The perspective of use of digital libraries in era of e-learning

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Abstract – The aim of this paper is to review digital libraries’ role in supporting e-learning. Digital libraries offer technology based information resources and services to enable learners to access relevant knowledge anywhere anytime. As such, digital libraries are inseparable from the learning process because they made e-learning possible. Though highly relevant for e-learning, digital libraries haven’t been used in education to their full capabilities due to their unequal development worldwide, legal and technical barriers and the fact that the industrial sector (commercial publishers) still manages access to digital content used in education on commercial basis (making it inaccessible to wide audience without paying a fee). The paper also present results from the research of digital libraries and their capabilities for inclusion in education.

I. INTRODUCTION

During centuries, libraries have been the guardians and distributors of “books, journals, maps and other materials that are used by students in the learning process” [1]. Today, they are concerned about their sometimes diminished role in society and this role relies increasingly on information and communication technology which gradually leaves behind traditional information institutions including libraries and printed resources for learning used so far. The response of libraries to the current challenges was development of new digital information resources supplemented by new content delivery services. Presently, libraries worldwide display successfully both their traditional and digital faces and efficiently serve different purposes and different audiences. One such purpose in which libraries participate successfully is e-learning. Libraries have already been introduced to the scene of computer-based learning in the mid-20th century and they are now connected in the unity of libraries and e-learning [2]. They “serve as specific media to implement the learning process” [3]. Libraries support e-learning by offering carefully selected information resources and a variety of ICT supported services to facilitate access to their holdings which include learning material as well [4]. These services include: online bibliographic instructions, computerized library catalogs, digital libraries, distance learning services, e-databases, instant messaging services, inter library loan and document services, ready references, virtual classrooms, virtual references etc. [5]. In the era of ubiquitous learning in which learners of all age use electronic devices on daily basis to access learning material on local computer network as well as on the internet, libraries are expected to make an extra effort to adapt and prepare content in their existing digital collections and their online library services supported by rapidly changing information and communication technologies. Research [2] confirmed existence of such a trend in which students of today have closely embraced modern technologies to enhance their learning, and libraries have become their partners in role of knowledge organizer offering various services that are ICT incorporated. Having this in mind, this paper will discuss the role and perspective of use of digital libraries in today’s evolving e-learning environment.

II. LIBRARIES IN THE DIGITAL ERA AND E-LEARNING

Libraries were among pioneering institutions which introduced computer technology in their daily operations in the middle of 20th century and they continued to introduce new technological successes throughout the rest of the century to improve access to and use of library holdings. Major step forward in library development happened in the beginning of the 1990s when digital libraries were introduced. The concept of digital libraries was a major success from its very start as “it came out of closed walls of library and reached users in their home, workplace and even while traveling, with the help of laptops” [6]. Digital libraries “have emerged as a leading edge technological solution to the persistent problem of enhancing access, process of archiving and expanding the dissemination of information” [7]. Digital libraries generally speaking “consist of digital contents (which are sometimes but not necessarily text-based), interconnections (which may be simple links or complex metadata or query-based relationships), and software (which may be simple pages in HTML or complex database management systems)” [8]. More specifically, digital libraries offer “online catalogues, databases, multimedia, online journals, digital repositories, electronic books, electronic archives and online / electronic services” [9]. Digital libraries have brought digital revolution which has affected almost every aspect of library services „from the automation of internal recordkeeping systems to the digitization of physical collections, and from the acquisition of new „born-digital” works of art or library publications, to the use of technology to present collections and engage audiences” [10]. The engagement of audiences of different types proved to be crucial for the
development of digital libraries because libraries have formed their services according to information needs and requests of different audiences including students and educators.

In spite of the engagement of different audiences including students [11] digital libraries didn’t have any substantial role to play in the learning sector because in some cases they were not included fully in the learning process in favor of the industrial sector (mostly commercial publishers) which controls digital information resources. They suggested that digital libraries had (and still have) a great potential in learning due to the nature of resources they bring together and that can be used “to illustrate a variety of educational topics in practically all areas of knowledge, or to support individual learning” [11]. Digital libraries are indispensable for education because the offer up to date material, immediate access to a wide range of sources which do not exist physically, provide resources via an internet connection each moment from each place and because of these advantages, in digital libraries learning is independent process [12]. The role of digital libraries is clear: they function as “digital schools that offer formal packaging for specific skills and topics as well as general browsing for creative discovery and self-guided, informal learning” [13]. Same authors [13] suggested that digital libraries serve at least three roles in learning: they serve a practical role in sharing expensive resources including physical and digital resources, equipment, human resources – librarians who serve to allow instructors and students to share expensive materials and expertise; they serve a cultural role in preserving and organizing artifacts and ideas as well as ensuring access to materials through indexes, catalogs, and other aids that allow learners to locate items appropriate to their needs; and finally, they serve social and intellectual roles by bringing together people and ideas with formal, informal, and professional learning missions. Libraries “both traditional and digital one have three roles in education: place for sharing reach information, maintaining ideas, and give awareness to bring together individual with learning aims” [12]. Tanner and Deegan [14] analyzed values and benefits of use of digitized resources in teaching and learning and concluded that “The increasing availability of digitized resources allows educational institutions to provide students with more varied, more accessible and richer teaching materials than ever before. This encourages a more exploratory, research based approach to teaching and learning. Entirely new kinds of topics and courses can be studied, new modes of assessment are possible, and students are given a richer educational experience”. Abbott and Cohen [15] investigated possibilities of use of large digital collections (in libraries) in education and found out that students (as library users) face a challenge when they try to find and access primary documents in digital libraries because documents (digital resources) can be found in any number of digital libraries on the internet and this presents a problem. The solution to this problem would be better integration of information about digital resources and networked systems on global level so they could be more easily located and used.

