# The education function in a digital library environment: a challenge for college and research libraries

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### Abstract

Digital libraries have been a feature of the information arena for some time. They have re-defined the concept of “bibliographic instruction” in which the connotation “library” is implicit, but has become inadequate in a digital library context. This article relates the results of pilot studies of Internet use in academic libraries in the New York metropolitan area to the education of users in a digital library environment. It attempts to crystallize vital concepts and issues generated by interviewing users and information professionals, which could not be quantified in an earlier publication. The studies revealed an urgent need to develop user-education programs that emphasize: the nature and various types of digital collections; interfaces; hardware and software requirements; telecommunications access modes; and making such programs part of continuing education.

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#### Introduction

The phrase “digital library” refers to a collection of information bearing artifacts whose unit records have been encoded in electronic formats in “digital” as opposed to “analog” mode and stored in machine readable form. Library and information science literature has variations of this definition mainly because the concept has recently been grafted on to conventional libraries which have a predominant print hard copy base. As currently articulated, the concept bears several semantic connotations: electronic library – records are in electronic form; library without walls – virtual library; hybrid library – contains both hard copy and electronic formats; library of the future – hopefully (eventually) all records will be in digital form; digital library – an ambitious statement implying that all records are presently in digital form (Bowden and Rowlands, 1999). According to Stephen Griffin, manager of the Digital Libraries Initiative at the US National Science Foundation, “It is true that use of these labels is often in reference to the same sort of environments – people mean the same thing...”(Griffin, 1998, p. 24).

Such attempts at defining the digital library imply that its conceptualization, content development, and setting up of management structures, are in a state of flux. In spite of the apparent lack of an acceptable common definition, the existence of digital collections either in the library or as part of access services is a reality among all libraries in the United States. User need to access and utilize such collections is not only vital to college and research library services, but also urgent. Such a need has been accentuated by the ubiquitous Internet requiring both in-house and external access to digital collections.

Obviously accessing digital collections requires a different mode of access, equipment, and skills, for both library users and staff, in contrast to print hard copy. The need to access digitized multimedia sometimes requires conversion, calling for more than one level of access to make the information obtained useable. In earlier electronic information access, text was the main mode of storage and transmission. Availability of downloadable graphics, images and animation on the Internet and intranets has markedly changed the concept of online access.

These trends have mandated changes in the nature of conventional “bibliographic instruction” for college and research libraries. It may be argued that the use of such a phrase in describing teaching end-users how to use information resources in the library is an anachronism. As we delve deeper into the super digital information age “biblio” must give way to “digital” or even more appropriate “information resources”, which covers both electronic and hard copy resources. The hype and constant use of search engines sometimes blinds end-users to subject focused digital resources in-house or outside the home academic library.

The purpose of this article is to relate the researchers’ study of the end-users’ use of search engines in academic libraries in the New York metropolitan area to the problem of user education in a digital library environment (Kibirige and DePalo, 2000). We have attempted to include research information obtained from both respondents and information specialists, which could not be quantified in the published work. Four academic institutions participated in the study done between 1997 and 1999. Findings of the study pointed to the urgent need to re-educate end-users in their perception and utility of search engines in accessing digital collections in and outside the library. Awareness and focusing on this need will allow them to facilitate end-user optimum utilization of digital resources provided through the library.

#### Phases in digital library development

The many facets of the concept of “the digital library” make it rather difficult to find models to be used in digital library planning and development. Two institutions which almost equate the generalized definition seem to indicate a dire need for collaborative effort. But even before the planning committees are selected, the commitment of the administration is paramount in getting the projects off the ground. Whoever has to write or otherwise endorse the vital checks must be convinced that developing a digital library is central to the mission of the organization(s) for which it is being created. The two institutions are: The University of Edinburgh (UK) – Edinburgh Electronic Virtual Library (EEVIL); and the University of California system – California Digital Library (CDL). Based at the University of Edinburgh and sponsored by grants from the British government, EEVIL was launched in 1995 to collect and make available to British research institutions, material in digital collections developed by EEVIL staff members. In addition, it provides links to digital collections held by member institutions – those that have agreed to make their digital collections accessible under the UK Electronic Library Programme - eLib (MacLeod and Kerr, 1997). EEVIL is a multi-institution collaborative effort with the basic goal of making information readily available to researchers in the UK. On the other hand, CDL is a one-institution organization. The University of California System, happens to have a multi-unit structure of constituent universities. The CDL is the 10th research library in the system and the university librarian has the same status as the others managing conventional libraries (Quint, 1998). Although these two are on different sides of the Atlantic, their basic goal is similar – to create an electronic environment for fast, readily accessible information for users.

Judging by the reports of the two prototype digital libraries, the planning process pays a lot of attention to user needs and mission objectives of the participating institutions. The participants in planning are multi-disciplinary, drawing on the expertise of computer scientists, librarians, and telecommunications engineers. In addition, planning is typically dynamic, as the changing technology environment demands that projections be made as to mode of operation; user base and especially user expectations; and the technology in use has to be constantly modified.

