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LIBRARIES AND THE NATIONAL INFORMATION INFRASTRUCTURE:

PROCEEDINGS OF THE 1994 FORUM ON LIBRARY AND INFORMATION SERVICES POLICY

Sponsored by the

National Center for Education Statistics
and the
Office of Library Programs
U.S. Department of Education

and the

U.S. National Commission on Libraries
and Information Science

May 16–17, 1994
Washington, DC

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U.S. National Commission on Libraries and Information Science
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Washington, DC 20005–3522

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United States
National Commission on
Libraries and Information Science

August 1994

The Honorable William J. Clinton
President of the United States
The White House
Washington, D.C. 20500

Dear President Clinton:

The Members of the U.S. National Commission on Libraries and Information Science (NCLIS) are pleased to present these *Proceedings of the 1994 Forum on Libraries and the National Information Infrastructure: Library and Information Services Policy*. The subject of these proceedings is in keeping with your *1994 State of the Union Message* which stated: "We must also work with the private sector to connect every classroom, every clinic, every library, every hospital in America into a national information superhighway by the year 2000."

The forum was cooperatively planned by NCLIS, the National Center for Education Statistics and the Office of Library Programs of the U.S. Department of Education. Held on May 16 and 17, 1994, in Washington, D.C., the forum provided an opportunity to explore the integral role of libraries in the evolving information and communications infrastructure. Forum participants explored federal, state, and local perspectives and responsibilities related to libraries in the National Information Infrastructure (NII). In addition, participants discussed information services value measurement within the changing library and information services environment.

The 1994 forum was the second in a series of annual meetings exploring the development of national policies related to library and information services. The vision which emerges from these proceedings provides an exciting challenge to the entire library and information services community. The National Commission is honored to convey the results of this forum to you in the hope that the vision expressed in your *State of the Union Message* will be achieved in the next five years.

Sincerely,

Jeanne Hurley Simon
NCLIS Chairperson

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LIBRARIES AND THE NATIONAL INFORMATION INFRASTRUCTURE:

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National Center for Education Statistics
and
Office of Library Programs
Office of Educational Research and Improvement
U.S. Department of Education
and
U.S. National Commission on Libraries and Information Science

16–17 May 1994
Ballroom Section B
Washington Vista Hotel
1400 M Street, N.W.
Washington, D.C. 20005
(202) 429–1700

In 1993 NCES and NCLIS instituted a series of annual inter-disciplinary forum meetings focusing on library and information services policy issues. These forum meetings bring together statisticians, librarians, information service professionals, researchers, economists, and public policy specialists. The forum meetings offer an opportunity to discuss the issues facing library and information services and the resulting statistical requirements for measuring and planning library and information service performance effectiveness. The forum meetings are intended to ensure that statistical information about libraries and information services meet the needs of policy makers at various levels. Policy forum meeting results are intended to guide public policy development related to libraries and information services.

The 1994 Forum addresses the role of libraries in the National Information Infrastructure (NII). Forum participants will: 1.) review NII-related programs. policies, and activities at the Federal, State, local, and institutional levels; 2.) identify and discuss various policy issues related to the role of libraries in the NII; and, 3.) identify statistical indicators that are needed to measure the effective involvement of libraries in the emerging NII.

AGENDA

Monday 16 May 1994

8:30 – 9:00 am	Coffee
9:00 – 9:15 am	**Welcome and Introductions** Emerson Elliott, NCES Commissioner Jeanne H. Simon, NCLIS Chairperson *Forum participants will share brief introductions and thoughts about the outcome of this Forum meeting.*

9:15 – 9:45 am

Perspectives on the National Information Infrastructure: The NII Vision

How will the NII/Internet impact education, in general, and libraries, specifically? How is NCES planning to use the Internet/NII to further its mission? What roles are the Department of Education planning for involving libraries in the Internet/NII?

Presenters:

Ray Fry, Library Programs
Paul Planchon, NCES

9:45 – 10:45 am

SESSION I: Libraries and the NII: The Federal Perspective

"...we must also work with the private sector to connect every classroom, every clinic, every LIBRARY, every hospital in America into a national information superhighway by the year 2000."

-- President William J. Clinton, State of the Union Address, January 1994

What Federal policies are required to achieve the vision of the NII? What is the role of libraries in achieving this NII vision? What is the Federal government's role to help assure that libraries will contribute to achieving the NII vision? What data are needed to formulate policies that advance the NII goals? Who is responsible for obtaining and interpreting these statistics? What research is needed?

Moderator: Peter R. Young, NCLIS

Panel:

- Sally Katzen, Office of Information and Regulatory Affairs
- Toni Carbo Bearman, US Advisory Council on NII
- Thomas A. Kalil, National Economic Council
- David A. Lytel, Office of Science and Technology Policy
- Laura Breedan, National Telecommunications and Information Agency
- Don Gips, Federal Communications Commission

10:45 – 11:00 am

Break

11:00 – 11:45 am

SESSION I: Libraries and the NII: The Federal Perspective (continued) –

Discussants:

- Carol Henderson, ALA Washington Office
- Robert Gillespie, Gillespie Associates

11:45 – 12:00 noon

General Discussion by Forum Participants

12:00 – 12:15 pm

Summation: (Issues Identified and Actions Needed)
Dennis Reynolds, CAPCON

12:30 – 1:15 pm — Luncheon, Ashlawn South

1:15 – 2:00 pm — Luncheon Presentation:
- Sharon Porter Robinson, Assistant Secretary for Educational Research and Improvement
- Linda Roberts, Special Advisor on Education Technology, Department of Education

"Libraries and the National Information Infrastructure: Basis for Reinvention?"

2:00 – 2:15 pm — Break

2:15 – 3:00 pm — **SESSION II: Libraries and the NII: State, Local, and Institutional Perspectives**

What State and local policies are required to achieve the vision of the NII? How are libraries involved in the NII/Internet? What State and local government programs are addressing connection of libraries to the NII/Internet? What statistics are available about NII/Internet institutional use? What data and research are needed to support policy work related to libraries and the NII/Internet?

Moderator: John G. Lorenz, NCLIS Consultant

Louisiana Libraries Network
- Thomas Jaques, Director, Louisiana State Library
- Ronald Hay, LSU Computer Services

Blacksburg Electronic Village
- Steven Helm, Librarian, Blacksburg Electronic Village
- Bradley Nash, Jr., Sociologist, Blacksburg Electronic Village

3:00 – 3:15 pm — Break

3:15 – 4:30 pm — **SESSION II: Libraries and the NII: State, Local, and Institutional Perspectives (continued) –**

Discussants:
- Douglas Zweizig, University of Wisconsin
- Paul Evan Peters, Coalition for Networked Information
- Eleanor Jo Rodger, Urban Libraries Council

4:30 – 5:30 pm **General Discussion by Forum Participants**

What are the various policy responsibilities of Federal, State, local, and institutional sectors for library involvement in the NII/Internet? What are the major barriers to achieving the NII vision where all Americans participate in the information revolution? What statistical information is required to achieve this NII vision and how will this data be collected, analyzed, and interpreted to formulate policies?

Summation: (Issues Identified and Actions Needed)
Joseph Shubert, New York State Librarian

6:30 pm Dinner, Woodlawn
(Optional for Forum Participants)

Small Informal Group Discussions of the following questions:

1.) What is required to connect libraries to the NII and what are the costs?
- Equipment and software
- Telecommunications connections
- Training
- Access fees

2.) What NII-based services will libraries provide to patrons and what patron needs for information should be addressed?