The relationship between digital libraries and e-learning is quite straightforward. Digital libraries as networked information systems are already part of the learning process [2]. The need for digital libraries in e-learning could be also found in the very definition of e-learning: „E-learning could be interpreted as electronic learning; the learning that involves the Internet; learning from a distance via the aid of the internet and, or other electronic gadgets“ [2]. E-learning includes „all forms of electronic supported learning and teaching, which are procedural in character and aim to effect the construction of knowledge with reference to individual experience, practice and knowledge of the learner“ [3]. E-learning is not possible without the learning material and that is where digital libraries as the aid come in convenient. The existing experiences, practices and knowledge of the student become more rich as they gain access to the quality information resources in digital libraries which have become an important stakeholder in the learning process in the last two decades. Pavani [1] analyzed whether digital libraries are suitable for inclusion in the learning process and found out the following reasons for doing so: documents in all formats are managed in a unified way: texts, animations, interactive exercises, audio files, video streams, e-books, e-journals and online tests can be stored, described and distributed through computers and networks; access control: contents can be assigned different types of access according to the classes of users that are entitled to them; content sharing: authors can make their contents available for other faculty to aggregate into their courseware; interactivity: contents stored in digital libraries can be interactive and based on multimedia; customization: some users may require special characteristics of the contents and the system; reuse: courseware can be developed with a granularity that makes it flexible to combine and support multiple syllabus; cross-institution cooperation: digital libraries are networked information resources and this allows that contents can be used from different cooperating institutions; any place and any time learning: students study in different hours of the day any day of the week. Wangila [16] shares similar thoughts: digital libraries were developed to enable higher education (and other educational) institutions provide library services to all its students and other stakeholders in and off campus to facilitate access to digital library resources from any location or work station making it easy to share digital information as well as available to everyone at any time. Huang [17] analyzed the concept of library 2.0 (best of libraries to date with community support and ICT support) and its relationship with e-learning. The author offered the following characteristics that would make stronger mutualism of libraries and e-learning: library is everywhere; no barriers (library is accessible and age-friendly and it provides access to the library’s resources); library is individualized (actively providing readers with diversified content according to their needs); library is inviting participation; library promotes flexibility and best-of-breed systems (support for the e-learning to make them customized and flexible according to the needs of different subjects). Finally, digital libraries also facilitate knowledge sharing between the stakeholders in the learning process and encourage them “to work together,
develop their skills, and form strong and trusting relationships” (Dhiman, 2010).

For students, digital libraries provide technology-based information and services to enable them “to access relevant information and services anywhere anytime, as well as provide empowerment for innovative and life-long learning” [3]. A document “Digital libraries in education” [18] suggested existence of three chains of support for students in digital libraries. First, if a digital library provides users with profiles, they are able to form learning communities. Second, content supported by metadata enables the formation of customizable collections of educational objects and learning materials. Third, tools supported by common protocols or standards enable the development of varied application services that enhance the value of the library’s content for the learner.

Librarian’s job has also changed as it began to depend more intensively on information and communication technology. According to Sreenivasulu [19], the librarian’s role is now oriented towards „consultancy to the users and providing digital reference services, electronic information services, navigating, searching and retrieval of digitized information through web documents that pan the universal digital library or the global digital library”. For Ashikuzzaman [20], librarians must assert themselves as key players in the learning process, thereby changing their roles from the information providers to educators, they should become information gateways and advocates the librarian’s involvement in teaching communities so as to meet information needs of the students. For Hermosa and Anday [4] librarians transformed their jobs into virtual or digital environments, while customizing their services and resources for e-learners (they provide remote access to, and electronic delivery of, library resources, and are using communication technologies to deliver electronic reference services and instructional support).

III. DIGITAL LIBRARY SERVICES FOR E-LEARNING

Digital libraries are opened to the wide public and as such they offer many possibilities of inclusion of their content in formal and informal learning. Calhoun [21] investigated social roles of digital libraries which also include teaching, learning and the advancement of knowledge. For formal education, digital libraries can offer the following services: specialized educational digital libraries, portals for teachers or students, integration with learning management systems and access to primary sources [21].

