

**DIGITAL LIBRARIES SUPPORT DISTRIBUTED EDUCATION  
OR  
PUT THE LIBRARY IN DIGITAL LIBRARY**

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**ABSTRACT**

Many digital library discussions focus on computer processing and neglect the range of services that libraries traditionally provide. The digital library is not equivalent to a digitized collection with information management tools. It is also a series of activities that brings together collections, services, and people in support of the full life cycle of creation, dissemination, use, and preservation of information. A digital library should be a seamless extension of the library that provides faculty and students with access to information in any format that has been evaluated, organized, archived, and preserved. Access to evolving digital information is provided through global as well as personalized systems and through the services of information professionals. Digital libraries and traditional libraries should not be separate, but should coalesce to accomplish more than either can do independently to serve the user community on the highest order.

## INTRODUCTION

My thesis is that many digital library (DL) discussions focus on computer processing and the limited notion that a library is just a collection of documents. Frequently these discussions are held among computer scientists and do not include librarians. As a result they neglect to consider that libraries provide a range of services and resources to anticipate as well as meet the needs of their user communities.

Through this presentation, I want to have a catharsis (in the Aristotelian sense) and I'm going to have it in public in front of what I hope is a sympathetic crowd. I will briefly express my dissatisfaction about the shortsighted approaches of computer scientists who conduct research and write about digital libraries, failing to take into consideration the range of library resources and services and the multi-faceted roles of information professionals and librarians. Secondly, I will share a definition of "digital library" created with my colleague at Virginia Tech, Nan Seamans. Third, I will share some design scenarios prepared by a variety of Virginia Tech faculty that describe their visions of the library. And, lastly, I will make recommendations for actions we should take.

## CATHARSIS

Through working with computer science faculty at Virginia Tech over several years, I developed the opinion that their research and development of digital libraries was so narrowly restricted as not to be about libraries at all. They usurped the word and ignored the broad range of services and resources associated with libraries. Unfortunately, reading about DLs has not dispelled what I learned through my VT experiences. For example, the October 1998 "Report of [the] First Summit on International Cooperation on Digital Libraries" defines it as "a collection of digital objects ... along with methods of access and retrieval, and for selection, organization, and maintenance of the collection." Michael Lesk's 1997 book, *Practical Digital Libraries: Books, Bytes, and Bucks*, says "Digital libraries are organized collections of digital information. They combine the structuring and gathering of information, which libraries and archives have always done, with the digital representation that computers have made possible, [ixx] and: DLs "address traditional problems of finding information, of delivering it to users, and of preserving it for the future." [p.2]

While their goals are lofty--to improve access to information--they concentrate solely on computer processing of information and ignore those aspects of libraries that can not be preprogrammed or digitized. Therefore, what they attempt to create is not a library at all; certainly not the Athenaeum-like place where writers and scholars meet. They use it more in the old fashioned sense of a circulating collection with simultaneous multi-user access. The computer scientists who discuss and conduct research and write about DLs are on a noble mission, but because they often isolate themselves from librarians and libraries, the broad range of services and the human environmental factors of the building structure, eludes them.

Librarians and information professionals do not try to meet the needs of library users and other information seekers with just one format, even one that is becoming as pervasive as digital. Similarly, few libraries limit their collections to just works available in paper, but also include magnetic tapes with audio and video recordings as well as bits and bytes, and vinyl, and microforms. We know that our library users inquiring about information want it in whatever format they can get easily and quickly.

When a diverse group of teaching, research, and library faculty came together because of our interest in applying for grant funds to support DL research, it quickly became evident that we lacked a common understanding of "library." This can, of course, be attributed in part to the jargons of our separate professions. English and Engineering faculty thought first of the building that houses *their* collections. Computer Science faculty focused on programming access to digital resources, ignoring the role of subject bibliographers who evaluate and develop collections that meet the needs of the breadth of a research university as well as the needs of degree programs and the specific research needs of the faculty, i.e., collection development and collection management.

Another point of confusion was trying to incorporate asynchronous teaching and learning into our plans. The classroom, like the library, needs to be thought of as having a component that is independent of time and place. However, they would not eliminate the instructor from the course, but they would consider eliminating the librarian from the library. In both cases the one that resides wholly on a computer or a network of

computers is not a complete replacement of the other, but is more effective as a component.

