of universities and other documents in the field of natural, technical, social and other sciences. The database is updated on a daily basis.

Due to innovative information technologies libraries of Kyrgyzstan address successfully the problems on preservation of invaluable masterpieces of historical and cultural heritage of the country through their digitization and preservation in digital archives.

In order to ensure a long-term preservation of historical and cultural heritage, four libraries of the country (National Library of the Kyrgyz Republic, Central Scientific Library of National Academy of Sciences, Kyrgyz National University Library and the Issyk-Kul Regional Library named after V.Lenin) within the framework of the "Book monuments in Kyrgyzstan: preservation and access" project (<http://project.rarebooks.net.kg/>) have created digital collection of 120 titles of books that contain invaluable information about the history of our country, Kyrgyz statehood, scientific and cultural heritage of the past generations.

Important event in the library community of the country is participation of National Library of KR in the international "World Digital Library" project as a full partner in May 2010. The epic "Manas" by a variant of the great manaschy Sayakbai Karalaev in kyrgyz language (in five books 1,584 pages in total) as well as Russian translation by S. Lipkin and a prosaic retelling of the epic written by Z. Bektenova and K. Nanaeva are included in the World Digital Library. In addition, the World Digital Library edition presents the epic "Manas" in English translation of the English poet and translator Walter Mey. Also, the World Digital Library includes excerpts from the film, directed by M. Ubukeyeva "Manaschy", giving a vivid picture of the epic and its performer Sayakbaev Karalaev. Thanking to participation of NL of KR in this project the unique piece of Kyrgyz people is available to users around the world

Perspectives

In the future, is expected to replenish World Digital Library fund with the digitized editions of "small" epics of the Kyrgyz people, as well as to place the first primers of the Kyrgyz language, created in the 11th century by the great scholar, poet and educator in Central Asia Yusuf Balasaguni "Kutadgu Bilig ("Beneficial Knowledge ") and books of researchers of Central Asia and Kyrgyzstan.

The National Library of Kyrgyzstan has started working on the "Golden Collection of Eurasia" project, involving national libraries of the CIS countries. Within the project, the unique collections and books representing the value of global and national importance (rarities in the Kyrgyz language in the Arabic and Latin script, handwritten religious books, etc.) have been digitized.

As can be seen, librarians of Kyrgyzstan have experience in creating and preserving digital collections, the content of which mostly contains published text materials. Based on the experience of libraries of U.S.A., Europe and other countries, the content of archives (repositories) can be expanded by placing manuscripts, maps, various kinds of images, presentations, databases, datasets, audio and video files and other materials, including web sites of scientific and educational interest of society.

In the future, the number of institutional open archives (repositories) in the country could be increased by their development in the leading universities of the country.

Kyrgyzstan already has a professional database of training of students to perform a new professional role in the management of digital objects repositories (archives). This is the Department of Information Systems, Book and Archives at Bishkek Humanities University by K. Karasaeva. But this will require new curricula for digital curation (development strategies, regulations, management, preservation, processing and software, copyright issues, etc.) that will teach courses on the creation and management of open archives (repositories) to students of this department and professional development courses for librarians.

Thus, the management and preservation of digital objects over the lifecycle of teaching and research interests of society is relevant for today. It is associated not only with the physical security of data, but also

guarantees the possibility of their use by the software of the future. It is particularly important the concept of integration and reliability of data.

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