

Executive Summary

of

A proposal for

Content, Technologies and User Informatics for Digital Library Development at Virginia Tech

Background

For more than a decade serial costs for academic libraries have risen at an average annual rate of 12% or more. At the same time essential technologies requiring additional support have become mainstream items for delivering academic library services and resources to the client community. Because the Virginia Tech library has had no funding increases for the last several years - the present operating budget is 8% less than that of four years ago - Virginia Tech's information users have had access to fewer new publications each year and are losing ground in the technologies and support that they need to make their use of information resources productive as they learn, teach, and do research.

This report is a proposal from a committee charged by the Vice President for Information Systems to consider library issues and to make recommendations to him regarding library services at Virginia Tech.

Recommendation

After reviewing the *Implementation Plan, Academic Agenda*, the Committee concludes that the creation of a Digital Library is critical to the strategic direction of the university.

The Digital Library will focus on content and technologies appropriate to what has been called the *age of information*. The Digital Library will include a strong research initiative that capitalizes on existing academic collaborations and strengths where Virginia Tech is an acknowledged leader. The Digital Library research initiative will focus on user informatics - user focused research for information system improvements.

Benefits of the Digital Library

- Establishing the Digital Library at Virginia Tech assures that each member of the university community - wherever located - has immediate access to the information and technologies needed for teaching and research in a digital age.
- Establishing the Digital Library at Virginia Tech assures a mechanism for continuous system feedback and improvement through research.
- Establishing the Digital Library at Virginia Tech creates the opportunity to provide leadership to other partners and agencies who will be similarly involved with attempting to better understand how user communities work with information and make it a strategic part of their operating environment.

A proposal for

***Content, Technologies and User Informatics for Digital Library
Development at Virginia Tech***

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A proposal for

Content, Technologies and User Informatics for Digital Library Development at Virginia Tech

BACKGROUND

"It was the best of times, it was the worst of times". is the opening of *A Tale of Two Cities* -- a story of social upheaval, opportunity, and revolution associated with an era more than 200 years ago. These same lines are significant today as we attempt to satisfy the needs of a Virginia Tech client community requiring easier strategies to get reliable information to improve the ways the community teaches, learns, works, and grows socially. A new era is before us, one that is increasingly being tagged as the *information age* and...

It is the best of times.....

Information is everywhere, it is fun to use, and there is plenty of it. Information that was totally unavailable to the public, or was old news by the time it hit any print outlet, is now available from source organizations and updated immediately. For free, we can find cheap airline rates, check out the weather at our destination, verify the source for a common quotation, check stock prices, map a drive to our destination hotel, review planning papers at peer institutions, and send digital postcards. It's not uncommon to hear a politician speak of supporting Internet access so students can check out the resources of the Library of Congress (LC) for a paper.

It is the worst of times.....

Information is overwhelming users. The ability to develop effective coping strategies may be *the* survival skill for our times. There are suggestions that exposure to information overload may even make us sick. A recent Reuters report - *Dying for Information?*- notes that two-thirds of managers report stress associated with information overload and 42% claim ill health. Two-thirds indicate they need very high levels of information to perform, but almost half say that they are unable to deal with the vast amounts they get on a daily basis.

Providing access to high quality digital resources is expensive in money and staff. Professional societies note that they will not consider material for inclusion in their prestigious (and costly) publications if it has appeared elsewhere electronically. In doing this they create captive buying audiences for their output. Electronic resources subscribed to and paid for today may disappear tomorrow. A significant number of important publishers do not make an archiving commitment for their electronic products. This creates a situation where institutions can pay twice for information: once to get the distributed accessibility associated with the electronic product, and then again to get the paper resources that assure access to the same information when it is needed five years from now. Buying a paper publication is a simple monetary transaction. In contrast, buying an electronic publication may involve the development of a Request for Proposal and extensive contractual negotiations associated with variable costing algorithms, the definition of user populations, archiving rights, and fair use practices.

It takes a strong technological support base to provide digital information to a client community. The student that the politician describes as using the Library of Congress certainly isn't tapping into the millions of books held at the Library. These books aren't in digital format and using them still requires a trip to DC. The student *may* be accessing some wonderful representations of primary source and archival materials that the Library holds and has digitized as part of the American Memory Project, LC's contribution to the National Digital Library Initiative. If the student is working with American Memory resources it is because Congress provides several million dollars annually to support the labor and technologies needed for digitizing and classifying the materials.

Some of the pain of the "worst of times" scenario has been very localized. A pattern of double digit inflation of library materials for many years, combined with the reality of an operating budget that has been flat for several years (8% smaller than in 1994/95) has created a situation in which the Libraries have been able to deliver less than is needed by the client community. Although rank comparisons of peer library funding are not the only measures to be considered, they are one macro level indication of appropriate support. The total dollars available for library materials and services at Virginia Tech put the VT Libraries next to the bottom when compared with peers (Appendix A). Since 1995 faculty and graduate students have had 2,200 serials cancelled, and the entire community has seen fewer and fewer new books added each year. In 1997 alone, almost 100 titles were cancelled in biology, chemistry, and engineering -- subjects directly relevant to the university's cross-cutting initiatives. Overall VT library funds are a significantly smaller part of the university E&G budget, slipping from 2.5% several years ago, to 2.3% in the most recent comparison.