3.) What is the difference between the Internet, NREN, and the NII?

4.) What are the roles and responsibilities of the various sectors in constructing and organizing the NII?
- Federal government
- State government
- Local community government
- Public sector interests groups
- Private sector
    - Computer services
    - Telecommunications services
    - Content providers
    - others

1994 Forum on Library and Information Services Policy

Tuesday 17 May 1994

AGENDA

8:30 – 9:00 am	Coffee
9:00 – 10:15 am	**Session III: Libraries and the NII: Measuring the Value of Information Services** *How can the value of library and information services be measured? What indicators of performance effectiveness are needed to plan for the transition of libraries to the NII/Internet? How does the study of information economics differ from economic analysis of more traditional resources? What is the social value of information in the post-industrial global economy?* Moderator: Paul Planchon, NCES, Elementary/Secondary Education Statistics Division Panel: – Julia Blixrud, Council on Library Resources – Marvin Sirbu, Carnegie Mellon University – Brigitte Duces, World Bank
10: 15 – 10:30 am	Break
10:30 – 11:15 am	**Session III: Libraries and the NII: Measuring the Value of Information Services (continued) –** Discussants: – Hugh Farley, New York State Senator – Frank Lucchino, Allegheny County (PA) Controller (NCLIS Commissioner) – Robert Willard, Mead Data Central (NCLIS Commissioner)
11:15 – 11:45 am	**General Discussion by Forum Participants**
11:45 – 12:00 noon	Summation: (Issues Identified and Actions Needed) Martin Dillon, Online Computer Library Center

12:00 – 12:30 pm	**Forum Review; Evaluation; and Planning Future Forums** Mary Alice Hedge–Reszetar, NCLIS Carrol Kindel, NCES - CO-CHAIRS Summarizers: Dennis Reynolds, CAPCON Joseph Shubert, New York State Librarian General Discussion
12:30 – 1:15 pm	Luncheon, Ashlawn South
1:15 – 2:00 pm	**Luncheon Presentation and Discussion** Topic: Implementing the Institute for Postsecondary Education, Libraries and Lifelong Learning Martin Dillon, Online Computer Library Center Douglas Zweizig, University of Wisconsin
2:00	Forum Adjourns

List of Participants

Toni Carbo Bearman, Dean, School of Library and Information Science, University of Pittsburgh , and Member, U.S. National Advisory Council on National Information Infrastructure, U.S. Department of Commerce

Mary Treacy Birmingham, Director, METRONET

Julia Blixrud, Program Officer, Council on Library Resources

Laura Breeden, Director, Telecommunications and Information Infrastructure Assistance Program, NTIA, U.S. Department of Commerce

Tobi Brimsek, Assistant Executive Director, Special Library Association

Marion Crounse, Director, New York. State Senate Subcommittee on Libraries

Martin Dillon, Director, Office for Research, OCLC, Inc.

Brigitte Duces, Senior Operations Officer, The World Bank

Hon. Emerson J. Elliott, Commissioner, National Center for Education Statistics, U.S. Department of Education

Hon. Hugh Farley, New York State Senator

Hardy Franklin, Director, District of Columbia Public Library

Ray Fry, Director, Library Programs, Office of Educational Research and Improvement, U.S. Department of Education

Robert Gillespie, Robert Gillespie Associates

Don Gips, Deputy Chief, Office of Plans and Policy, U.S. Federal Communications Commission

Gordon Green, Chief, Governments Division, U.S. Bureau of the Census

Ronald Hay, Director, Computer Services, Louisiana State University

Mary Alice Hedge, Associate Executive Director, U.S. National Commission on Libraries and Information Science

Steven Helm, Blacksburg Electronic Village, Montgomery–Floyd Regional Library, Virginia

Carol Henderson, Executive Director, American Library Association, Washington Office

Thomas Jaques, State Librarian, State Library of Louisiana

Tom Kalil, Office of Science and Technology Policy, National Economic Council, Executive Office of the President

Hon. Sally Katzen, Administrator, Office of Information and Regulatory Affairs, Office of Management and Budget

Carrol Kindel, Chief, Library Statistics Unit, National Center for Education Statistics, U.S. Department of Education

John Lorenz, Coordinator, Library Statistics Program, U.S. National Commission on Libraries and Information Science

Hon. Frank Lucchino, Controller, County of Allegheny, Pittsburgh, Pennsylvania, and Commissioner, U.S. National Commission on Libraries and Information Science

Mary Jo Lynch, Director, Office for Research and Statistics, American Library Association

David Lytel, Information Specialist, Office of Science and Technology Policy, Executive Office of the President

James McConnaughy, National Telecommunications and Information Administration (NTIA), Office of Policy Analysis and Development, U.S. Department of Commerce

Bradley Nash, Jr., Blacksburg Electronic Village, Montgomery–Floyd Regional Library, Virginia

Paul Evan Peters, Executive Director, Coalition for Networked Information

Paul Planchon, Associate Commissioner, Elementary/Secondary Education Statistics Division, National Center for Education Statistics, U.S. Department of Education

Dennis Reynolds, Executive Director, CAPCON

Hon. Sharon Porter Robinson, Assistant Secretary, Office of Educational Research and Development, U.S. Department of Education

Eleanor Jo Rodger, President, Urban Libraries Council

Donna Scheeder, Congressional Research Service, Library of Congress

Joseph Shubert, State Librarian, New York State Library

Hon. Jeanne Hurley Simon, Chairperson, U.S. National Commission on Libraries and Information Science

Marvin Sirbu, Engineering and Public Policy Faculty, Carnegie–Mellon University

Elizabeth Vanderputten, U.S. National Science Foundation

Robert Willard, Director, Government Marketing, Mead Data Central, Inc, and Commissioner, U.S. National Commission on Libraries and Information Science

John Yahner, U.S. Federal Communications Commission

Peter Young, Executive Director, U.S. National Commission on Libraries and Information Science

Douglas Zweizig, Professor, School of Library and Information Studies, University of Wisconsin

Introduction

Hon. Emerson J. Elliott, Commissioner, National Center for Education Statistics, U.S. Department of Education:

In 1993, the National Center for Education Statistics and the U.S. National Commission on Libraries and Information Science jointly developed and conducted a planning forum to address some critical issues facing library and information services and their statistical implications, but also to consider the need for an inter-disciplinary forum on an annual basis. Our conclusion was obviously affirmative. It is also interesting to note that approximately 50 percent of today's participants also attended the September 1993 planning forum.

These forum meetings bring together statisticians, librarians, information service professionals, researchers, economists, and public policy specialists. The forum meetings offer an opportunity to discuss the issues facing library and information services and the resulting statistical requirements for measuring and planning library and information service performance effectiveness. The forums are intended to ensure that statistical information about libraries and information services meet the needs of policy makers at various levels and guide public policy development related to libraries and information services.

Why is the National Center for Education Statistics involved in this joint activity together with the Office of Library Programs and the U.S. National Commission on Libraries and Information Science? One of the things we find is that as national debates change in education issues, and in library issues as well, people's interest in data also changes. At last fall's planning session, we discussed some of the current, important issues that people are sensing in the library community. Those of you who were here or have read the proceedings of the 1993 forum will recall that three topics of concern were developed:

1. How we educate information handlers;
2. Impacts of technology; and
3. Economic impact of library services.

The latter two with a particular focus on libraries in the National Information Infrastructure are the subjects of this two-day forum. The idea is to begin to address aspects of these developments from the point of view of, "How will interest in data be affected? What kind of data will be needed to satisfy those interests?"