Because of these kinds of discussions, we initially had a difficult time agreeing on how the grant would be allocated. Therefore, using our own words and borrowing from others (including Stephen Griffin, Program Manager of the Digital Libraries Initiative at the National Science Foundation, and Digital Library Initiative Phase I participants), Nan Seamans and I developed and circulated among the grant writing group this definition of a digital library.

**DIGITAL LIBRARY DEFINITION  
FOR VT DLI2**

<http://scholar.lib.vt.edu/DLI12/defineDL.html>

The "digital library" is not merely equivalent to a digitized collection with information management tools. It is also a series of activities that brings together collections, services, and people in support of the full life cycle of creation, dissemination, use, and preservation of data, information, and knowledge. The challenges and opportunities that motivate an advanced DL research initiative should

be associated with this broad view of the DL environment.

A DL should be a seamless extension of the library that provides scholars with access to information in any format that has been evaluated, organized, archived, and preserved. Access to this evolving collection of digital information is provided through personalized systems as well as through the services of information professionals. The DL adds value and saves time while extending the hours of access. It reduces the need for proximity to information resources, but still emphasizes the quality of those resources. It is a library that can be individually customized and, ultimately, will be easy to use.

Libraries are more than their information resources, their collections, the buildings that house them, the systems that they run on, or the services they provide. Libraries have information professionals that make judgments and interpret user needs; they provide services and resources to people (students, faculty, and others, and organizations). Some

traditional library services can be replicated in the DL, partially or wholly, but some cannot be replicated. Online instruction is important, but sometimes meeting face-to-face, or having a (telephone) conversation, between student and instructor (including the information professional and librarian) is the most effective method.

Information seekers should not be denied any library resource or service because it is not available online. The DL and the library should be complimentary, intertwining systems that exist to serve the user community on the highest order.

With a DL evolving within an academic library interested in research and development along pedagogical lines, we have a unique opportunity to incorporate participatory design to address user issues and collection-centered issues, as well as systems-issues. While it didn't generate as much discussion as we would have liked, we used the opportunity to educate our colleagues and we received important input. For example, professor of political science, Tim Luke, wrote:...

we seem to want "the library

digitized," recognizing, as Gail's description does, that we are talking about rebuilding an entire environment, culture, space, and discourse for knowledge accumulation/evaluation/organization/preservation around digital means of access and use. ... we want to generate a system, like [OCLC] or the Internet, rather than a product, like an OPAC or Windows, so that it might be easily, cheaply, and widely used. ...This perhaps flies in the face of university's economic development mission, but this orientation seems more worthwhile and important than just throwing forth a new stream of computing commodities. ...The library is a very old social institution, so we need to have an attitude of permanence when working in this area ... In addition, we also need to ... preserve physical things that contain/express information.

Luke goes on to suggest that the DL should have these characteristics

- an open, adaptable notion of

document...

- a flexible, expansive system of cataloging tags
- a backward link and forward link to creators and users
- an incomplete, emergent method of evaluative records/profiles/notes
- a uniform, expansive, but accurate system of searching
- a simple, shared means of dissemination
- an adaptive, rebuildable, and error-resistant means of storage

twluke@vt.edu

Sat, 13 Jun 1998 15:34:39 (EDT)

<http://video.dlib.vt.edu:90/~fox/DLI2/ScenLuke.txt>

Another faculty member, Gary Downey, professor of engineering and director of the Center for Science and Technology Studies, wrote in response to our definition: "so the focus of an ethnography project studying both the project itself and prospective participants would be on the identities of the relevant positions or groups." He commented that adding collection-centered issues in the midst of the user-issues and systems-issues is a major intervention in technology-oriented thinking that will help our DL research

project. He agreed with our broad notion of a DL and its being a seamless extension rather than a wholesale replacement of the library.

Downey, however, criticized our phrase "digital library environment" because he prefers "thinking about computer technologies as collections of activities--in this case, the digital library as a collection of library activities that live alongside and in the midst of other library activities. Even more particularly, I think of computer technologies as collections of activities of communication--which raises questions about who is communicating to whom about what, and what kinds of social interactions are taking place through such communications, how these modify pre-existing relationships among people, and so on."