Our times, our challenge...

Our challenge for the successful delivery of library services in this bipolar era of information dependence is to know how and when to continue current programs, to adapt alternative programs, and to create new programs in support of a rapidly evolving university. For the Libraries the academic agenda is the guide for strategic actions.

DIGITAL LIBRARIES FOR VIRGINIA TECH

We are proposing that most of the future growth in the University Libraries collections and services be digital.. We see the Digital Library model as the most appropriate fit for Virginia Tech's aspirations.

There is overwhelming evidence that library collections and services for the Virginia Tech we see being created in the ***Update to the University Plan 1996-2001*** cannot be tradition- bound or place-centric. User needs and expectations are changing, and we need to adapt to different user configurations. The aims articulated in the **Plan** that are relevant to a Digital Library initiative for Virginia Tech include:

- to serve a growing student population with **new expectations**;
- to create an atmosphere where learning can occur **regardless of time or distance**;
- to generate research that **addresses human concerns and anticipates future action**;
- to be an **active partner with learning communities of all kinds to design what is needed for future success**.

These aims mandate a new kind of library. For example, asynchronous learning activities that free a student to learn any time, any place challenge us to consider how to develop and deliver non-mediated information services. The need to provide a variety of research resources to students around the state or around the globe, and enrolled in various programs, leads to a logical emphasis on digital resources for the collection. Life-long learning has become a reality for most of us. Considering the information needs associated with life-long learning suggests a new model of information access and delivery. The variety and complexity of search software associated with each new information product we make available to the community makes it imperative that we better understand why and how our clients work with these products.

The university's ***aims , strategic directions and tasks*** in the **Implementation Plan** shape the initiatives outlined here for a Digital Library for Virginia Tech. For organizing purposes we are

proposing three focal points for Digital Library initiatives Content, Supporting Technologies, and User Informatics. Links to the **University Plan, Academic Agenda** are noted for each initiative.

Digital Library - CONTENT

Plan

3.1d, facilitate teaching in distributed learning environment;

3.2, maintain VT position among top 50 institutions in terms of sponsored research;

3.2a recruit and retain faculty;

3.2g, increase extended campus graduate enrollment;

3.3h.4, work with Extension offices engaged economic development activities;

3.4a, exploit the World Wide Web for efficient and effective student services;

3.4d, provide for instruction in a distributed learning environment;

3.4e, make library holdings accessible online to students and faculty.

Until two years ago few of the highly cited and refereed journals were accessible in a digital form. They represented just a few drops in the river of information considered important to the academic community. This is changing rapidly, particularly for scientific and technical publications. Almost 1,500 publications from professional societies and major publishing houses are now available for licensing, and we can expect to see a significant addition of titles next year. The number of online publications is now large enough to begin addressing issues of breadth and depth that brought earlier discussions related to practical applications for library users to a dead end.

While the main added value of digital publications is that they can be readily replicated in many places at once, and are never lost, stolen, mutilated, in circulation, or at the bindery, the qualitative differences they make possible should not be overlooked. These include citation links, hyperlinks, graphics, interactive commentaries, and access to raw data. Digital publications include new types of materials - chemical structures, case law, engineering standards, media performances - which will be increasingly important for a competitive research faculty and knowledgeable graduate students.

We believe that it is time to make an aggressive move to create the Digital Library for Virginia Tech by investing heavily in the important digital journals, hyperlinked indexes and other multimedia resources that are needed to support the university's cross-cutting initiatives and essential college programs. We are proposing that support for up to 1,000 digital titles be provided in the base budget for next year, and project growth to at least 3,000 core digital publications within five years. Additionally we are proposing support to provide up to 20,000 digital articles, on demand, to meet primarily undergraduate student needs. A similar service limited to faculty and graduate students would support immediate access for up to 3,000 articles per year.

The core of publications that have no digital counterparts will need provisions for one time incremental support for next year. During 98/99 we recommend that the Libraries work with faculty to redefine from a zero base the publications they find critical for research and teaching, and to develop the cost base associated with supporting these contemporary needs. Costs associated with meeting core needs should be articulated in 99/2000 funding requests.

Issues, strategies, and funding to build CONTENT for the Digital Library at Virginia Tech follow.

