

Digital Libraries in Education: Promises, Challenges and Issues

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Abstract

The examples above illustrate that digital libraries have obvious roles to play in formal learning settings by providing teachers and learners with knowledge bases in a variety of media. In addition to expanding the format of information (e.g., multimedia, simulations), digital libraries offer more information than most individuals or schools have been able to acquire and maintain. Digital libraries are accessible in classrooms and from homes as well as in central library facilities where specialized access, display, and use tools may be shared. Remote access allows possibilities for vicarious field trips, virtual guest speakers, and access to rare and unique materials in classrooms and at home. The promise is one of better learning through broader, faster, and better information and communication services. These physical advantages promise several advantages to teachers and learners by extending the classroom, however, as with all technologies, there are costs and tradeoffs to these advantages.

KEYWORDS- Digital Library, Education, Information Technology

INTRODUCTION-

One clear difference between traditional libraries and digital libraries is that digital libraries offer greater opportunity for users to deposit information as well as use information. Thus, students and teachers can easily be publishers as well as readers in digital libraries. The number of student-produced "Mosaic home pages" and gopher sites continues to grow as teachers and students not only bring digital library information into the classroom but move the products of the classroom out into the digital libraries. Just as distinctions between publishers and readers are becoming less clear in networked environments, Internet access in classrooms blurs distinctions between teaching and learning. Students bring interesting and important information to class discussions and in many cases lead teachers and classmates to new electronic resources and tools. Teachers' increasingly will find themselves in the important roles of moderator and critic, modeling for students how to examine and compare points of view and look critically at information. Teachers who have begun using networked materials in their classes are early adopters of new ideas and technologies and are comfortable sharing power with students. Just as "authority of information" has become an issue in professional communities that leverage networks, the authority of information in classrooms that has traditionally rested solely with teachers will increasingly be challenged by students locally and remotely.

ROLE OF DIGITAL LIBRARIES -

Digital libraries will support communities of interest and allow more specialized courses to be offered. For example, students at different high schools in the CoVis project collaborated by sharing a digital library of weather data [12] and students in the Earth System Science Community Project described above share a variety of NASA data in classes in Washington D.C., St. Louis, Los Angeles, and New Mexico. Telecourses have already allowed rural schools to offer advanced placement courses to a few students by sharing teachers across geographical distances. As network access improves in schools, highly specialized courses offered on a distributed basis will become common, and it is likely that some of these will be offered by students. Internet-based courses have already been offered successfully, although mainly on the topic of the Internet itself, and network based electronic conferences have proven effective (e.g., University of Maryland Professor, Thomas O'Haver recently ran a chemistry conference that involved 450 participants from 33 countries).

The most important changes that digital libraries bring may be in advancing informal learning. The same advantages that accrue to classroom learning also accrue to individuals pursuing their own learning. In many ways, the development of Freenets are extensions of the public library system. Digital libraries are digital schools that offer formal packaging for specific skills and topics as well as general browsing for creative discovery and self-guided, informal learning. The design community has already begun to consider ways to support learning on demand in electronic environments [9] to address problems of coverage (since no learning system can cover all things learners may need) and obsolescence (systems and knowledge changes).

MAJOR PROBLEMS OF LIBRARIES-

For the promises to obtain, issues of access and intellectual property must be addressed. Although the U.S. Library of Congress has committed to becoming a digital library, it can make available only documents or finding aides created within the Library or government agencies, items out of copyright, and representations from exhibits or events sponsored by the Library. Although these represent enormous quantities of information, the core holdings of the Library--the books, films, and recording--cannot be made available electronically under current copyright law. Whether the copyright law will change to allow materials to be accessed electronically under some educational fair use arrangement remains to be settled. Curators, theater owners and publishers are loathe to give up restricted access due to understandable self-preservation concerns. Some of these fears may be unfounded. For example, in the 1930's owners of professional baseball clubs allowed only World Series games to be broadcast on the radio because they feared that attendance at regular games would go down if all games were broadcast. When Lawrence McFale in Cincinnati began to broadcast the Reds' games in 1938, entire new markets opened up beyond the traditional male attendees--women and men who previously did not know much about baseball became interested and attendance went up (Ken Burns' PBS series, Baseball). Additionally, entire new revenue streams from advertising became available, which today eclipse attendance profits. However, historical examples are not likely to be enough to convince publishers and other information

industry entities to make their "property" available electronically without secure mechanisms for profit.