Gary Downey <downeyg@vt.edu>

Tue, 19 May 1998 17:06:10 (EDT)

Subject: Re: definition of a digital library

Stimulating discussion about resources and services that would be useful to DL users ensued. One of the ways we decided to clarify our various views of DLs was by creating scenarios to demonstrate how the (digital) library could support (distributed) teaching

and learning. Those who developed scenarios were from the departments of English and Computer Science. Faculty from the library also developed scenarios, one from a reference librarian and one that outlined the cycle of library activities from an instructor planning a course and determining what resources would be necessary, including library acquisitions and reference services for those resources. What follows are summaries of a few of them. The full text is of the scenarios is at <http://scholar.lib.vt.edu/DLI2/>

## **HIGHLIGHTS FROM SCENARIOS**

### **REFERENCE SCENARIO**

The “reference scenario” by Jane Schillie (Virginia Tech Arts and Sciences College Librarian for the Social Sciences) demonstrates that undergraduate students are seduced by the convenience of searching the web. They are impressed by the quantity of information retrieved and they think, “all information is equal.” Schillie's scenario demonstrates the advantages of the personal reference interview as intellectual access versus electronic access.

She wrote that librarians teach information discrimination through

personalized research assistance, guidance, and instruction. Librarians are trained information professionals, perhaps a better label for the digital librarian cum-traditional librarian. They ask probing questions because experience has taught them that most people who ask information professionals for assistance do not initially ask the question that they really want answered. The librarian listens carefully and analyzes and interprets the responses to discover what information is needed. Then she guides them to the appropriate resources. In this particular scenario, a trained information professional discovers that a student requesting assistance in finding information about the women’s movement is actually interested in finding primary source material to help her analyze Gloria Steinem’s influence on the women’s movement.

### **TEACHING SCENARIO**

Dan Mosser, VT professor of English, presented a scenario for his course on the History of the English Language (HEL). His students will read, watch excerpts, play interactive games, perform workbook exercises, record their speech, and subject their speech and collected research samples

to spectrographic analysis. Initially Mosser was very frustrated about the amount of time and trouble it would take to digitize and get copyright permission for all the material he wanted his students to use. Because he was so focused on a new distributed learning environment, he did not consider methods of distribution beyond the web. He lost sight of the library and only considered using the DL. He is a sophisticated library user, but because he is on campus, he had not kept up with new document delivery services, for example.

From his office he looked for specific videos in the library's online catalog, but he did not find the title he wanted. He completed the appropriate web form, requesting that the Center for Alternative Media purchase it. Preferring a digital video, it was four weeks before he received e-mail notification that it had arrived. He also received copyright permission to use it for this specific class, with access limited to users with vt.edu accounts. With a fresh sense of overcoming the technology, he added a link from his online syllabus directly to this library resource using the EReserve (electronic reserve) system.

Mosser's class will meet traditionally and with a virtual class in England. He requested

and received the publisher's permission for the class in England to have access to the digital video for one week. During this week Mosser will record the "discussion" and mark points in the discussion as it takes place; later he will annotate it with explanatory text and links to video excerpts. This he archives with his other HEL class materials. Quite some time later, he will make a conference presentation that includes this segment and he will submit it to the VTDL (Virginia Tech Digital Library). This digital work will be annotated as a personal publication (i.e., lacking peer review) and given subject descriptors.

#### **RESEARCH SCENARIO**

Robert France, Research Associate in Computer Science, created a scenario about a faculty research project. In his scenario, the fictitious Dr. Charity Miller is beginning new research on the history of photography. She uses a VRML (virtual reality markup language) browser on her desktop computer to interact with VTDL from her private space, a virtual carrel that has all the resources of a traditional carrel and more. She begins with a web search, exporting her findings into her carrel.

Next she searches the library catalog that includes not only local library holdings but many other libraries and databases such as OCLC's WorldCat. When her hits have been listed, they include brief descriptions and whether or not it is available in paper locally or digitally anywhere. These she drags into her "personal digital library." Things are accessible by all of the standard library access points, including as a shelf-list in call number order, and by any personal notes that she has added to them. The hits are color coded, designating their quality rating (which can be based on the source of the work or library bibliographers' evaluations made during collection development, etc.). Some of the works are not available digitally and some the library does not have. Dr. Miller uses an online form to borrow works through interlibrary loan, but she does not have to key in much information because there is metadata within the citations.

