

DIGITAL LIBRARIES SUPPORT DISTRIBUTED EDUCATION

or (preferably)

THE LIBRARY IN DIGITAL LIBRARY

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The full paper is at <http://scholar.lib.vt.edu/DLI2>.

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.

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INTRODUCTION

My thesis today is that many digital library discussions focus on computer processing and the limiting notion that a library is its resources but not its services nor its environment. Often these discussions do not include librarians, and, so, at least partially as a result of this closed discussion, 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.

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Through this presentation, I want to have a catharsis (in the Aristotelian sense of a purging that will result in a release of tension by affording it expression) and I'm going to have it in public in front of what I anticipated would be a sympathetic audience. I'll briefly share my dissatisfaction with the shortsighted approaches of computer scientists who conduct research and write about digital libraries. I will share a definition of "digital library" and some design scenarios prepared by a variety of faculty that describe their visions of the library. Lastly, I'll recommend actions we should take.

CATHARSIS

Through working with computer science faculty at Virginia Tech over several years, I found that their research and development of digital libraries is so narrowly restricted as to not be about libraries at all. They usurped the word and ignored the broad range of services and resources historically associated with libraries. Unfortunately, reading about digital libraries did not dissipate 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.” And, digital libraries “address traditional problems of finding information, of delivering it to users, and of preserving it for the future.”

It’s not that their goals to improve access to information are not loft goals, but they concentrate solely on computer processing of information and ignore those aspects of libraries that can not be programmed 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 but apply the technology to allow multiple simultaneous users. The computer scientists who discuss and conduct research and write about digital libraries 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 attempt to meet the needs of 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 digital library research, we soon realized that we lacked a common understanding of “library.” English and Engineering faculty thought first of the building that houses *their* collections. Computer Science faculty focused on programming access to existing digital resources, ignoring the rolls of librarians' in collection development, evaluating and developing library resources to meet the needs of the breadth of a research university.

The role of the library was also not immediately evident in discussing asynchronous teaching and learning in the digital library planning. We readily agreed that the classroom needs to be thought of as a *component* of the teaching/learning process that can be independent of time and place. However, while my colleagues would not eliminate the

instructor from the course, 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 or duplicate of the other. The asynchronous, the digital is more effective as one component of the whole, including the physical environment.

Because of such 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, a colleague of mine at the Virginia Tech library, and I developed and circulated among the grant writing group this definition of a digital library.

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DIGITAL LIBRARY DEFINITION FOR VT DIGITAL LIBRARY

http://scholar.lib.vt.edu/DIGITAL_LIBRARYI12/defineDIGITAL_LIBRARY.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 digital research initiative should be associated with this broad view of the digital library environment.

A digital library 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 should be provided through personalized systems as well as through the services of information professionals. The digital library 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.

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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. Information professionals make judgments and interpret user needs; they provide services and resources to people. Some traditional library services can be replicated in the digital library, partially or wholly, but some cannot be replicated. Online instruction is important, but sometimes meeting face-to-face, or having a conversation, between student and instructor is the most effective method. Information seekers should not be denied any library resource or service because it is not available online. The digital library and the library should be complimentary, intertwining systems that exist to serve the user community on the highest order.

With a digital library 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 our draft definition of a digital library didn't generate as much discussion as we would have liked, we welcomed the opportunity to share it with 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 [the] 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.

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Luke goes on to suggest that the digital library should have these characteristics

- an open, adaptable notion of document...
- a flexible, expansive system of cataloging tags
- a backward link and forward link between 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.digital.libraryib.vt.edu:90/~fox/DIGITAL_LIBRARYI2/ScenLuke.txt

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Another faculty member, Gary Downey, professor and director of the Center for Science and Technology Studies, wrote in response to our definition: "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 digital library research project. He agreed with our broad notion of a digital library and its being a seamless extension rather than a wholesale replacement of the library.

However, Downey 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

Our grant writing group had animated discussions about resources and services that would be useful to digital library users. One of the ways we decided to clarify our various views of digital libraries was by creating scenarios to demonstrate how the digital library should support distributed teaching and learning. Faculty from the English and Computer Science departments developed scenarios as did faculty from the library. What follows are summaries of a few of them. The full text of the scenarios is at

http://scholar.lib.vt.edu/DIGITAL_LIBRARYI2/

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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 illustrates 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; they ask probing questions because experience has taught us that most people who ask for assistance do not initially ask the question that they really want answered. The information professional listens carefully and analyzes and interprets the responses to discover what information is needed, and guides them to the appropriate resources. In this particular scenario, the librarian 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.