Digital Library - BUILDING CONTENT

Issue	Strategy	Resources
Lack of a critical mass (breadth & depth) of journal and indexing materials that can be immediately and easily accessed by participants in distance learning programs.	Almost 1500 relevant digital titles are available from major professional societies, and university and discipline publishers. Make a bold investment to support 1000 of the titles that best fit college programs and the cross-cutting initiatives, to create for VT one of the larger digital collections in existence. As appropriate, partner with VIVA or ASERL consortia to maximize buying power. (Appendix B).	\$720,000
Most digital publications that we can subscribe to will not guarantee archival access, so there is no backup resource if the digital products disappear at some time in the future.	Use the OCLC ECO service which has archiving license rights to some digital journals to ensure future access for core publications or purchase paper duplicates for a very select core.	\$75,000
Even with 1000 digital publications, prices will increase for many of the 10,000 non-digital publications that VT has.	Provide a one- time funding (non-base) until core collection is determined by faculty input in '98/'99 review.	\$250,000
Many of the publications relevant to undergraduate programs are not in digital journals	Use FirstSearch on-demand e-mailed article service to provide up to 20,000 articles, primarily for undergraduates.	\$60,000
A single faculty member may need to use a research publication often, but it is not needed by any other member of the community.	Use CARL UnCover service to deliver up to 3,000 faxed articles to faculty desktops within a 24 hr. turnaround	\$36,000
Most books used by the VT client community are not available digitally, and books represent almost 60% of library materials now used.	Support a base addition which provides for adding 20,000 new books/yr for as long as this high use continues to be demonstrated. This is a relatively small number of books in comparison to our peers but would meet essential VT needs.	\$100,000
There are unique resources at Virginia Tech which are not accessible to our wider community, for example, early working documents in the International Archive of Women Architects (resources from that aging population of women who broke new ground as they entered the architectural profession in the early part of the century) and other slides, photographs, and media representative of many university agencies.	Support for two graduate students to assist in indexing and digitizing resources for the Digital Library collection.	\$20,000
Digital publishing provides an opportunity to create new kinds of scholarly communications.	Support for a collaborative program between the Scholarly Communications Project and faculty creating the Center for Digital Discourse at Virginia Tech. The Center will act as a refereeing and technology assisting agency for new ventures in academic publishing.	\$90,000

Digital Library - SUPPORTING TECHNOLOGIES

Plan

3.1d, facilitate teaching in distributed learning environment;

3.4h, contribute to advancement of networking infrastructure;

3.4a, exploit World Wide Web for efficient and effective student services;

3.4d, provide for instruction in a distributed learning environment;

3.4e, make library holdings accessible online to students and faculty;

Content alone is not sufficient for the Digital Library. Equipment, software, and maintenance support are also critical for the Digital Library at Virginia Tech. For example, the Libraries' Scholarly Communications Project has supported innovative work with electronic journals and other media publications like newspapers and TV broadcasts, has originated electronic reserve services, and is the home for the digital texts in the extremely successful Electronic Theses and Dissertations program. These programs have progressed from experimentation to production mode. Production mode requires consistent support for programming and commercial software for indexing and search engines.

The library web has become the major connector for uses on campus and at distance learning sites to gain access to indexes and other digital publications that are password protected. The Virginia Tech Libraries was one of the first among the doctoral institutions to create procedures to handle authentication of VT users who wish to gain access while using commercial internet providers such as AOL. This enhanced VT's abilities to serve distance learners. Consistent support for the Libraries' web is needed to ensure remote access to resources.

Most major research libraries are migrating to third generation integrated catalog systems which offer high speed searching of very large databases, have Oracle report generating capabilities for producing user based analytical reports, and feature hyperlinks, z39.50 searching, and multi-media capabilities. With web linkages, a library catalog is a very visible feature to prospective students and their parents.

Since most of the resources of the Digital Library are accessed over the Internet, it is important that they be available at all times. The regular Internet is slow and often unreliable during those peak times of the day that the university client community makes the most use of library resources (10 am to 4 pm). We are proposing that the Libraries partner with one or more other VIVA institutions in the state to establish dedicated connectivity to resource providers by using Net.Work.Virginia

Issues, strategies, and funding needs regarding the **Supporting Technologies** for the Digital Library follow.