Stopping her far-ranging search, she now focuses on the VT library using the same catalog search and the same query but restricting the scope of the search to the local collection. Miller picks a point in the stacks where several relevant books have been "shelved," and using one book as a clue,

clicks herself to the virtual stacks. Here she sees every book that the library owns in this range, even ones that are currently circulating or are physically in storage. She chooses to see them color-coded by quality, relevance to her search, or other criteria and can arrange them in any classification scheme or any other piece of metadata. Spine labels are clear and easy to read! From her research she accumulated an annotated bibliography of works in the library. Instead of walking to the library, she emailed them to Document Delivery, a library service that will deliver them to her office.

While this is in the works, Dr. Miller concludes her initial searching by accessing the American Memory Project. Here she finds illustrations of technological change in photography. She exports some into her workspace, uses an HTML editor to pass it to the VTDL image indexer. The indexer identifies matches in the local collection of images. A visualization device creates a topographical map. The documents that are near each other in the map have similar content and mountains represent many images with the same content. She can see clusters of near matches or similar images so she's ready to begin her investigations.

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["Put the Library in Digital Library"](#)  (a.k.a. "Digital **Libraries Support** Distributed **Education**")

draft of a presentation for the 1999 Conference of the Association of College and Research Libraries, 'Racing Toward Tomorrow,' Detroit, April 9, 1999

"Library Services and Resources for the University Community" ([text](#) and [some illustrations](#)) 

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["Technology Initiatives and Organizational Change: Higher Education in a Networked World"](#) 

Joanne Eustis and Gail McMillan  
presentation at CAUSE '97, Orlando, Florida, Dec. 4, 1997 [accompanying slides](#)  
CAUSE is an association for managing and using information resources in higher education.

**VIRGINIA TECH**

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meets their needs and desires (i.e., 3Qs: quality and quantity, quickly).

### **SCHOLARLY COMMUNICATIONS PROJECT**

<http://scholar.lib.vt.edu>

Along with our fictional scenarios, the grant writing group was exposed to a unit of library that has been designing and implementing enhancements to traditional library resources and services since 1989, the Scholarly Communications Project. It is an early (and sustainable) model of how DLs enhance traditional library resources and services, in many cases paralleling the physical library. Libraries can have an active role in DL development, adapting to evolving needs and expectations of the user communities. Librarians educate today's casual web browsers who will become tomorrow's serious researchers, from undergraduates cruising the web to sophisticated graduates submitting electronic theses and dissertations, to powerful members of the academy publishing electronically. The Scholarly Communications Project collaborates with university researchers so that information seekers continue to have the opportunity to select resources in the environment that best

### **POST-SCENARIO DEVELOPMENTS**

Digital library researchers have not, for the most part, acknowledged the hybrid format environment. These scenarios and library practices, however, reveal that even the very farsighted researchers agree with this reality. The format question should be resolved logically according to how the information is available and how it is to be used.

Developing these scenarios, some individually and some through group input and critique, helped our grant writing group better appreciate the range of goals a DL grant should support. Though we did not come to consensus about the definition of a DL, Nan Seamans and I contributed to broadening the scope of the research to be undertaken to the library's advantage. One goal is to improve teaching and assignments through the incorporation of library materials. The information resources that are important to a class should be format independent, whether the class is taught in a campus classroom or at a distance via a network to a distributed and asynchronous

"class." To accommodate both classroom teaching and distance education (for neither will completely replace the other in the immediate future), students need access to information resources and not all are, can, or will be digital.

Because a resource is not digital does not mean that it cannot be used in distributed, asynchronous education. Digitizing an article may be one practical solution; another solution, however, may be linking to an existing article database. In some situations, sending a library book to a student's home may be the best way to get the information to the student, and making that possible through online requests should be a component of the DL, as it is the library. Offering services such as document delivery through online request forms, as well as information in multiple formats, was not initially a component of the computer scientists' DL and they did not encourage the other teaching and research faculty to incorporate this broader level of resources and services into their scenarios.

#### **IN CONCLUSION**

The DL should not be limited to a collection of documents controlled solely by automated information management tools. It

should also be a series of activities that brings together the collections, services, and people in support of the full life cycle of information--creation, dissemination, use, and preservation.

The DL must also function as a social institution if it is to be a library. This aspect of the evolution of the DL can be detected in recent reports of evolving genres of digital documents that are coming out of social, though distributed, interactions. For example, there is a dispersed group of unacquainted people writing poetry together by contributing alternating lines to limericks. There is also the notion of published conversation being used by some newspaper publications to engender reader input and reaction. The impact informal communication through electronic mail has had on research in many areas is also familiar.