For progress of knowledge digital libraries offer the following services: self-archiving, deposit incentives; mandatory deposit, open access journals. libraries as publishers, digital libraries of theses and dissertations, cross-repository services, object reuse and exchange services, workflow-based content creation and management, data curation and researcher profiling services [21], digital information resources usable on different electronic devices, library services for information discovery, course materials, exhibits, workshops etc. Wangila [16] pointed out that “the integration of the digital library technology with the educational enterprise has come at a similar time when the student requirements for access to library resources also heightened”. The same author suggests the need for policies, guidelines and standards to ensure professional efficiency and quality of information service delivery in digital library.

In spite of wealth of materials and services, all digital libraries are not equal. Their differences define their possible use. This part of the paper will present digital libraries which offer support for the learning process. The focus will be on the most famous world digital libraries as there is no one global register which would list all existing digital libraries offering educational resources. Since each digital library (and institution behind digital library) has its own approach to presenting learning and teaching materials, it is rather difficult to compare them against a fixed set of criteria.

The purpose of the research is to identify major digital libraries which offer educational information resources and services as part of their Web site. The research aims to provide answers to two questions: 1) do researched digital libraries have a section with educational content as an integral part of their Web sites that can be clearly and undoubtedly identified; 2) is such educational section of a digital library clearly structures as to offer learning material, teacher support, lesson plans, and other aid necessary for teaching and learning? The following section of the paper will present digital libraries which have educational section.

The British Library

The British Library at http://www.bl.uk [22] offers online resources, visits and workshops and teaching resources in the „Learning” section of its Web site. The teaching section presents teaching resources divided into sections „By subject” „By age”, „By resource”. Each of these sections is further divided into subssections „Language”, „Curriculum”, „Subject” and „Themes” with ready-made teaching material. The online resources section of the British Library Website offers items and expert commentary related to History, English and Citizenship with complete insight into topics in the enumerated categories.
The Library of Congress

The Library of Congress at https://www.loc.gov/education/ [23] offers classroom materials and professional development to help teachers use primary sources from the Library's vast digital collections" (Library of Congress). The Library of Congress Web site for education is divided into two big categories „For Students & Lifelong Learners” and „For Teachers”. The first category offers materials for advancement of reading, poems for high schools, American history for elementary and middle school students, fun science facts from the Library of Congress and highlights from the Library's online collections. In category for teachers, the Library of Congress offers blog with posts about use of primary sources and tools and techniques to use them, free resources to help teachers effectively use primary sources from the Library's digital collections in their teaching, teacher-created lesson plans using Library of Congress primary sources, sets of primary sources on frequently taught topics and primary source-based, ready-to-use resources for teachers and facilitators. This Website offers one of the most thoroughly prepared content among the researched libraries.

Fig 2. The Library of Congress education resources

Europeana Space

Europeana Space at http://www.europeana-space.eu/education/ [24],is an EU funded project focused on the creative re-use of available digital cultural content* (Europeana Space: About). The Web site offers 5 examples of Educational Demonstrators, a MOOC (Massive Open Online Course), dissemination events and collection of resources and best practices as well as 6 thematic Pilots. Europeana Space targets users from primary school to universities and engaging them with digital cultural heritage.

Fig 3. Europeana Space

Historiana

Historiana at http://historiana.eu/ [25]The EUROCLIO programme is an „on-line educational multimedia tool that offers students multi-perspective, cross-border and comparative historical sources to supplement their national history textbooks” (Historiana). Historiana offers three categories that can be used in teaching and learning: „Historical thinking” which introduces and individual to historical interpretation of facts, analysis of historical sources etc.; „Teaching methods” with instructions on how to teach history and „Teaching challenges” that offer content on how to improve history teaching.

Fig 4. Historiana

National library of Australia

National library of Australia at http://www.nla.gov.au/using-the-library/learning [26] offers the learning section at its Website. The section is further divided into learning program and school and teacher program. The learning program includes learning sessions to help users use library collections for research, work and study and topics like getting started at the Library, using microform readers, academic eResources and Trove, online resources from Australian libraries. Additional topics include resources for family history research like searching passenger lists, finding
In theory, digital libraries have great potential and predispositions for support to the learning process. In practice, digital libraries are usually part of national libraries which are more frequently oriented towards preservation of national heritage and less to support of schools and universities. While the first part of the paper straightforwardly explained reasons for better inclusion of digital libraries in education and the second part demonstrated lack of actual sections of digital libraries prepared for inclusion in the learning process by offering review of very few digital libraries equipped for participation in education. Answers to research question would be: 1.) there are few digital libraries that clearly offer a section with educational content as an integral part of their Web sites that can be clearly and undoubtedly identified; 2.) these sections a digital library frequently (but not generally) have structures as to offer learning material, teacher support, lesson plans, and other aid necessary for teaching and learning. One could argue that all library holdings are to be used in the learning process and that might be true to some extent. However, education is well defined activity which relies heavily on national educational standards and pedagogical frameworks and procedures and require clearly defined approach of use of any material in the learning process. As a result, national libraries must prepare the necessary library material together with instructions for teachers and students to become fully recognized as educational aids by those for whom they are built.

**REFERENCES**