Hon. Jeanne Hurley Simon, Chairperson
U.S. National Commission on Libraries and Information Science

I am here today to learn. This is an exciting cooperative effort, and it is very encouraging to see that federal agencies can work so well together. We hope to continue working together in this very constructive and pleasant vein. Before us, we have an exciting agenda and the vast intelligentsia of several interested communities—that means we are going to get some things accomplished! Ever since President Clinton announced in his State of the Union address that "we must also work with the private sector to connect every classroom, every clinic, every library, every hospital in America into a national information superhighway by the year 2000," I have taken heart. And, Vice President Al Gore has followed up on numerous occasions emphasizing the President's statement.

We are here today to specifically put some flesh on the bones of what our distinguished national leaders have been saying. Our objective today is to share and develop information that will contribute to sound policy formulation and we will be accomplishing that through your good offices. I look forward to a productive meeting. As set forth in the introduction to the forum agenda, forum participants will:

1. Review NII-related programs, policies, and activities at the federal, state, local, and institutional levels;
2. Identify and discuss various policy issues related to the role of libraries in the NII; and
3. Identify statistical indicators that are needed to measure the effective involvement of libraries in the emerging NII.

Perspectives on the National Information Infrastructure— Two Roles of the Department of Education

How will the NII/Internet impact education, in general, and libraries, specifically? How is NCES planning to use the Internet/NII to further its mission? What roles are the Department of Education planning for involving libraries in the Internet/NII?

Two officers of the U.S. Department of Education's Office of Educational Research and Improvement (OERI) addressed the above questions:

Ray Fry, Director, Office of Library Programs,
Office of Educational Research and Improvement,
U.S. Department of Education

This forum is both timely and critical. The Library Programs Office operates ten grant programs under the Higher Education Act (HEA) and the Library Services and Construction Act (LSCA). We have no national advisory board. Twenty years ago, several programs did have national advisory boards and we found their advice and direction very helpful. A forum, such as this one, helps to take the place of such an advisory group.

I would like to talk about the roles that the Office of Library Programs plays, and expects to continue to play, in helping build the NII. Networking, resource sharing, and interlibrary cooperation are really not new to us. Title III of the LSCA came into being in the mid-1960s. Since then, $250 million have been distributed through the states to build networks and cooperative ventures. Since the late 1950s, over $2 billion has been funded through the states to improve public library services under Title I.

Regretfully, we have little validation or evaluation of those programs. When the time came when we should have been doing the evaluation and validation, the then Administration was recommending zero funding for the programs. There have been some studies, for example, a recent American Library Association study of Title I and III, published by the U.S. National Commission on Libraries and Information Science, which found that 25 states are now using funds for Internet projects.

In Virginia, for example, the state library is going to use all of their Title I and Title III money for the next three years and the goal is Internet access to all citizens at a cost per access no greater than a telephone call. Pretty ambitious! In Maryland, all counties except two, will soon be on a dial-up access capability to the Internet. We also fund

projects under HEA, Title II (A), College Library Technology Program, and several of them are tying into the Internet now. As an example, in 1993 we funded a project for $159,000 for the South Central Research Library Council in New York. Working through New York's nine reference and research library resources systems, this project will provide on-site advice, guidance, education, and technical support to 111 New York academic libraries to enable them to establish Internet connections or to increase and enhance staff knowledge and skills in using the Internet.

One might say that the $100 million that we put into strengthening research libraries under the HEA Title II (C) program ties into supporting networking, resource sharing, and the NII. Under II (C), the over-arching purpose was resource sharing. The three immediate purposes were bibliographic control, collection development, and preservation and conservation. When the program first started, I expected collection development to be the area in which most money would be spent. Not true at all. It was bibliographic control consistently through the years—more than two-thirds of the money—and that is because it ties right into network development. Approximately 20 percent was for preservation and conservation; and the remaining funds in collection development.

Over the past few years, we have used some of our programs, particularly in the higher education field, to strengthen the state library agencies to do a better job of administering the big programs. Our two big programs are LSCA, Title I ($80 million), and Title III, Interlibrary Cooperation ($20 million). We have always felt there was a weakness in the areas of planning and evaluation. It is just basic. If you do not have the training and expertise in planning and evaluation, it is known that resources may not be used to maximum advantage.

Two years ago, the School of Library and Information Studies, University of Wisconsin, received funding for a three-year workshop for these three purposes: (1) to train at least two state library agency people in the basics of planning and evaluation; (2) to develop an easy-to-use evaluation manual; and (3) to tie in this effort with the promotion of the National Education Goals. More recently, there have been some spin-offs from that program, into regional workshops that are targeting the evaluation of Internet operations. We think it is moving along very well.

At the moment, we are working on the reauthorization of LSCA. This forum is critical for that purpose. We just held our first steering committee meeting, and six task forces are busy at work. The task forces are: (1) Technology and the NII; (2) National Education Goals; (3) Service to Special Populations; (4) Professional Development; (5) Research and Demonstration; and (6) Strengthening State Agencies. And, you can believe that the most important is the Task Force on Technology and the NII. We have always believed, and continue to believe, that strong State Library Agencies are critical to public library development in this country. We expect to present a legislative proposal with the 1996 budget.

In closing, I would like to make a sociological tie-in to our effort today. I would like to present to you the results of a project funded by Office of Library Programs to the Carlson School of Management. The study looked at ten roles of the public library. Of the ten roles, consistently the three educational roles came out 1, 2, 3. That is why we call this brochure, *Public Libraries Serving Communities: Education is Job #1.*

The ten roles considered are:

1. Educational support center for students of all ages
2. Discovery and learning center for preschool children
3. Learning center for adult independent learners
4. Center for information about the community
5. Research center for scholars and researchers
6. Recreational reading center of popular materials
7. Information center for community businesses
8. Comfortable, quiet place to read, think, or work
9. Community activities center
10. General information center for community residents

The following groups were surveyed: (1) opinion leaders in communities (educational, political, civic leaders); (2) general public; (3) African Americans; (4) Caucasian Americans; (5) Hispanic Americans. The results were clear: Most of those surveyed, especially African Americans and Hispanic Americans, regard public libraries as a very important source of support for their community's educational aspirations. Also, the lower the education and income level of the public, the higher they rate the educational importance of their public library.

Paul Planchon, Associate Commissioner, Elementary/Secondary Education Statistics,
National Center for Education Statistics,
U.S. Office of Education

I would like to talk about the increasing role that NCES has been playing in the world of technology. As I have traveled around the country over the last couple of years, I have been absolutely amazed with the rapid rate of increasing knowledge about technology and the information superhighway, and more than simply the necessary knowledge, but also the beginning steps for implementation.

- Approximately two years ago we had a meeting of state representatives in our National Cooperative Education Statistics System here in Washington where we had a presentation on the Internet. Hardly anyone in that group knew anything about the Internet at that time;

- It was one and one-half years ago when we first learned about Gopher Servers and the way they can help you search out resources;

- It was only a year ago within the Department of Education that we began the process of wiring up our buildings to develop a local area network;

- About nine months ago we acquired the capability for E-mail within the Department; and

- Six months ago we established our first Gopher Server within the Department.

Prior to the introduction of that Gopher Server our information services unit within OERI received approximately 300 inquiries for information in a month. Now, we have 300 accesses of files on our Gopher Server a day. From 300 inquiries a month to 300 a day!