Digital library development is fraught with problems and issues that need perpetual attention. Examining the literature reveals several fundamental issues that include: cost at both the initial level and recurrent costs when the library is established; the basic organizational infrastructure – independent unit vs incorporation in existing conventional library set up; needs of internal and external users; negotiating license agreements for vendors of proprietary collections; access rights, among the intended users; technology options to use; developing interfaces to use in accessing the digital collections; and training both the staff and patrons. However the digital library is defined, these issues seem to crop up at the design, implementation, and regular operational levels.

Given the definitions in current literature cited at the beginning of this article, partial digital libraries abound in most industrialized countries in Western Europe, North America, and the Pacific Rim. These are the libraries in the second stage of the metamorphosis to fully developed digital libraries. In their article, Oppenheim and Smithson referred to them as “hybrid libraries” and provided an elaborate exposition about: their content, characteristics, and services (Oppenheim and Smithson, 1999). They gave some of the European examples, which included: The Royal Dutch Library and the University of Tilburgh Library in the Netherlands. The five British examples were:

1. (1) University of East Anglia;
2. (2) Kings College London;
3. (3) University of Birmingham;
4. (4) University of Northumbria; and
5. (5) The London School of Economics.

Within the USA, several projects have been developed – many with US Federal Government funding (Griffin, 1998). Among these are: The Carnegie-Mellon University Informedia Project; Virginia Tech’s Networked Library of Theses and Dissertations Project; and Cornell University Electronic Text Center Project (Engel, 1998). At the national level, The Library of Congress American Memory Project (Davis, 1998) and The British Library Electronic Library Programme (Alexander, 1996) are some of the most prominent ones in the world. While the examples cited in this article are illustrative, no attempt was made to provide an exhaustive listing. The authors are aware of many more deserving libraries which should be on the “hybrid library” list as defined by Oppenheim and Smithson.

Most libraries characterized as hybrid-libraries have many common features. First, they have licensed digital collections such as CD-ROMS, DVD, or locally loaded databases obtained from external sources. Second, they provide remote access to in-house or external digital collections, the latter being mainly via the Internet. Third, they have internally developed digital resources, which may include in-house reports, statistics, local historical archives, or material digitized by scanning hard copies. Fourth, they may provide on their Web site, a subject oriented summation of the Internet sites most relevant to their clients. Fifth, if organized separately, they may also provide access to general image, video, or animated databases. Finally, all do provide training programs for their staff and users about the nature of digital resources and how to use them.

Hybrid-libraries are ordinarily access nodes in the global digital library environment. While the usual definition of node implies ownership of a domain name, in this context, node means the “main access point” to digital resources on the Internet. Coupled with their “hybrid-library” features, this connotation calls for the need to design interfaces that incorporate external and internal digital collections with a seamless search and retrieve mode. Several issues crop up at this level. First, provide an interface that is user-friendly and is cognizant of the idiosyncrasies of digital collections. Second, design interfaces for both novices and advanced users. Features should be incorporated in the design which allow the latter to skip some of the steps. Third, develop access rights which limit access to licensed databases, but at the same time allow external users access to institutional digital resources as well as resources obtained from state and federal agencies. Fourth, differentiate between access and availability, especially for remote sites to which the local library serves merely as a pointer. User frustration will be greatly minimized if they are informed in advance that external digital resources may have restrictions on access rights. Finally, subject categorization of digital resources is usually necessary for Web links provided on the library’s Web site. Such classified links facilitate clients’ ease of access to digital Web resources and may require indexing and other methods of surrogation.

As already intimated, fully-fledged digital libraries, as contrasted to digital collections are in their formative stages and relatively few. While it might be argued that discussing their characteristics and the services they should render is speculative, one can discern trends in the current so called “hybrid-libraries”. Some of the expected features are: commitment to user services; user friendly interfaces, which recognize diversity in the structure and content of digital resources; speedy and timely delivery of information services; and multi-media digital resources, which include: text, images, video and animation. They provide an electronic digital information-rich environment aimed at satisfying user needs with optimum convenience.

#### Educational needs of the digital library user

For decades, academic libraries recognized their education function and developed elaborate bibliographical instruction programs, which are available in most US colleges and universities. While the suggestions made in this article capitalize on some of the experience gained from such programs, current technological innovations demand new operational paradigms. For instance, in the days of the card catalog, access knowledge acquired lasted a long time before it became obsolete. However, in the digital age an ever-changing information technology complicates assimilation and retention of the requisite access language information. Consequently, an information seeker in a digital library environment needs a lot of initial training and constant handholding. An obvious potential remedy is the fact that many of the library users have access to computers at home and at work and thus have the basic computer access skills before they come to the library. The need to understand the equipment may be as simple as getting on the system and logging off – to how does one download or e-mail the downloadable material to one’s e-mail address. Downloading images and animated video material requires knowing the capacity of the equipment the end-user is working with. If remotely accessed from the office or home, the equipment – computer and telecommunications links must have the capacity to accommodate the type of image desired. The end-user will be frustrated when the home or office equipment does not have enough memory or storage on the hard disk to manipulate an animated graphic vital to his or her work. The user must thus be apprised of the limitations of the equipment to be used for access whether at home, office or in the host library. In addition, the access computer may not have the appropriate software for the graphics the user needs to manipulate.