Digital Library - SUPPORTING TECHNOLOGIES

Issue	Strategy	Resources
Lack of easy way for students in distance learning environments to borrow and return library books or get copies of articles from print journals and other non-digital resources in the libraries.	Establish library request database on library web for books and article copies. Copy articles and fax or mail; ship books in pre-paid return mailing bags.	Bill back labor, materials, mailing costs to instructional unit, through cost-recovery model developed for distance learning efforts.
A 21st century library catalog system has integrated functionality, supports search algorithms for speedy return of results from large databases, and includes hyperlinking capabilities for accessing and using multiple media formats. UVA, GMU, and Wm & Mary have all migrated to third generation systems.	Develop RFP, and award contract for third generation coordinated library system with multimedia capabilities.	One time : \$400,000 over two years
Access to most library digital resources is through web page, and PERL scripts. The web requires active development and maintenance to assure that scripting is current each time vendor makes an access change (frequent). For many distance learning students the library web will be the sole communication link to the library. The Library web site is one of the more highly used web sites on the campus network. In a survey of a large core curriculum class in fall 97, 75% of respondents reported using the library web, a third had used it 11 or more times that term.	Support Library web with design and technical staff.	\$35,000
Distance learning students can't access most library digital resources until they have an active PID, and this activation may not take place until some time after the first day of class.	Work with AIS security -- perhaps give faculty for the class authority to activate PID?	None
PIDs for students not "actively enrolled" are not disabled quickly enough to maintain compliance with user access stipulations of contractual digital library resources.	Work with AIS security to have inactive students purged from user database of active PIDs no later than the third week in the term after their active enrollment.	None
Library based experiments for which VT is nationally recognized do not have the support needed to assure that they remain successful in what has become a production environment.	Support electronic theses and dissertations, electronic reserve, and electronic publications with programming and indexing software support.	\$50,000
Most of the resources in the Digital Library are accessed over the Internet. There is a need for reliable connectivity and bandwidth.	Partner with one or more VIVA participants to use Net.Work.Virginia to establish direct link with major database providers.	\$30,000

Digital Library - USER INFORMATICS

Plan

3.1 life-long learning;

3.1c, core curriculum;

3.1d, facilitate teaching in a distributed learning environment

3.4i.4, engage users actively in application development

3.4i.8, organize for responsiveness to customer needs and satisfaction

3.4i.9, adapt formal quality improvement process for continuously improved service

3.6a, build on existing strengths across colleges to enhance collaborations.

The Digital Library CONTENT and TECHNOLOGIES are not ends; they are only means to satisfying users who need information. All our efforts should lead to a satisfied user who has had his or her information need met. Meeting information needs is not always easy. There is great variation in how users define their information need; variation in the skills that users have developed to break information-seeking tasks into finding, evaluating, and using information, and variation in how two different users with the same questions might review the same item as relevant to their need.

Users who can define their needs and have the skills to evaluate and use information may still be at risk. They can be overwhelmed with the amount of information they find. It is increasingly common to see titles like *Information Overload*, *Avoiding Information Overload*, or *Still Drowning* featured in major technical, professional, and business publications. Andrew Garvin, president of Find/SVP, the information analysis company, considers our inability to cope with information overload to be one of the greatest challenges of our time.

We are proposing that the Digital Library for Virginia Tech serve as a test -bed site for USER INFORMATICS - the study of how people interact with information. The field is one which depends upon cross departmental collaboration since aspects of psychology, learning theory, communications, technology, computing, indexing, and culture are intertwined in any broad assessment. We believe that the Virginia Tech community of information users could be actively involved in projects relating to the understanding of how information is processed and used. Classes in the core could include an information component to assure that students are given the skills to become life-long learners and the component and its variations could become an assessment target. As knowledge of how people work with information becomes more important to business and education, the likelihood of synergistic partnerships and funded research opportunities will increase. From a very pragmatic viewpoint, the very least we could expect from a focus on USER INFORMATICS is a significant improvement in our understanding of information clients in the Virginia Tech community. Better understanding should lead to continuous system improvements.

To support the USER INFORMATICS program we are proposing annual funding for a proposal cycle similar to that of the Center for Innovative Learning. Proposals would be reviewed by a board with representation from the CEUT, the CIL, and if established, the Institute for Distance and Distributed Learning.

Digital Library - User Informatics

Issue	Strategy	Resources
<p>Information about how users interact with our rapidly evolving information systems, how they work with information content they find, and how to teach information handling skills that will help them learn, is limited. Investigating these areas is important for academic and business environments. VT has strengths in communications, psychology, human computer interaction, technologies, and learning assessment that make it an excellent site for research and experimentation in a field that is of great interest to academic and business partners. User informatics is a research area which can be initiated with some modest investments and is likely to be of increasing interest to funding agencies. Feedback from information related studies based on participants in Virginia Tech programs will have practical applications to the daily operations of information services.</p>	<p>Provide support for an annual proposal cycle for small grants related to the study of how users find, select, and use information in the academic environment. Proposals could include such things as network literacy efforts, replicable strategies for testing web design and content with potential users, or content analysis to determine what users do in seeking information.</p>	<p>\$100,000</p>
<p>The evolutionary component of the Digital Library should expand upon existing related programs to create a cohesive research arm of the Digital Library. This program, the Virginia Tech Digital Research Library Institute, can serve as the scholarly foundation for the AC&ITC and position Tech among the leaders of universities applying technologies to support learners.</p>	<p>Provide sustaining support for the Virginia Tech Digital Library Research program by hiring a Director the Institute and providing annual funding for related programs like BEV, Center for Applied Technology in the Humanities, the Digital Library Research Lab, the Multimedia Lab, the Scholarly Communications Program, and the Virginia Tech Information Center. (See Appendix C for expansion on the Digital Library Research Initiative)</p>	<p>up to \$480,000 if fully funded</p>

Appendix A

Members Association of Research Libraries: Total Expenditures 1996/97, Peers Highlighted