CONTENT SELECTION:

Even more challenging, however, is building intellectual infrastructures for digital libraries. These include techniques for using electronic information in teaching and learning [18]. Teachers must learn how to teach with multimedia resources and to share informational authority with students. Designing activities that take advantage of digital library resources requires time and effort to examine what is available and integrate information into modules and sequences appropriate to the students and curriculum. Furthermore, modeling the research process for students requires teachers to grapple with problems on-the-fly, make mistakes, recover, react to dead ends, and demonstrate all the other uncomfortable and frustrating aspects of problem solving. Like Euclid, who presented the products of geometric research in the form of neat, polished deductive proofs (rather than the empirical and intuitive thought that led to the theorems), teachers are more comfortable providing polished packages/modules rather than the messy details of discovery and problem solving. Applying digital libraries in classrooms requires different attitudes and tolerances for such learning conditions.

Just as teachers must learn new strategies for using electronic tools in teaching, students must learn how to learn with multimedia (both actively and passively) and how to take increased responsibility for directing their own learning. In our observations of students in classrooms where Perseus was used, students expressed concerns about taking notes--because a screen of text, a screen of vases, and the instructor's verbal comments were concurrently available, they did not know what to write down! Although better technological tools such as networked laptop computers may solve the technical problem, the issues of what to attend to and how multiple streams of information should be integrated require new combinations of perceptual, cognitive, and physical skills for learning. In short, building intellectual infrastructures requires intellectual, emotional, and social breakthroughs for teaching and learning.

CONTENT ACCESS AND DELIVERY

At the nexus of physical and intellectual infrastructure is the interface to the digital library. Tools for finding, managing, using, and publishing electronic information must be both powerful and easy to use. Digital libraries must provide a mix of software and people to provide reference assistance and question answering services (e.g., Ackerman's Answer Garden system for handling X-Windows questions, [1]). The people in the digital library will go beyond reference to serve as teachers on demand. These humans must be aided by software that shunt "typical" questions toward pathfinders or frequently-asked-question services. Thus, digital libraries will extend what has been the most beneficial feature of electronic networks--communication---to teaching and learning settings. Good interfaces will allow learners to take advantage of digital resources equally well in classrooms, homes, and offices.

Clearly, digital libraries have important roles to play in teaching and learning. Existing physical schools and libraries will continue to exist since they serve cultural and

social roles as well as informational roles. There will always be a need for physical objects and social settings in learning; the vicarious is not enough. Parents will continue to demand child care, assurances of organized and shared culture beyond television, and human direction and guidance in learning at all levels. These demands will also be augmented by digital environments. Digital libraries will allow parents, teachers, and students to share common information resources and communicate easily as needed. In special cases, work, school, and play may become one--novice and professional learners collaborating with common information resources to solve real problems. In many respects, digital libraries will become digital schools. This represents a return to Alexandria, where learners of all types come together to share and explore information and expertise.

A) PROMISES:

Accessibility: Digital libraries facilitate access to vast amounts of information, breaking down geographical barriers and providing resources to students and educators worldwide.

Resource Diversity: They offer a wide array of resources, including e-books, academic papers, multimedia content, and databases, catering to various learning styles and preferences.

Cost-Efficiency: Digital libraries can reduce costs associated with purchasing physical books and materials, making education more affordable and sustainable.

Searchability and Organization: They enable efficient search functions, allowing users to quickly find relevant information through keywords, categories, or filters.

Remote Learning: Digital libraries support remote learning, enabling students to access materials from anywhere with an internet connection, fostering flexibility in learning schedules.