The next step, within the Department, is to establish links with our regional offices. That should be completed within the year. So, things are happening very quickly within Office of Educational Research and Improvement (OERI) and within the Department of Education, and NCES is attempting to play our part in that.

Five years ago with the reauthorization of the Elementary and Secondary Education legislation, two cooperative systems were created in the NCES legislation: (1) A National Cooperative Education System, K-12; and (2) A Federal-State Cooperative System for Public Library Data. In both areas we have been working with representatives at the state level to develop strategies for providing technical assistance for improving the quality of the data collection, and for moving toward mechanisms for gathering and disseminating that information. We expect new legislation to be passed this summer which will add yet another cooperative system, a cooperative system on higher education. NCES will be working with these three cooperative systems to promote the increasing use of technology.

In anticipation of this passage, this past spring we established a project called the Internet Demonstration Project. This is a project with seven participating states: California, Colorado, New York, Oregon, Washington, West Virginia, and Wyoming. In those states, representatives from the higher education community, the K-12 community, and the library community have come together. There are five representatives from each state, one representative each from: the state-level higher education agency, state-level education agency, institutions of higher education, K-12 local schools, and the state library agency.

The primary project within the Internet Demonstration Project is what we call the "Data Machine." A more sophisticated way to refer to this project is, "An Integrated Data Collection and Dissemination System". We hope to develop protocols for the collection and dissemination of information in higher education, K-12, and in our library surveys

using Internet. The inspiration for this actually came out of the Federal-State Cooperative System for Public Library Data. Most of you are familiar with traditional data collection methodologies, paper and pencil. Someone enters the data, and then you have it on tape.

Approximately five years ago, the participants in the Federal-State Cooperative System for Public Library Data decided that they wanted to develop electronic means for collecting and disseminating their information. To do so, they developed software called DECPLUS. A floppy-disc was sent out to the library data coordinators in each state. There were electronic means for entering the data from data bases, or keying it in. They developed local editing: longitudinal edits; cross-sectional edits; logical consistency edits. They developed tables for outliers in the data set. That data was then sent into NCES for re-editing and then certified that the data was ready for distribution as a national data set.

The idea for the Data Machine—the Integrated Data Collection and Dissemination System—is to take a number of the functionalities that exist in the DECPLUS system and to generalize it to other collection systems, (namely, our common core of data in ESEA and the Integrated Postsecondary Data System in Higher Education) to provide for the submission of those data over Internet and then to widely disseminate them.

We will be working on an eighteen-month project: six months of design; six months of coding; and six months of testing, whereby we will develop a flexible data collection system using Internet. It will provide for people to enter information into forms and will allow them to enter information using computer-assisted data collection methodologies such as DECPLUS, or to enter the information in files or file transfers. That system will have the local decentralized editing that DECPLUS has. We would hope that at the point that states submit information to us, it will be of high enough quality that they can make that available immediately on the Internet for other states and people to use that information much more quickly. It takes us six to nine months once we get the data sets acceptable. We hope that this will speed up the release of that information.

Once the data sets have been cleaned, edited, and computed nationally, we hope to make them available on a MOSIAC Server linked to a hierarchical data base that we will maintain at OERI so that the information can be quickly queried and disseminated around the nation. We hope that this Data Machine will be scaleable so that it will be useful not only for us at the national level in working with states, but can, in turn, be used by state agencies in collecting information from libraries, school districts, or institutions of higher education. In turn, those agencies can work with sub-units within their area of authority.

There is a second project that the Internet Demonstration Project is taking on. A committee is working on the development of Electronic Data Interchange (EDI) Standards. We hope to be developing in the next year EDI Standards for public library

surveys and our surveys in K–12 and higher education. We hope that at some point those EDI Standards will become part of this Data Machine concept.

With the combined resources of the library, higher education, and K–12 cooperative systems, we hope to increase our role in providing technical assistance to states, and, in some cases, to sub–units within those states. We see, eventually, where we can move beyond the collection of statistics—that I would characterize as aggregate statistics where institutions provide summary statistics on numbers of resources, staff, people served, students, and so forth,—to a day where we actually have micro–record systems that exist across the nation. And, those micro–record systems can be imported up to the next higher level. With the ability to manipulate those micro–record systems, we will greatly enhance the analytic power of our information systems.

Libraries and the National Information Infrastructure: The Federal Perspective

The following questions were posed in the forum agenda:

> ***What Federal policies are required to achieve the vision of the NII?***
> ***What is the role of libraries in achieving this NII vision?***
> ***What is the federal government's role to help assure***
> ***that libraries will contribute to achieving the NII vision?***
> ***What data are needed to formulate policies that advance the NII goals?***
> ***Who is responsible for obtaining and interpreting these statistics?***
> ***What research is needed?***

OPENING REMARKS

Peter R. Young
Executive Director
U.S. National Commission on Libraries and Information Science

In his opening remarks, Peter Young pointed out that in his January 1994 State of the Union Message, President Clinton stated, "We must also work with the private sector to connect every classroom, every clinic, every library, every hospital in America into a national information superhighway by the year 2000".

Will libraries play an integral role in the emerging information and communications infrastructure? What federal policies are required to enable libraries to fulfill such a role? How can these policies be developed, and who is responsible for assuring that the library role in the NII is realized? These questions are not easy; neither are the answers easily determined.

One of the reasons the NII is so promising is that it cuts across different industries and disciplines. But, this same characteristic makes the NII difficult to embrace. There is a blend of vision and challenge that permeates our topic today and tomorrow. Another reason that complicates the NII topic is the rapid pace of development, not simply in terms of technology but also the policy supporting the NII.

One thing is for certain, however: That within this ever-changing and interdisciplinary convergence of technologies, industries, and sectors, we must have some way of describing the changes that are occurring in our information environment.

A news item heading in today's, New York Times reads, 'Census Officials Plan Big Changes in Gathering Data.' The article talked about the Census Bureau planning wholesale changes in how to collect data in the year 2000 and beyond by using sophisticated estimates based on surveys to supplement the actual counting (which they are doing with the long-form questionnaire). The Bureau plans extensive monthly surveys conducted over an entire decade, providing a more timely flow of this broad demographic data.

This policy forum has a number of purposes, but for me one of the most important purposes is that it gives participants a chance to carefully and deliberately ask questions. Questions about what the future will be like. "The discussion and exchange at this forum are structured around the following three topics:

1. The Federal Perspective;
2. The State, Local, and Institutional Perspective; and
3. Measuring the Value of Information Services.

The dialectic covering each of these three sessions is in four parts.

1. Brief panel presentations with a moderator;
2. Discussants who offer comments on the panel presentations and the topic;
3. Open group discussion; and
4. Summation to identify issues and needed actions.

I would like now to introduce our first panelist, Sally Katzen.

Panelists

The first panelist was Sally Katzen, Administrator, Office of Information and Regulatory Affairs (OIRA) in the Executive Office of the President.

Sally Katzen: As the Administrator in the Office of Information and Regulatory Affairs (OIRA), I have learned that most people focus on the "Regulatory Affairs", but I have found the "I" in OIRA to be among the most challenging and most rewarding aspects of my position. The importance of information in a free society cannot be overestimated.

The President's related statement in his State of the Union Message was originated by the Vice President and has been adopted by all of the senior Administration officials. It is something we take very seriously, and "library" is a crucial part of it.

I wanted to give an overview of the federal perspective from my dual -- not conflicting, but complementary, roles of Administrator of OIRA and as Chair of the Information Policy Committee of the Information Infrastructure Task Force (IITF), the

Administration's vehicle for implementing the government's role in the NII. The IITF is chaired by the Secretary of Commerce Ron Brown.