RANK			RANK			RANK		
1	HARVARD	\$70,917,819	41	CONNECTICUT	\$17,180,186	81	WASHINGTON ST	\$11,117,129
2	STANFORD	\$42,954,263	42	WAYNE STATE	\$17,105,100	82	OREGON	\$11,079,423
3	YALE	\$39,154,000	43	NEW MEXICO	\$17,087,941	83	TEMPLE	\$11,076,006
4	CALIFORNIA, LA	\$37,007,887	44	TEXAS A&M	\$17,071,590	84	FLORIDA STAT	\$11,032,822
5	TORONTO	\$36,428,256	45	NORTH CAROLINA ST	\$16,780,431	85	HOUSTON	\$10,922,608
6	MICHIGAN	\$34,273,593	46	ALBERTA	\$16,731,039	86	SUNY-STONY BROOK	\$10,695,216
7	CALIFORNIA, BERKELEY	\$33,933,812	47	CALIFORNIA, DAVIS	\$16,289,233	87	ROCHESTER	\$10,641,179
8	PENNSYLVANIA STATE	\$29,381,324	48	MICHIGAN STA	\$15,775,778	88	SOUTHERN ILL	\$10,614,608
9	COLUMBIA	\$29,231,723	49	COLORADO	\$15,648,969	89	KENT STATE	\$10,434,156
10	WISCONSIN	\$28,397,491	50	MARYLAND	\$15,603,070	90	CASE WESTERN	\$10,386,801
11	CORNELL	\$28,358,048	51	KENTUCKY	\$15,493,171	91	HAWAII	\$10,109,259
12	PRINCETON	\$28,002,125	52	KANSAS	\$14,974,010	92	SYRACUSE	\$9,905,150
13	MINNESOTA	\$27,043,567	53	BROWN	\$14,778,852	93	OKLAHOMA	\$9,891,030
14	WASHINGTON	\$27,030,473	54	VANDERBILT	\$14,526,674	94	MANITOBA	\$9,852,928
15	PENNSYLVANIA	\$26,336,252	55	ILLINOIS, CH	\$14,445,025	95	COLORADO ST	\$9,766,010
16	INDIANA	\$25,432,909	56	CINCINNATI	\$14,396,669	96	TULANE	\$9,742,278
17	ILLINOIS, URBANA	\$25,314,119	57	SOUTH CAROLINA	\$14,222,819	97	LOUISIANA ST	\$9,635,780
18	RUTGERS	\$24,785,416	58	SUNY-BUFFALO	\$13,974,189	98	RICE	\$9,569,740
19	TEXAS	\$24,538,692	59	IOWA STATE	\$13,903,580	99	HOWARD	\$9,052,492
20	NEW YORK	\$24,242,867	60	CALIFORNIA,	\$13,891,798	100	CALIFORNIA,	\$8,996,720
21	NORTH CAROLI	\$23,391,822	61	NOTRE DAME	\$13,547,022	101	QUEEN'S	\$8,957,315
22	VIRGINIA	\$23,248,612	62	BRIGHAM YOUN	\$13,427,893	102	SUNY-ALBANY	\$8,780,814
23	OHIO STATE	\$22,096,269	63	MIAMI	\$13,350,984	103	SASKATCHEWAN	\$8,741,818
24	SOUTHERN CAL	\$21,935,490	64	BOSTON	\$13,032,502	104	AUBURN	\$8,731,492
25	DUKE	\$21,574,509	65	CALIFORNIA,SB	\$12,976,039	105	ALABAMA	\$8,730,235
26	BRITISH COL	\$21,121,587	66	MCGILL	\$12,971,447	106	WATERLOO	\$8,595,833
27	JOHNS HOPKINS	\$20,531,044	67	TENNESSEE	\$12,736,687	107	OKLAHOMA ST	\$8,546,757
28	ARIZONA	\$19,712,136	68	MIT	\$12,458,763	108	MCMASTER	\$8,284,517
29	CHICAGO	\$19,702,107	69	PURDUE	\$12,400,119	109	GEORGIA TECH	\$7,980,268
30	ARIZONA STATE	\$19,618,004	70	LAVAL	\$12,134,880	110	GUELPH	\$6,751,080
31	EMORY	\$19,349,321	71	MISSOURI	\$11,890,532			
32	PITTSBURGH	\$19,274,840	72	DARTMOUTH	\$11,875,485			
33	IOWA	\$18,652,223	73	OHIO	\$11,822,109			
34	NORTHWESTERN	\$18,567,036	74	YORK	\$11,748,368			
35	FLORIDA	\$18,475,394	75	WESTERN ONTARIO	\$11,728,514			
36	WASHINGTON U ST. LOUIS	\$18,427,197	76	TEXAS TECH	\$11,506,888			
37	UTAH	\$18,149,937	77	NEBRASKA	\$11,324,820			
38	CALIFORNIA,	\$17,802,190	78	DELAWARE	\$11,324,763			
39	GEORGETOWN	\$17,420,794	79	VPI & SU	\$11,272,738			
40	GEORGIA	\$17,333,876	80	MASSACHUSETTS	\$11,185,689			

