

Foreword

THE DESIGN, CONTENT, AND USE OF DIGITAL LIBRARIES

Digital libraries are meant to provide intellectual access to distributed stores of information by creating information environments which advance access beyond electronic access to raw data—the bits—to the fuller knowledge and meaning contained in digital collections. Electronic access is increasing at a rapid pace through global efforts to increase network connectivity and bandwidth, new information management tools, and importantly, interoperability across systems and information content. The quantity of online digital information is increasing ten-fold each year in a relatively uncontrolled, open environment. This pace of information creation far surpasses that of the development of technologies to use the material effectively. The number of people accessing digital collections through the WWW also shows explosive rates of growth. Finally, internationalization is making a “global information environment” a reality. (Griffin, 1998)

As this statement by Griffin suggests, one of the seminal developments in the field of information management at the end of the last century and the early part of this century has been the rapid growth of digital library initiatives. Griffin also hints at the key areas of development for digital libraries: network connectivity and interoperability (design), knowledge and meaning (content), intellectual access (use). Ten years on from Griffin’s 1998 observations, we now have before us the *Handbook of Research on Digital Libraries: Design, Development and Impact*. In this collection, Professor Foo and his colleagues address these same issues in considerable detail: design, content, use. The issues remain, but the solutions have advanced considerably in the past decade as digital “libraries” have come to encompass not only libraries, but also institutional digital repositories, certain kinds of portals and Web sites and digital archives.

The term “digital library” probably was coined in the 1980s during discussions among a number of U.S. agencies that culminated in the Digital Libraries Initiative (DLI) in 1993 (Griffin, 1998). The impact of the DLI began in earnest with the establishment of six DLI projects (http://www.cise.nsf.gov/iis/dli_home.html).

From the beginning, DLI was regarded as a community-based process which, although this may have been downplayed in recent years, is resuming significance in current developments. The community basis of early digital library initiatives was evident in the breadth of interest and involvement of researchers across many disciplines; this extended quite rapidly to absorb researchers and practitioners from many disciplines far beyond the hard sciences and information science into the human and social sciences. This much is evident in the many digital library projects currently established or under development, covering such topics as ancient Near Eastern materials, medicine, children’s literature, Greek and Latin classics, and much more.

In all such projects, whether community-based or otherwise, digital library *design* remains a significant concern, and we are still seeking improvements on a number of fronts, some of which are becoming critical.

This is especially true of system architecture, which must become increasingly sophisticated in order to deal adequately not only with the more complex content of digital libraries, but also with the greater expectations of users in terms of flexible content management. Another important design consideration involves metadata and metadata applications that can be developed and fine-tuned in terms of “searchability” and long-term sustainability. And a third, perhaps most critical, issue is that of privacy and security in digital library applications. Interestingly, as these words are being written, Victoria University of Wellington has just hosted the International Conference on Managing Identity in New Zealand: User-centric Identity in the 21st Century (<http://www.identityconference.victoria.ac.nz/>). As the Conference publicity indicates, “...the representation of personal identity in digital environments takes place on a different footing compared to identification processes in the physical world.” As a consequence, we now face new challenges on several fronts—social, technical, legal, political, and economic—to ensure secure identity management in an online environment. It is within this framework that we must consider ways of ensuring secure and accurate information access and transfer within digital libraries through the use of appropriate technologies.

From design, we move to digital library *content*, and especially how this content can be processed and managed; again, there are several areas of critical importance. One of these may be broadly termed semantics and ontology: how terms can be understood and standardized both to aid effective searching to improve text summarization, which in turn leads to better search results. Also within the broad ambit of semantics are metadata standards, and how these can be used to improve document description. A second major issue in terms of content processing and management relates to use and usability. In order to improve processing and management with a view to the use of digital library content, we face the enduring issue of user-friendly interfaces—what the technology can do must match what the users want it to do. Here, the concern is how we can use the technology, particularly machine learning, to build user profiles in terms of their interests, thereby improving search and retrieval functions in digital libraries. Through better understanding of user needs and interests, it is possible, for example, to employ ranking functions when ordering retrieved results in a manner most suited to individual requirements.