For now, the DL is a collection of information resources and limited library activities that live alongside and in the mist of other library activities. Cheryl LaQuardia put it well in a recent issue of *Library Journal* when she reported that "We confuse the methodology for the product, consider the means as the ends, and mistake the medium

(the web) for the message. Technology will eventually recede into the background to be a silent and unobtrusive servant.”

The best DL will be a seamless extension of the library that, among other things, provides its user community with access to information in any format that has been evaluated, organized, and preserved. Ideally, access to constantly evolving digital information will be provided through global as well as personalized systems with the availability of services by information professionals, librarians. DLs and libraries should not be separate, but should coalesce to accomplish more than either can do independently to serve the user community on the highest order.

Libraries and librarians are committed to their collections and to their users, and that commitment extends to the digital collection and the online user. Computer scientists have an unfortunate tendency to limit DLs primarily to repositories of information. And, as we all know. There is, of course, much more to libraries. People using libraries seek information, certainly, but this just the tip of the iceberg. They also go to libraries seeking knowledge and wisdom and art and entertainment, and more, but they also seek

*help*. Effective use of libraries involves library professionals helping researchers turn their rambling tales of what they are looking for, into the essential elements of well framed questions. The next step is to help them identify a well-defined body of information and avoid the misguided hunt for information. At this point, patrons are ready to continue on their own and to derive more benefits from interaction with the (digital) library.

Information professionals, librarians, know users and know domains of information. We are not indifferent to the collections we service or the users we assist. A machine is; a computer program or script is, also. DLs fail to address libraries as social institutions and we need more librarians like Gary Marchionini working with computer scientists doing research on DL who will help them understand that "To be called a library, an entity must be ... guided by a service mission that is manifested in policies of acquisition (collection development), organization, and access. Libraries offer both content and services guided by such policies and exist in a social-political context that influences policies and operations."

How do we begin to overcome the current limitations of DL? We must take action, be proactive, take a leadership role, not just manage the information resources and services we know so well. Here are some suggestions:

- Do not wait to be asked to participate with faculty in preparing grant applications. For example, work with the computer science faculty and researchers to help them understand how their grant applications will present a stronger argument for funding if information professionals contribute to the “library” in “digital library” research.
- Do not wait to be asked to participate with faculty in preparing classes and instruction. For example, don’t let faculty inadvertently limit expectations based on what is available electronically. Do not let them waste time scanning articles when the article database the library subscribes to has the them available online. Encourage faculty to centralize course materials through systems such as electronic reserve.
- Aggressively inform students about how to get and evaluate the information they need.

Promote library services such as Document Delivery and resources such as online journals and article databases, as well as library resources available through the OPAC. Help them understand that the information they need is available in lots of different formats and many, not just digital, are within easy reach. Help them learn to evaluate Internet resources.

- Work with systems designers to improve functionality and make information easy to find. It is not enough to complain about what your OPAC does not do that it “should” do. We must talk (constructively) with system vendors and offer to help put our knowledge into applications. Complex systems like OPACs do not engender unassisted, unmediated public use and independent information seeking behaviors are increasing tremendously. Similarly, DL designers devote the majority of their resources to managing content. We must help them to also focus on user services, one of our areas of expertise.
- Learn from DL research. Do not assume that its limited perspective means that its findings are invalid. Do not assume that through our noble goals for educating library users, we

can make people approach information and technology, as we know that they should. We must develop (digital) libraries where information is easy to find and easy to interpret (including evaluating the source).

- Take a risk: meet and respond to the changing information environment and commit to improvement. Explore, discover and create new services, and let go of some control of the known. Expect a learning curve (yours and your faculties' and students'), but realize that it is a temporary unease due to lack of confidence and the trepidation at the unknown. Seek new funding or allocations; form new alliances--facilitate activities and share leadership. Try something new, quietly, then learn from the mistakes, make improvements, and advertise successes.

There are new and evolving roles for us. I moved from a behind-the-scenes serials cataloger to become a liaison to our teaching and research faculty--working on grants, teaching classes of faculty and graduate students, working with programmers to transform building-centric services to enhanced library web services. We have new roles to fill. While the format of our

resources may change, while access to information may change, while styles of service may change, the vision of high quality, service-oriented, information centers still fits the library's mission. We will serve our user communities best if we incorporate th/S into the DL also.

I challenge you to think differently, to think creatively, to identify the actions that librarians and information professionals should take, and then take them.

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