Our peers

Appendix D

	Agriculture and Life Sciences	Architecture and Urban Studies	Arts and Sciences	Pamplin College of Business	Engineering	Forestry and Wildlife Resources	Human Resources and Education	Veterinary Medicine
JOURNALS								
Academic Press	X	X	X		X	X	X	X
Amer. Assoc Advancement of Science	X	X	X		X	X	X	X
American Chemical Society	X		X		X	X		X
American Institute of Physics			X		X			
American Meteorological Society	X		X					
American Physiological Society	X		X			X		X
Association for Computing Machinery	X		X	X	X	X		X
American Mathematical Society			X		X			
Blackwell Publishers	X		X		X	X	X	X
Cambridge Univ Press	X	X	X	X	X	X	X	X
Carfax Publishing	X		X		X	X		X
Elsevier Publishing	X		X		X	X		X
Institute of Electrical Engineers					X			
Johns Hopkins Univ Project Muse Journals			X				X	
Jr of Biological Chemistry	X		X			X		X
Kluwer Publications	X		X		X	X		X
Lexis/Nexis full text publications	X	X	X	X	X	X	X	X
MCB Univ Press		X	X	X			X	
Oxford Univ Press	X	X	X	X	X	X	X	X
Plenum Press	X		X		X	X		X
Royal Society	X		X					X
Royal Society of Chemistry	X		X					X
Society for Inst of Applied Math.			X		X			
Springer Verlag	X		X		X		X	X
Taylor and Francis		X		X			X	
Indexes								
ABI/Inform Global			X	X			X	
Beilstein	X		X		X			
EI Engineering Index					X			
MLA Bibliography			X					
Web of Science	X	X	X	X	X	X	X	X

Appendix C

The Virginia Tech Digital Library Research Initiative

Opportunity

Virginia Tech has a golden opportunity in 1998 to launch a digital library initiative that:

- will advance the seven cross-cutting initiatives,
- serve as the scholarly foundation for the new Advanced Communications and Information Technology Center (ACITC - in which the digital library will occupy about 1/3 of the \$25M space),
- enable new programs in the proposed Institute for Distance and Distributed Learning, and,
- position Tech among the leaders of universities applying technology to support learners

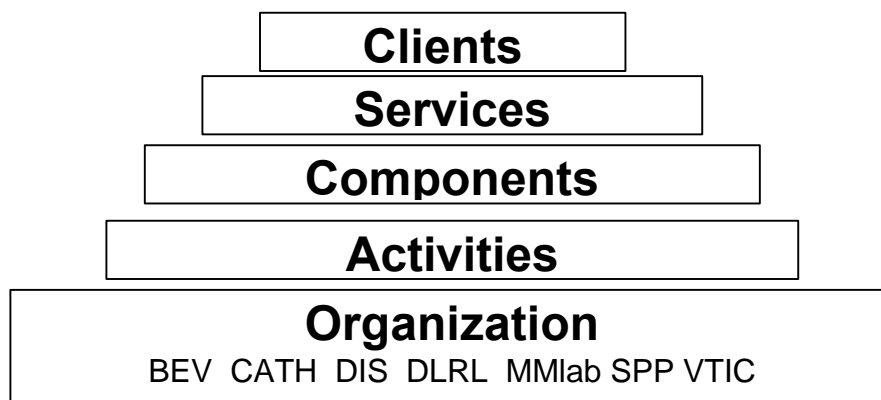
Research Support

In 1991, Tech received one of the first grants from NSF for research in digital libraries. Grants from NSF, US Dept. of Education, and SURA, and donations from IBM, Adobe, Microsoft, OCLC and others have brought total funding to well over \$2M. As a result, we have established a Digital Library Research Laboratory (DLRL) that will subsequently move into the ACITC. Opportunities for external support remain as worldwide interest, including at the very highest levels of government, continues to grow. For example, the Digital Library Initiative, supported from 1994-98 at the level of \$24M by NSF, ARPA and NASA, will be renewed in 1998 with double the funding from those agencies plus many others, e.g., NIH, Library of Congress, Getty. Tech should integrate its digital library plans with efforts to compete for digital library research funds by:

- building upon its track record of innovation,
- sharing costs that will come from stocking the ACITC, and
- developing an integrated program of research, digital library, and high tech classrooms that will make ACITC an unparalleled vehicle for learning and scholarship.

Framework

As argued in “A proposal for Content, Technologies and User Informatics for Digital Library Development at Virginia Tech,” Tech must launch a concerted initiative in the digital library field. Indeed, we must build a separate and distinct Virginia Tech Digital Library (VTDL). The framework for VTDL is illustrated in the figure below and explained in the sections that follow.