In my position of OIRA Administrator, we have been working on the revisions of OMB Circular A-130, that addresses information and its uses. We have made major strides toward promoting information dissemination policies particularly in the electronic age, at reasonable costs. Another thing we are working on is oversight of federal agency information management practices. When I arrived at OIRA, I found not just the state of technology to be appalling but also the management practices, awareness, and interests in effective use of information to help the government do what it is suppose to do—provide services and function efficiently and effectively. Information is a key part of that and has been sorely lacking.

"It seems to me that libraries are key to insuring the free flow of information and the availability of that information."

As Chair of the Information Policy Committee, I am specifically responsible for three committees: (1) privacy; (2) intellectual property rights; and (3) government information. The privacy working group has drafted revisions to the 1973 Code of Fair Information Practices and is ahead of the other committees.

The new principles, which are still in draft, identify the responsibilities of the data providers, the data collectors, and the data users. Essentially, they say, "Given the distributed nature of computers today, **all** must exercise responsibility for ensuring the quality of data, for ensuring that it is used in a manner that is consistent with the purposes for which it was collected, and for providing only the minimum amount of information necessary to complete a transaction. No data dump please." It is meant, as was the earlier version, to help drafters of legislation and regulations go about their work. It is the level of generality that states general principles and needs to be fleshed out for each of the sectors to which it is applicable. It will appear shortly in the *Federal Register* and public comments are due in mid-June. It is available on-line.

The working group on privacy is also reviewing the legislative language introduced by Senator Simon to establish a Privacy Protection Commission. This is a recommendation of the National Performance Review and is extraordinarily important, but very complicated in a democratic society. Where do you put it; how do you staff it; what teeth does it have; what resources does it have? We will be working in this area.

The intellectual property rights working group is looking at a comprehensive review of the adequacy of current law and institutional arrangements to insure that in the electronic age the full range of information and entertainment products will be available on the NII. Let me be very clear. If we do not protect intellectual property rights, nothing will go up on the system. So, it is essential that we have a clear idea of protection, and that our creators and producers are aware of that and feel comfortable

with what we have done. The report is due to the Information Policy Committee at the end of May.

The most important issue for this group would be how fair use translates in an electronic environment. I do not have the answers to that just now. People seem to think when we put a topic on the agenda, we have a preconceived notion of how we want it to turn out. The truth of the matter is we have it on the agenda because we do not have the answers.

The third working group is on government information. This group has been working on various workshops to teach federal employees how to use the Internet and bulletin boards. A program called E-Media, basically directed to public affairs people within the government, explained how to disseminate information in the electronic age. It was so successful, it was over-subscribed. E-Media II, III, and IV have been held, and we will keep going as long as there is interest. Someone has said that the interest is because there is a lack of knowledge and a need to bring government employees up to speed in the new electronic era. I would like to say, rather, it is a surplus of interest of how to do their job better. And, we will help them in this regard.

We are currently conducting a workshop on improving access to legal information, in which, as a lawyer, I have a particularly keen interest.

"The importance of information in a free society cannot be overestimated."

To tie all of this together in the information dissemination area, we have put renewed emphasis on the Government Information Locator Service (GILS), an agency-based reference source for government information dissemination products. GILS will help identify where the public information resides throughout the federal government, describe what is there, and assist in obtaining that information. It is just like the card catalog, except that it will find and retrieve data. This is extraordinarily important because there is so much information in the government which is hard to find. The information that the government has is a national resource, and we ought to be exploiting our resources, in the best sense of that term, rather than ignoring them. The GILS can be accessed directly and indirectly. Directly through kiosks which we hope to establish throughout the country—800 numbers, electronic mail, bulletin boards, faxes, and so forth. There will be off-line access—floppy disks, CD ROM, and printed works. Indirect access can be provided through the GPO, NTIS, depository libraries, other public libraries, and private information service companies.

As a next step there, we have presented a GILS paper to the IITF for OMB to do a bulletin with instructions to the agencies on how to review their inventory and set up their system. We have promised to make that bulletin available for public comment and input before it is finalized.

The GPO is another issue of importance. As you know, H.R. 3400 proposed moving the printing policy to the Executive Branch and leaving the depository library program with the Superintendent of Documents at GPO. The House proposal sent the depository library program to the Library of Congress and kept printing policy with the GPO. This was not particularly what we had in mind. This is now on the Senate side in Rules Committee, and we are working with them. The Deputy Director of OMB, Alice Rivlin, testified in March and made very clear that we are committed to improving the efficiency and effectiveness of government printing while strengthening the depository library program. It is not to sacrifice the depository library program but to enhance it. I understand that the central procurement function of GPO is very important. We have heard the concerns, and we are hoping to achieve your objectives in a way that help achieve our objectives, as well.

Second Panelist:
Toni Carbo Bearman, Dean, School of Library and Information Science, University of Pittsburgh , and Member, U.S. Advisory Council on National Information Infrastructure:

I have been in the information policy field since 1962, starting as a *teenage* professional (laughter). It is a great pleasure to be on the U.S. Advisory Council on NII. Quite frankly, it was a real surprise. There are 30 members appointed by Commerce Secretary Ron Brown for two-year terms to provide advice to the government from the private sector. The private sector is very broadly defined, and I think we need to keep that in mind. It is not just big for-profit companies or even just small businesses; it is all of those who do not work for the federal government—which means the not-for-profit group and all the "ordinary type" citizens.

"I think of the NII as today's Andrew Carnegie. The NII is the people's university because it provides us access to libraries and to many other information resources."

I was surprised that more private sector people are not here today because, of course, the Administration has said that the private sector is going to be building the NII, again using that very broad definition of "private sector." At our first meeting on February 10, 1994, with Vice President Gore and Secretary Brown, we were asked to define universal service and universal access; define what is meant by NII; recommend the role of the government; ensure that we do not have a society of information "haves" and "have nots"; and address international issues in the Global Information Infrastructure (GII). A big job.

We have met twice and are focusing on three mega-projects. The first one is the definition of universal service and universal access. The second deals with the issues of privacy, security, and intellectual property. I chose to work on the third mega-project, defining the NII in five applications areas: (1) education, including life-long learning

and, of course, libraries; (2) public safety/crime; (3) health care; (4) electronic commerce; and (5) government information. All of these, of course, interrelate and overlap. I am very interested in the applications areas, of course, and education and libraries, but I also hope to work on the topics related to government information and health care. There is no way that the 30 members can do this alone, so we will be calling upon many others, including those present today, for advice and assistance.

There have been several documents issued in addition to the *Report of the Information Infrastructure Task Force Committee on Applications and Technology, Putting the Information Infrastructure to Work*. If you have not read the task force report, I suggest you do so. The entire report is of great interest. However the chapter entitled, *Libraries and the NII* is critical reading, this from one individual representing the library and information field and higher education. Thank heavens I stand on the shoulders of giants. Many of you have already been of great help and assistance in providing advice, and we will need much more of the same in the future.

" . . . we were asked to define universal service and universal access; define what is meant by NII; recommend the role of the government; ensure that we do not have a society of information "haves" and "have nots"; and address international issues in the Global Information Infrastructure (GII). A big job."

Following are my own personal concerns and particular missions as a Member of the Advisory Council.

- We need to encourage clear thinking and civil discourse. Not that the thinking is not clear, and the discourse mostly is pretty civil. I think we need to be very clear what we are talking about`; we need to distinguish among kinds of information. Information about what our government is doing is clearly from personal information. When people make sweeping statements about all information, I try to get them to be more specific and clear about what they mean.