This focus on understanding the use of digital resources leads seamlessly into the third area of concern, the *use and users* of digital libraries. How usable are digital libraries, and how can usability be evaluated? What are the critical factors behind effective use of digital library content? What interfaces are available, and how appropriate are they for the intended users? How effective is the visualisation feature of digital library collections, and how navigable is the visual content of digital collections from the user perspective? These are enduring use and user questions from the predigital era now translated into a digital environment, with the advantage of better technological support for possible answers.

Design, content, and use—these three areas of principal concern in the digital library environment are also addressed by the editors of the *Handbook of Research on Digital Libraries: Design, Development and Impact*, which should come as no surprise to anyone who knows this team. The collection of papers in the *Handbook* will go some way towards improving our understanding of how current research is addressing these three areas of principal concern, and where this research may be taking us in the immediate future.

What must be addressed next by researchers is the community-based nature of digital libraries and how this community basis can and must inform future digital library developments. Understanding the community or communities of users, or perhaps the communities of practice, implies a more realistic awareness of not only ICT availability in much of the world, but also the digital literacy of such communities where the enabling ICTs are embedded in regional or national information infrastructures.

In the early 1980s, I participated in a Unesco-sponsored conference on the topic of documentation for development (as in “Third World” development), at which a sadly misguided participant stated adamantly that

“even the smallest information centre in the most underdeveloped part of the world has a desktop computer.” It was not true then, and it certainly is not true now, but a similar misconception is still with us:

One of the great boons of the Web is the online availability of the treasures of the world’s libraries and museums. Great paintings, personal letters, dairies of the famous and infamous, ancient papyri, important national documents—all are there for any student with a computer and Internet access. (Anderson & Maxwell, 2004, p. 1)

The operative phrase in this statement is “any student with a computer and Internet access,” with the unstated assumption is that this applies to most students. However, the reality is different: in the USA alone, it was estimated in 2004 that

- 33% of urban residents do not use the Internet
- 34% of suburban residents do not use the Internet
- 48% of rural residents do not use the Internet (Steffl-Mabry & Lynch, 2006, p. 66).

The residents are reported as not *using* the Internet; in how many developing countries would the more appropriate comment be “unable to use because access does not exist” or “unable to use through lack of digital literacy”? For most of Africa, for vast swathes of Asia and Oceania, for much of the Middle East, for significant parts of Latin America, this would be the reality.

Since digital libraries depend ultimately on the ability to access and to understand their content, it is incumbent upon researchers to tackle this double-edged sword of access and understanding with the same vigour with which they have tackled the issues of design, content, and use. There is perhaps less we can do as researchers in relation to regional and national information infrastructures, except to lobby for greater commitment and investment and to make our expertise available for development, than in relation to understanding through digital literacy. Indeed, as we broaden our horizons from literacy to information literacy—and now to digital literacy—there is much that is already being done, as can be seen in Rivoltella’s edited collection, *Literacy: Tools and Methodologies for Information Society*. As long as the digital divide, digital illiteracy, and digital exclusion are with us, digital libraries will be that much less effective than their potential warrants. “Digital exclusion [...] is to remain incapable of thinking, or creating and organizing new more just and dynamic forms of production and distribution of symbolic and material wealth” (Fantin & Girardello, 2008, p. 312).

With this situation as an underlying imperative, the editors and authors who have contributed to the *Handbook of Research on Digital Libraries: Design, Development and Impact* deserve particular commendation for the manner in which they have delved with insight and scholarly rigour into the areas underpinning forward motion in digital library development and use. In 58 chapters, this collection addresses a range of issues under the broad rubric of design-content-use that will inform our thinking on future digital library development for some time. And in the final section, there are several chapters that serve as links between the specific technical issues addressed in earlier sections and possible future developments—food for thought indeed.

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