Organization

Any new initiative requires skilled personnel to lead, organize, and coordinate. Tech has the basic foundation for VTDL and must:

- appoint a full-time director (\$80,000), and
- provide seven new staff positions (up to \$300,000), one for each unit that will work together in this new organization.

These innovative groups are already a part of, or directly connected with, Information Systems or ACITC activities at Tech:

1. **Blacksburg Electronic Village (BEV)** has led the nation in community networking and making information accessible to the great majority of individuals in the Town.
2. **Center for Applied Technology in the Humanities (CATH)** supports scholarly efforts such as conversion of historical documents to digital formats and organizing electronic collections such as those related to the life of Darwin.
3. **Distributed Information Systems (DIS)** has supported campus WWW pages, VT Online, and many other widely used information services.
4. **DLRL**, the research arm for digital library research activities, is closely allied with the Department of Computer Science and is responsible for most of the grants.
5. **Multimedia Lab (MMLab)** that will be housed in the ACITC will build upon various departmental or college multimedia labs around campus, such as the highly effective Engineering/Architecture facility in Hancock.
6. **Scholarly Publishing Project (SPP)** has played a lead role in electronic journals, electronic reserve, conversion of special collections, digital preservation, and the electronic thesis and dissertation initiative.
7. **Virginia Tech Information Center (VTIC)** has provided outstanding outreach services, extending the reach of library efforts to the local community, the Commonwealth, and now Russia.

Activities. VTDL's activities will support the **University Plan**.

First, each of the seven groups will extend its current agenda in coordination with the other groups. For example, BEV will help ensure that all students, whether on campus or off, have high speed network connectivity. CATH will enhance support services for humanities scholars, who will add digital materials to their lectures and publications, and become a center for digital discourse. DIS will use federated search methods to reduce information overload and create easier interfaces to the vast array of collections and database available. DLRL will partner with other groups in the VTDL and the campus to obtain research grants, especially in applying digital library methods to enhance learning. The MMLab will extend the influence of FDI training so that highly motivational, pedagogically sound, and easily reusable multimedia resources are developed to support campus research and development. SPP will encourage more electronic journals, aid faculty and students in preparing and sharing the "grey" literature owned by universities (e.g., reports, preprints, and theses), extend electronic reserve to broader and more robust use, and develop real solutions for long-term digital preservation. VTIC will work to increase state-wide interest in VTDL, through its services and contacts with the Commonwealth.

Second, VTDL will concentrate on fund raising. It will work with Development to "stock" the electronic library portion of the ACITC with equipment, software, systems and services. It will use DLRL as its arm for obtaining research support. By co-locating services in ACITC, a consolidated support team working across the various parts of VTDL will be able to handle a large base of equipment, which will be sought through donations and cooperative projects.

Third, VTDL will leverage a new fund (\$100,000) of seed money that it will manage for digital library projects carried out jointly by VTDL and other branches of campus. There will be close cooperation with the Institute for Distance and Distributed Learning, the Center for Innovation in Learning, ASPIRES, Reachout, and CEUT. In particular, a range of pilot studies and trials will be launched to help identify areas of future "production" effort. All such projects will have an assessment component. Initial preference will be given to low costs efforts, such as an association-run digital library wherein the needs of a large department (faculty, staff, and students) can be met regarding electronic journals, renewable electronic databases, and conference proceedings for under \$5K/year. However, broad coverage across the full range of "components" of a digital library is needed ultimately.

Fourth, VTDL will liaise with other universities, university coalitions (e.g., an analog to the CIC, for our region), library coalitions (e.g., ARL's SPARC), and not-for-profit library groups (e.g., OCLC) to advance the digital library climate on campus, and to help realize the long-term economic benefits of this technology.

Fifth, VTDL will work closely with the Office of the Provost, Deans, and Departments to integrate digital libraries into the academic agenda of the campus. We will request one day

of the FDI week to deal with issues related to digital libraries and services. Where there is interest, and with support from departments like Computer Science, there will be offerings of large enrollment courses (in some cases, online only) to promote understanding about the use of information. In cases where departments have serious programs regarding managing information, e.g., Chemistry, VTDL will support any special training needs or courses as appropriate, perhaps in the spirit of helping coordinate sharing and open discussion, such as that found in the Writing Across the Curriculum effort. VTDL's efforts will go well beyond information literacy, to ensure skill and understanding of information-seeking behavior, and to make clear the economic issues relating to a spiraling "publish or perish" mentality.

Components. Many components compose the VTDL.

First, there is the **personal connection**. Each member of the campus community will be supported in ubiquitous computing, so that they can seamlessly and synchronously access information at home, in their office, in labs and classrooms, and while traveling. We should purchase additional hardware and software to facilitate this goal. (\$100,000)

Second, there is the **personalized library**. Each student, staff and faculty member will have a personalized piece of VTDL, supporting searching and browsing, carrying a full catalog and able to generate bibliographies on demand, remembering what has been read and what has been written, and including not only text but also full multimedia, e.g., works of musicians or artists, drawings of architects, images of dissections. One key is a **personal tutor**, aimed at enhancing learning, identifying when you are new to an area and seeking out WWW, interactive, and written tutorial resources. Another key is the **personal portfolio**, which will be readily available so that new teachers and co-workers understand one's background more completely, as will prospective employers.