- We must focus on the types of publics; I like the plural of the word because it does matter. Do we really think the government is going to link every library in this country? Are they going to link public libraries and corporate libraries as well? Maybe; maybe not. Who is going to pay for each is quite different.

- We should distinguish among value, price, and cost. I keep encouraging a focus on value. What is in the interest of society to provide? It is in the interest of society to have an educated public, therefore, we should continue to support public libraries and public schools. What else should be supported? This issue has to be addressed.

- I think of the NII as today's Andrew Carnegie. The NII is the people's university because it provides us access to libraries and to many other information resources.

- What is clear in focusing on the value is the need to build very strong public/private partnerships. For example, we are working to help improve the libraries in the schools in the Mon Valley in Pittsburgh and have approached Bell-Atlantic for help. We have also talked with TCI about helping with other libraries. It is this kind of public/private partnership that is needed focusing on the value to society first.

- We must focus on access. This is a single issue for everyone. Who is going to get access to what information? How can we ensure that we do not leave out the information "have nots"? (It really is not either "have" or "have nots"; it is a spectrum, as we all know.) Some people have access to some kinds of information; some people have access to a lot more kinds of information because, in part, of economic conditions. Related to that is the question of preservation. We can provide access to government information, but will it be available ten years from now, or even next year? This, of course, relates to who is going to pay? There is a question of privatizing certain services. There is a big question of whether they will continue if they are no longer commercially viable. Preservation in all forms is a very, very important issue.

- One of the most important issues is human resources. How do we ensure that we have the multi-cultural diverse human resources to build, manage, and teach people how to use the information superhighway? This is a real concern to the University of Pittsburgh and to all of us. When I talk to our colleagues in the private sector, I ask them where they think they will get their work force tomorrow if we do not have people trained to find and use information effectively.

- We need an information ethic. Several years ago at the University of Pittsburgh, we introduced a forum on the ethics of information in society. We also have a course on this topic which many students are taking and we have just introduced a doctoral seminar. We must focus on many ethical issues, whether it is a six-year old understanding intellectual property or broader questions of protecting privacy.

- We must keep the global perspective before us. Vice President Gore has stated that this is a Global Information Infrastructure (GII).

My own specific objective is:

- To try to make the right things happen. Are we doing the right things? Are we really making them happen, or are we just spinning our wheels?

I would like to close by reminding us of the global perspective on all of this. The International Federation for Information and Documentation (FID) will be celebrating its 100th anniversary in Tokyo in the fall. Vice President Gore has been invited to speak on the global information infrastructure. The Crown Prince and Princess and several Ministers will be attending. FID has just established a Task Force on Global Information Infrastructure and Information Superhighways. At their meeting they are

issuing a resolution that has been signed by 40 different organizations, including the International Federation of Library Associations (IFLA), the international archive organization, and many others, on strategic alliances of international non-governmental organizations in information to serve better the world community. This reminds us that we are dealing with global issues. Information does not stop at our national borders.

The Advisory Committee looks forward to your help and advice in meeting the challenges ahead.

Third Panelist:
Thomas A. Kalil, Director, Science and Technology, National Economic Council, Executive Office of the President, The White House:

I would like to cover four issues: (1) The distinction between the NII and the Internet; (2) Why this is a top priority of the Clinton Administration; (3) The important role that libraries and librarians can play in the NII; and (4) Identification of specific partnerships between the Administration and the library community.

In terms of distinguishing between the NII and the Internet:

NII = A more nebulous concept and refers to an increase in our ability to communicate with each other and to access information.

Internet = Refers to something specific; the network of networks.

"Why is this such a top priority for the Administration?" I think the bottom line is that we see a really tremendous potential to take this explosion in information and communications technology and harness it to address various economic and social objectives."

An example of NII, in my view (and in the view of the Administration which will play a very important role in the development of the NII), would be video-conferencing over the Integrated Services Digital Network (ISTN) and the public switch telephone network that are really part of the NII, but not part of the Internet.

The things that we like about the Internet are:

- its openness;
- the ability of individuals to be producers as well as consumers of information;
- the fact that it allows 'many to many' communication as opposed to 'one to many';
- the fact that it serves as a test-bed for innovation; and

- the very vibrant gift economy that exists. The reason that many people are willing to take time to insert useful information and organize that information into virtual libraries is that they know that others are doing likewise.

Several issues that will determine how prominent a role the Internet will play in the future of NII are: its ability to solve a number of problems, its ability to deal with multi-media information; security; and, ease of use in the ability to handle commerce. If the Internet develops the capability of addressing some of these issues, it will be an important part of the NII. Certainly, major companies, for example, Microsoft, are sure it will be because they are putting support for the Transmission Control Protocol/Internet Protocol (TCP/IP) as part of Windows 4.0.

"Why is this such a top priority for the Administration?" I think the bottom line is that we see a really tremendous potential to take this explosion in information and communications technology and harness it to address various economic and social objectives. It always surprises me how rapidly this technology is changing. In 1976 if you had $20 million you could buy a Kray 1. By the end of next year, people will be able to purchase a computer that has six times the computing power for $500.00. So, in less than 20 years you are going from spending $20 million for something that allows you to do a 160 million instructions per second to a program that costs $500.00 and does 1 billion instructions per second. That is a pretty impressive improvement in price and performance. The mere fact that information and communications technology is changing at that rate does not necessarily mean it will instantaneously translate into the solutions to the problems we are interested in solving.

"Librarians can serve as knowledge-navigators and help people interact with this huge sea of information that can be pretty disconcerting for those people who are not familiar."

The major challenge is to figure how we actually apply this technology and use it to help create jobs, to make learning more exciting and improve student performance, to reduce the administrative processes with our health care system, and allow people to make more decisions about their health care needs. Obviously, libraries will play an important role. Recently, the Vice President has talked about not only the role this will play in economic development in the United States but also the economic development in the Third World. We are not interested in technology for technology's sake; rather how we can use it to address the various economic and social challenges.

In terms of the roles of the library community, three important roles come to mind:

1. Addressing the equity issue. How do we prevent a polarization of American society into "have" and "have nots". Even if people will get some type of life-line access, it is important to remember that full access to the NII may also require access to a PC

or other sophisticated form of information appliance that not everyone will be able to afford. I think the public library system will play an important role;

2. The libraries can play a key role in helping develop local nodes on the NII. People are going to want to have information about their community available, and libraries can play a key role; and

3. Librarians can serve as knowledge-navigators and help people interact with this huge sea of information that can be pretty disconcerting for those people who are not familiar on accessing information.

Finally, I would like to discuss some specific areas in which the library community and the Administration can work together. It is important to get to this level of specificity in that it really is not enough to say, "We feel unloved and under-appreciated." -- every group feels that way. The rural and urban people; big business; small business, Americans with disabilities all come and say their concerns are not being addressed. Policy makers have a problem in that there are only 24 hours in a day, and we do have to spend a certain period of that time with our loved ones and sleeping. So, I think it is incumbent upon people to identify those concrete areas where you wish the Administration to do things differently than are being done today. A number of possible areas come to mind:

1. The President's pledge that all libraries, classrooms, hospitals, and clinics will be connected;

2. The role of programs such as the Library Services and Construction Act and the Higher Education Act and how to use those funds to leverage other resources;

3. Copyright issues;

4. Government information;

5. Research issues in the area of digital libraries and information retrieval and discovery; and

6. NII pilot projects.

There may be other issues that occur to you. There are some things that are relatively easy to do and yet will make a difference. For instance, it was recently discovered that we are still spending money on preserving microfiche rather than on digitization. These are the things that can make a difference.