The user also needs to understand the nature of digital collections. Several issues come into play. First, he or she may have to use more than one interface to access dissimilar digital collections within the same library. As demonstrated by the research done at the US Library of Congress, a single, all purpose interface may not be appropriate for all digital collections, especially in large research libraries (Marchionini et al., 1998). Second, the user may also need to know the nature of the content of the digital collection(s), whether text, graphics, or both and their characteristics. Third, the licensing issue for particularly proprietary databases may baffle the end-user, as some vendors insist that their products can only be used within the library. Fourth, links to digital resources have to be clearly differentiated, internal as distinct from external. Some of the external links to digital resources may need user ID in contrast to internal collections. The Michigan Electronic Library[1] is a good example in this respect. It was established as “an online information system that provides residents of Michigan with no-charge Internet access to a basic set of electronic resources. MEL’s ‘virtual library’ is selected by librarians and is designed to be a significant information tool for the state’s libraries and its citizens...sponsored by the State Library of Michigan and the University of Michigan, University Library.” (State Library of Michigan and University of Michigan, University Librarary, 2000, par. 1). The site is linked to the Digital Resources section of the University of Michigan’s Library homepage. Once the site is accessed, the researcher is advised that “commercial databases are available to Michigan residents only” (State Library of Michigan and University of Michigan, University Library, 2000, par. 1). The researcher who is not part of the Michigan community cannot access such databases as SIRS or OCLC’s Firstsearch. These databases have limitations imposed by licensing agreements comparable to restrictions on many Web sites. When instructing students about Web page access for digital resources, one must be aware of disclaimers like Michigan’s. Although one may not necessarily have access to all of the links appearing on the Michigan Web site, it is still a very valuable research tool. It offers a keyword search option and offers the “outside” researcher links to a myriad live links. The Automotive Information Center can be accessed through the Business, Economics and Labor link and is a particularly comprehensive source that is universally available. The incentive for this free access to such comprehensive industry oriented data may be that Michigan is a major car-manufacturing center in the United States. Nevertheless, it is the responsibility of the Instruction Librarian to point out that ready access points to the collection may or may not be available in the recommended source. Finally, even in a fully digitized library some of the collections may not have been digitized yet. If “undigitized” or “in process” material must be indexed in the same interfaces as digital collections, they must be clearly labeled to avoid confusion.

Digitized multimedia must be clearly understood before the end-user accesses it. For sound/voice recordings, an appropriate sound card and speakers must be available in order to take full advantage of the recordings. Similarly, digitized artwork requires an appropriate video card for near-original-image reproduction. If the multimedia has to be imported into a text document for presentation or publication, image handling software must be accessible to the end-user. Currently, several relatively inexpensive image editors are available on the market for example, PhotoShop Pro. Some software suites like the Microsoft Office 2000 have these utilities bundled into their generalized offerings, for instance, Microsoft Photo Editor.

A perennial problem with digital libraries is accessing remote collections to which the host library has pointed the end-user. Similar to earlier online public access catalogs (OPACs) connections via Gopher, the end-user will be faced with the idiosyncrasies of the system to which he or she connects. When utilizing electronic resources at the local library, one may have a degree of hand holding which may have the luxury of voice or e-mail. The remote site identifies the user as “external” and by definition not entitled to human intervention type of help, unless done by special arrangement. In addition, remote site digital collections have a “transience element” which the end-user should be made aware of. Frequent users of the Internet would probably discover through trial and error and experience that some material on remote links have a way of disappearing without apparent notice to external users. The onus will be on the host library to explain the vicissitudes of external digital collections to its users during training sessions.

Access languages for digital libraries emanate from research efforts like the one supported by The Library of Congress. The resultant interfaces may need a higher learning curve on behalf of the staff and end-users. In their development effort at The Library of Congress, the research team headed by Marchionini tested an experimental interface they called WebToc and reported:

...a pilot study was conducted to evaluate the usefulness of WebToc versus plain browser for website navigation tasks. Results suggest that the complexity WebToc adds to the display makes simpler tasks more difficult but in the case of more complex tasks it adds enough value to outweigh display complexity (Marchionini et al., 1998, p. 544).

Some information professionals have indicated that online public access catalogs (OPACs) are difficult to use (Borgman, 1996). With layers of interfaces to plough through, digital library users will experience even more complex access tools. This will require a higher level of hand holding or very carefully developed online help files.

#### Relevance of pilot studies to digital library environments

Between 1997 and 1999 the authors conducted pilot studies to investigate the use of search engines for information sources in the academic libraries in the New York metropolitan area. Search engines were contrasted to online databases which may be URL (Universal Resource Locator) accessible online via an