Third, there is the **digital press**. As students prepare papers and reports, as graduate students produce theses, and as more electronic journals and even more advanced digital creations develop on campus, they must have support during the processes of authoring, submitting, archiving, and cataloging. Legal and other organizational help will be provided so that the author and university retain the intellectual property. A program will be launched for **electronic editors-in-chief**, so those whose first inclination is to start a new expensive paper journal will be aided in moving toward digital publication.

Fourth, there is the **electronic stack**. Whether through virtual reality, or simpler graphics methods of visualizing and browsing, the many collections on campus and the results of table-of-content services will be integrated into an enormous electronic space. Individuals can mark where they have been and be aided by a rapid search that "new regions where they can explore and discover serendipitously."

Fifth, there is the **Commonwealth Reading Room**. As VTDL expands and serves more of the state, and as other institutions in Virginia follow our lead, an even broader virtual library will become available. Aided by Net.Work.Virginia, access to anywhere will

appear to be local. This facility not only will connect with other digital libraries, but also will connect with local and remote paper collections, helping integrate the new and the old, the electronic and the manual.

Finally, there is the **electronic archive**. Just as one acquires “permanent” materials, which may go through processes like binding and cataloging before becoming available, so too must there be procedures for electronic archiving into the long term. Not only do we need education about standards and support from the MMLab to pick the best multimedia for preservation, we must have an infrastructure (local, or in partnership with OCLC or other group) in place to operate archiving.

Services & Clients. VTDL will provide a variety of services, geared to the needs of a wide range of clients. **Priority** in services is needed:

- We should follow Tech’s priorities in supporting the **7 cross-cutting initiatives**.
- We must give priority to faculty members, research associates, and students, who conduct the research to ensure Tech’s ranking in the top 50 research universities, especially at a time when investment in the library ranks much lower.
- We must purchase, both individually and as a member of a consortium, subscriptions to electronic journals and renewable databases.

In serving students, we must plan for the future. Some students reside on campus, some nearby, and some at a distance. VTDL should strive to provide services that are accessible to all students. VTDL services should be available at a wide range of locations, including ACITC classrooms and electronic library areas (where, however, fastest access may be afforded), dorms and offices, campus classrooms, apartments, remote centers, and homes of extended campus learners.

Tailored services are needed to support the full vision of VTDL. There are special needs of learners, whether they are engaged in broad or narrow studies, answers or reference, training or education. Other special needs exist for researchers, and still others for those who publish. Part of the agenda of VTDL will be to regularly survey the faculty as to their needs and wishes for services.

Focus & Effect. We strongly endorse an organizational and financial change at Tech to help solve current library resources problems. We must build a future where electronic information continues to increase and plays an increasingly large role in research, education and outreach. We must launch VTDL immediately to remain competitive for extramural funding. We need a full-time director, who has vision, leadership, and strong connections into the digital library community. The parts that will be assembled to make up much of the early staffing of VTDL must be consolidated and organized. Cost sharing for a strong research program is essential. Planning for ACITC must commence immediately so an integrated vision emerges wherein VTDL supports the research and educational programs of that center, and the research efforts (especially DLRL, HCI Center, CATH, etc.) ensure that VTDL has advanced capabilities, good interfaces, and serves the entire university community. Pilot projects must be launched now, as a variety

of associations and publishers begin to offer rudimentary digital library services. We can build strong partnerships and help push the evolution of services toward more effective support of Tech's future needs and goals.

Appendix D

The Committee

Erv Blythe, vice president for information systems, established the Library Serials Committee in fall 1997, to:

- (1) Consider and propose alternative strategies to deliver the information content currently provided to the university community in the libraries' serials collections
- (2) Recommend a goal for library funding over the next six years to create a more stable planning basis, and to eliminate the annual "crisis" reaction
- (3) Suggest a methodology to ensure wide faculty input into developing the collection of serials to be made available through the library.

Committee members include Nick Stone, CALS information systems; Yvan Beliveau, building construction; Ed Fox, computer science; Ralph Badinelli, management science; Karen Swenson, English; John Husser, music; Richard Gandour, chemistry; Gene Cliff, aerospace and ocean engineering; Earl Kline, wood science and forestry; Ray Plaut, civil engineering; Bob Williges, industrial and systems engineering; Eliza Tse, hospitality and tourism; Karen Dyer, veterinary medicine; John Burton, teaching and learning; John Eaton, associate provost for graduate studies; and Gail McMillan and Paul Metz, University Libraries. Eileen Hitchingham, dean of libraries, chaired the committee.

March, 1998.