Fourth Panelist:
David A. Lytel, Information Specialist, Office of Science and Technology Policy, Executive Office of the President, The White House:

The good news is that there is now a significantly greater recognition of the important social role played by librarians than in the past. That is also the bad news. It is bad news only insofar as some of the things we have taken for granted are likely to become highly politicized, in particular, the reauthorization of the Library Services and Construction Act. That is not necessarily a bad thing. What we are attempting to do is to focus the debate as best as we can, not through a series of meetings but through a set of publications. I would like to call your attention to the U.S. Department of Commerce's Report, *Putting the Information Infrastructure to Work: Report of the Information Infrastructure Task Force Committee on Applications and Technology*.(See Appendix A for additional information.) Think of this report as a serviceable first draft. The report's purpose was to describe a vision for the nation, assess where we are now, ask the question of how we are going to get there, and focus on a set of questions defining the government's role in achieving the national vision.

We have not entirely decided how to structure the feed–back mechanism, but there is the idea that rather than a rewrite, there would be a document written by the same authors summarizing the public comments received, to be published in September 1994. This extends the iterative process so that we are maintaining a discussion that is focused on exactly what it is we need to know.

"What are the people's feelings about using the LSCA as a vehicle for digitization of resources on a reasonably large scale? I would love to hear an echo on that."

The purpose of this is to come up with fiscal year 1996 budgetary recommendations. It is not just an idle exercise. We are trying to figure out what the federal government is going to spend its money on in fiscal year 1996. If the LSCA reauthorization is going to be ready at more or less the same time, you should be ready for a significantly higher public profile than you have now.

What are the people's feelings about using the LSCA as a vehicle for digitization of resources on a reasonably large scale? I would love to hear an echo on that.

Fifth Panelist:
Laura Breeden, Director, Telecommunications and Information Assistance Program, National Telecommunications and Information Agency, U.S. Department of Commerce:

I am the Director of a new grant program for telecommunications infrastructure. On March 7, 1994, Secretary of Commerce Ronald H. Brown announced the availability of $26 million in new federal matching grants to develop the National Information Infrastructure. The Telecommunications and Information Infrastructure Assistance Program (TIIAP) will target needed funds to non-profit groups such as schools, hospitals, and libraries to help them access new telecommunications technologies. It is a very broad program, and anyone who is not in the for-profit sector or the federal government is eligible to apply. The closing date for proposals was May 12. NTIA anticipates decisions on funding will be made by September 30, 1994.

"It would be interesting to have you tell us what you think 'advanced telecommunication services' means within the context of the public library. The Administration is looking hard at what universal service and universal access mean in a digital era."

There are very specific issues with which I think NCLIS and participants at this forum can help NTIA. Part of what you are looking at is statistical information on use of libraries and the effectiveness of technologies used in libraries. This is very much on my mind as well because there is legislation pending in the House under which NTIA would look at public library connectivity to the National Information Infrastructure. The way it is worded in the House version is, "Access to advanced telecommunication services."

It would be interesting to have you tell us what you think "advanced telecommunication services" means within the context of the public library. The Administration is looking hard at what universal service and universal access mean in a digital era.

There has been some controversy in the library community about why public libraries alone are included in this legislation.

Another mandate in this legislation is a survey of public school connectivity. Part of the objective is to provide information to the Federal Communications Commission (FCC) which will then prepare a Notice of Proposed Rule Making to determine the feasibility and advisability of preferential tariffs for not-for-profit institutions. As many of you know, the telephone company (as a result of the way the industry is regulated) tends to see its users in one of two classes —business or residential. Not-for-profit institutions are considered business users and, in effect, are subsidizing the residential user.

These issues are not just of academic interest. There is a real possibility that the regulatory structure is going to change; it may change quite a bit. The relationship between the FCC and some of the state agencies may change. And, it may have a very direct impact on the cost of telecommunications in the not-for-profit sector. I would encourage you to keep this in mind as you proceed with your work.

How effective is access to these services? What do you hope to achieve by providing a public access point in the library to the NII? How do you know you have met your goal? How do you know that it is the right goal? How do you decide whether it is cost effective? My task is to try to "jump start" the public sector's use of the NII. It is really an infrastructure building problem. With $26 million, or even $100 million, we are not going to create the NII for the public sector. NTIA's goal is to find the good models, spend the money on the right experiments, and evaluate and disseminate the results of those projects so that other similar organizations can learn from what we do. Part of what we may do is develop interesting tools, along with interesting models.

It is going to be very important to try to understand and evaluate what we learn from creating a highly distributed federal laboratory for looking at how you can use the information infrastructure to improve the delivery of social services. Because the program is so broad we will be looking at a number of different areas, and it would be very nice to develop evaluation instruments that could be self-administered by the project awardee and that could be used across a multiplicity of different types of projects. I do not know whether or not that is possible, but I would like to see whether it is. With the recently passed Government Performance and Results Act, the federal government must perform with results.

We are trying to get many different types of groups to cooperate and focus on inter-operability and the use of standards. I sometimes imagine being remembered as the 'mother of 10 million Gophers.' Please do not get me wrong; Gophers are wonderful. But, we need an information architecture that is to scale, and we need to think about structuring information so that people can continue to be publishers and creators of their own information. Librarians have been traditionally the people who think about these kinds of issues in our society. Part of the answer is using computers to do some of the "smarts." Recently, I heard someone say, "The next task is to teach the computer to read." We need to use computers and automation to help us with this problem, but we are so focused on the difficulties that we are forgetting that we will probably succeed, we will probably get there. But, there will be 10 million Gophers; is that what we want?

Discussants

The first discussant was Carol Henderson, Executive Director, American Library Association (ALA) Washington Office.

Carol Henderson: Ten years ago, an economist named Walter Bolter took a close look at what libraries were doing and was absolutely astounded and said, "If public libraries were an industrial group, they would be in the top six in the percentage of their budgets you invested for technology." He also said, "Libraries, in general, have the most widely distributed computer network, second only to banks." Libraries have a history of early deployment of technology, but we are certainly in a new generation of technology.

> ***"One of our concerns is that public libraries be defined in a broad enough way to encompass the full range of mechanisms through which public library service is delivered. That ranges from systems, cooperatives, state library agencies, as well as individual community libraries."***

In the area of connectivity for libraries, one of the major challenges is for rural areas. Some of our rural libraries still do not have an inexpensive way to get connected to networks such as the Internet. Those rural and small libraries have not only the affordability and connectability problem, but need particular emphasis on technical support and training. And, probably from levels beyond their own staffs, whether that is a systems level, a library cooperative or network, or state library agency. They are going to need continuing support. NYSERNET's Project included an evaluation component. That project showed: (1) that small rural libraries with limited staffs could effectively make use of the Internet resources for their communities if they had help with technical support and training on a continuing basis; (2) when special funding runs out, many of those libraries continue to have problems affording connectivity; and (3) even the tiniest public library had unique resources that simply may not exist anywhere else.

Because of these kinds of needs, I do think that the LSCA is one very important vehicle to provide a federal stimulus to getting additional libraries throughout the country connected. It has a history of providing a very useful support and coordination mechanism. LSCA is also important because of the current blurring of boundaries between types of libraries and types of agencies meeting information needs, and that development role throughout the states will be important.