B) CHALLENGES:

Digital Divide: Unequal access to technology and the internet creates disparities in accessing digital library resources, impacting students' learning opportunities.

Quality Control: Ensuring the accuracy and reliability of digital resources can be challenging. Not all digital content undergoes rigorous vetting or peer review.

Copyright and Licensing: Managing copyright issues and licensing agreements for digital content can be complex and may limit access to certain materials.

Technological Infrastructure: Inadequate technology infrastructure in some areas can hinder the seamless use of digital libraries, causing issues with connectivity, speed, and reliability.

Information Overload: The abundance of information available in digital libraries can overwhelm students, making it difficult to discern credible sources from unreliable ones.

C) ISSUES:

Privacy and Security: Concerns about data privacy and security arise when students and educators access digital libraries, raising questions about the protection of personal information and sensitive data.

Digital Preservation: Ensuring the long-term preservation of digital materials and preventing data loss or obsolescence requires ongoing effort and investment.

Training and Digital Literacy: Not all students or educators may possess the necessary skills to navigate and utilize digital libraries effectively, emphasizing the need for comprehensive digital literacy programs.

Customization and Personalization: Tailoring digital library resources to individual learning needs while maintaining inclusivity for diverse learners presents a challenge in designing platforms and content.

Sustainability: The environmental impact of digital libraries, including energy consumption and electronic waste, needs consideration to ensure sustainability.

Digital libraries play crucial roles in advancing agriculture education, extension, and research by providing comprehensive resources, fostering collaboration, and facilitating access to crucial information. Here's how:

Education:

Access to Educational Resources: Digital libraries offer a wide range of materials, including textbooks, journals, case studies, and multimedia content, enabling students and educators to access up-to-date information on various agricultural topics.

Enhanced Learning Opportunities: They supplement traditional classroom teaching by providing interactive and engaging resources, which can include simulations, videos, and online courses, fostering a deeper understanding of agricultural concepts.

Remote Learning Support: Particularly valuable for students in remote areas or those unable to access traditional educational institutions, digital libraries ensure access to agricultural education resources from anywhere with an internet connection.

Promoting Specialized Skills: Digital libraries often curate specialized content tailored to specific agricultural fields, supporting the development of specialized skills necessary for various agricultural disciplines.

Extension Services:

Dissemination of Information: Digital libraries serve as platforms for extension workers to access and disseminate information to farmers, providing updated agricultural techniques, best practices, and innovations.

Training and Capacity Building: Extension workers can access training materials, case studies, and guides from digital libraries, enhancing their knowledge and capacity to support farmers effectively.

Community Engagement: Libraries facilitate the creation of forums or discussion groups where extension workers, farmers, and experts can exchange ideas, share experiences, and address agricultural challenges collaboratively.

Research:

Access to Research Publications: Digital libraries offer access to a vast repository of research articles, papers, and scientific journals, allowing researchers to stay updated on the latest advancements and findings in agricultural sciences.

Data and Statistical Information: Libraries often house databases containing agricultural data, statistical information, and research findings, supporting researchers in analyzing trends and making informed decisions.

Collaboration and Networking: Digital libraries encourage collaboration among researchers, enabling them to share findings, collaborate on projects, and access research conducted by peers globally.

Innovation and Problem Solving: By providing access to diverse resources, digital libraries support innovation in agriculture by allowing researchers to explore new ideas, experiment with technologies, and address agricultural challenges more effectively.

Technology and Innovation:

Information on Agricultural Technologies: Libraries contain information on emerging agricultural technologies, enabling researchers and practitioners to stay updated on advancements that could improve agricultural practices.

Tech Transfer and Adoption: They facilitate the transfer of technology and knowledge dissemination, aiding in the adoption of innovative agricultural practices among farmers and stakeholders.

Digital libraries, therefore, act as indispensable resources in advancing agricultural education, facilitating extension services, fostering research collaborations, and driving innovation in the agricultural sector. They play a pivotal role in ensuring that relevant information reaches stakeholders, ultimately contributing to the sustainable development and growth of agriculture.

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