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TEACHING SCENARIO

Dan Mosser, VT professor of English, presented a scenario for his course on the History of the English Language. 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 didn't consider methods of distribution beyond the web. He lost sight of the library and only considered using the digital library. For example, though he is a frequent library user and has relatively easy campus access, he had not kept up with new document delivery services.

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 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 plans to record the "discussion" and mark points of the recording so that he can later add explanatory text and links to video excerpts. This he'll archive with his other class materials. Quite some time later still, he'll make a conference presentation that includes this segment and he'll submit it to the Virginia Tech Digital Library, annotating it as a personal publication lacking peer review.

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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 VT Digital Library 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. She drags into her "personal digital library" her list of hits that includes brief descriptions and whether or not it is available in paper or digitally. These 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 her university library does not have. Dr. Miller pastes the information into an online form to borrow works through interlibrary loan.

She then 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 the remote storage facility. 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 by 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 that she emailed to Document Delivery, a library service that will deliver them to her office.

While this is in the works, Dr. Miller accesses the American Memory Project where she finds examples illustrating technological change in photography. She exports some into her workspace, uses an HTML editor to pass it to the VT Digital Library image indexer. The indexer signifies when it finds matches in the local collection of images. A collection 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. Now she's ready to begin her historical investigations.

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SCHOLARLY COMMUNICATIONS PROJECT

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

Along with our fictional scenarios, the grant writing group learned more about the library's online resources and services such as those of the Scholarly Communications Project. It is an early (and sustainable) model of how digital library initiatives enhance traditional library resources and services, in many cases paralleling the physical library. Libraries do have a place in the digital library but must simultaneously maintain resources and services for the library's real users, not fictitious one. Libraries can also have an active role in digital library 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 meets their needs and desires in terms of quality, quantity, and timeliness.

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POST-SCENARIO DEVELOPMENTS

Digital library researchers have not, for the most part, acknowledged a hybrid format environment where, realistically, information seekers are not tied to using just one technology. These scenarios and actual library practices, however, demonstrate the expectation that the format question should be resolved logically according to how the information is available and how it is to be used.

Our grant writing group gained a better appreciation of the range of goals a digital library should support and broadened 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 resources and services, whether the students are taught in a campus classroom or at a

distance via a network in a distributed and asynchronous "class." For successful classroom teaching and distance education, students need access to information resources and not all are, can, or should 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 digital library, 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 digital library.

Another by product of last summer's grant writing project was a series of weekly brown-bag lunches at which we discussed a variety of issues related to online teaching and learning. Here was another opportunity to ask them to remember the library in the asynchronous learning situations. One means was for them to discuss this paper and our definition of a digital library. Being academics, part of the discussion focused on our use of the phrase "seamless technology." Some felt the technology should be described as a bridge connecting traditional resources and services and their new form in the digital library; that we should acknowledge the technology, appreciate it, and be enriched by using it. Others also shared their intellectual thoughts, but the intellectual discussion and the practical application continued to have points of convergence and divergence.

IN CONCLUSION

We agreed that the digital library 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.

We agreed that the digital library must also function as a social institution if it is to be a library and this aspect of the evolution of the digital library 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.

For now, the digital library is a collection of information resources and limited library activities that live alongside and in the mist of other library activities. Cheryl LaGuardia put it well in last November's 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."

Whether we celebrate the technology or not, the best digital library will be a [seamless or otherwise] 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. Digital libraries 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.

Computer scientists have displayed an unfortunate tendency to limit digital libraries to being primarily repositories of information. There is, of course, more to libraries and people using libraries to gather information, certainly, but this is just the tip of the iceberg. They also go to libraries seeking knowledge and wisdom and art and entertainment, and more; 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 to avoid the misguided hunt. At this point, patrons are ready to continue on their own.

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 is also.

Digital library development must not fail to address libraries as social institutions. We need

more librarians like Gary Marchionini working with computer scientists doing research on digital libraries 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."

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TAKE THE INITIATIVE

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

- Don't 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 students understand that the information they need is available in many different formats and more than just the digital formats are within easy reach. Also 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 the 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, digital library designers devote the majority of their resources to managing content. We must help them to also focus on user services, one our areas of expertise.

- Learn from digital library 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; give up 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.

IT CAN BE DONE

These are new and evolving roles for librarians. For example, 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 this into the digital library 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.