The library field can make major contributions in archiving, preservation, and digitization. The archiving is really a problem; regular Gopher-users know that you may find the source on one Gopher Server today and two weeks later it is gone. There is a real need for responsibility. In terms of digitization of some of our major library and data resources, there are a couple of avenues available: the LSCA, particularly for inventory; and the Higher Education Act (HEA) Library Programs.

One of our concerns with eligibility for preferential telecommunications rates is that public libraries be defined in a broad enough way to encompass the full range of mechanisms through which public library services are delivered. That ranges from systems, cooperatives, state library agencies, as well as individual community libraries.

Another concern is that "educational institution" not be defined too narrowly, certainly in surveying connectivity and availability of services and needs. It seems peculiar to make an artificial distinction between grade 12 and grade 13 and to eliminate the whole postsecondary level as H.R. 3636 does. We have lots of partnerships going on between schools and universities. We have lots of resource sharing among all levels of libraries in networks where if some institutions but not others are eligible for a certain rate, it will be problematic. With public libraries serving as sites for distance-learning for postsecondary education, would a public library then be ineligible for preferential rates because it was a postsecondary site or might it be the only postsecondary site in the state that was eligible for preferential rates because it was a public library? Because of these types of issues, we need to look at learning institutions as a whole.

Second Discussant::
Don Gips, Deputy Chief, Office of Plans and Policy, Federal Communications Commission:

The role of the Federal Communications Commission (FCC) is to follow the lead of Congress and the Administration in interpreting the laws and translating them into regulations. We are very much at the beginning of this process. The FCC has a long history in pursuing universal service goals. We have generally not thought of those goals in terms of institutions like schools, libraries, and clinics, but in terms of business and residential and making sure that the telephone networks reach out to rural communities. However, the President's and Vice President's challenge has forced us to rethink.

"FCC's new Chairman, Reed E. Hundt, is very committed to playing a large role in assuring that the information superhighway reaches these institutions to accomplish the goal of lifelong learning . . . . and . . . libraries are a critical piece of this puzzle."

The FCC's new Chairman, Reed Hundt, is very committed to playing a large role in assuring that the information superhighway reaches these institutions to accomplish the goal of lifelong learning. Mr. Hundt believes that libraries are a critical piece of this puzzle. We are also very excited and supportive of the far-sighted provisions in both H.R. 3636, introduced by Congressman Markey, and S.R. 1822, introduced by Senator Hollings, which will give the FCC the ability to ensure that schools, libraries, and clinics have access to the advanced networks at reasonable rates. However, this is where we need your answers to these key, fundamental questions with which we are currently struggling.

1. What constitutes connection?
2. What are these advanced networks?
3. How much should we require? How far do we go?
4. What would it cost?
5. What are the implications?
6. Who should pay?
7. Who should decide how the connections are made?
8. How are the funds distributed? Should funds come from rate payers?
9. What is the role of the federal government vs. the states in doing this?

Third Discussant:
Robert Gillespie, Robert Gillespie Associates:

When I first became involved with computing, it was to use it to do tasks that could not otherwise be done. I was frustrated with the tools that I had so I became a tool builder. The problem with the rapid progress in computing is often that we do need a billion instructions per second to keep up with the operating systems that we have built to do what we used to be able to do with 1,000 words.

"I am working with a set of people who are looking at the public libraries and what can be done to speed the diffusion of network technology. The federal role is one of initiating and helping, but not necessarily changing."

I feel that we do have an NII now, and we are in a transition to a new environment with many changes. It confuses people to think that somehow we are stepping into a completely different era or arena. It confuses them because they do not know what they are supposed to do. It is important to help people understand that we are making transitions; transitions are not easy, but that is our destination.

One National Science Foundation (NSF) program in 1965 was aimed at providing universities with a tool by moving from 10 universities with computers to 100 with computers. This was a successful program and its goal was science. Another NSF program, called the "Star Network Program", took those universities that had benefited from the first cycle and used them to provide services to diffuse these tools to the liberal arts educational institutions scattered around the states. These projects led to a jump from 10–15 percent of universities using computers in 1965 to 70–80 percent by 1975–80. These were very deliberate programs aimed at diffusing this new tool with the expectations of improving productivity and science. The programs, of course, began to change and evolve.

In 1980, another prominent program was "The Super Computer Program." From my perspective, the Super Computer Program was a program that we used to hide the

network program. One of the major objectives of the Super Computer Program was to link four or five centers. If you link the centers, you, of course, have to link the people using the centers. This meant linking people throughout the country. That program was a very, very important program. Not only for super-computing for which most people have a marginal use, but for the building of the network, itself. These programs were aimed at stimulating use and diffusion. They are good examples of federal programs that were very successful.

Since 1986-87, there has been a program to establish NSFNET, which has been very helpful in providing access to the variety of new tools that we now have.

These continue to be the elements that will be important in any kind of planning because it is something of which we can effectively take advantage. We have to change the framework a bit because we are always struggling with the "paradigm shift." I am currently looking for processes that we can set up to accomplish our goals. I am working with a set of people who are looking at public libraries and what can be done to speed the diffusion of network technology. The federal role is one of initiating and helping, but not necessarily changing.

I think there are opportunities ahead to invest in the development of model standards and model processes.

General Discussion

Peter R. Young, Executive Director, U.S. National Commission on Libraries and Information Science (NCLIS), began the general discussion by reviewing the following questions:

1. What are the consequences if libraries are not included in the NII? What happens to society? What happens to the library professions?

2. Why should we be concerned about these institutions? Should we be concerned about preparing these institutions for the future? Should they have a future?

3. How do you measure effectiveness?

Eleanor Jo Rodger: It is a narrow and limited role for us to defend our institutions. It is a powerful role for us to defend what we pay attention to. The issues we pay attention to are: (1) access and equity in the information environment; (2) access and equity in lifelong learning; and (3) sharing cultural richness. I would encourage us not to defend our institutions, but to pay attention to what it is society hoped for when it created us.

Donna Sheeder: The library community and its members must think of themselves as information providers and make their collections accessible electronically. Public libraries see their role as a link to the state and local government as an information provider. Increasing relations with legislatures and their understanding of the issues could result in higher success in funding.

Joseph Shubert: The Internet can make it possible for libraries to do more of what they are doing today. Libraries are a means by which people can take possession of their own lives. We must do a better job of learning how the new technology can make it possible for libraries to do a better job of educating.

Toni Carbo Bearman: Many of the regulatory issues are not just at the national level. The local public utility companies (PUC's) have a great impact on libraries.

Douglas Zweizig: The library community is interested in promoting diversity and stimulating use of diverse sources of information. Market forces are not so much interested in supporting diversity as they are interested in supporting standardization and predictability of markets.

Mary Jo Lynch: I would like to point out that the physical equipment may be available but not yet the skills to access the information resources.

Tom Kalil: We associate conceptual access with access to the hardware and they are not at all the same thing.

Eleanor Jo Rodger: Libraries are loved. We are loved for the way we are and were. We are not loved or funded for the way we may be in the future. It is a tremendous challenge to change when you are loved.

Frank Lucchino: I agree that public libraries are loved. Librarians have won the hearts of the public, but have not won the minds of the public officials that fund them. We must convince the public and elected officials of the relevance of electronic information services.

Hardy Franklin: People love libraries, but they cannot tell you why. Raise public awareness by relating libraries to the aspirations of the community and to the interests that are being served by the library.

Martin Dillon: If we were going to design a system for provision of information, of the sort public libraries provide, in an NII environment, would the resulting invention look like the public library? This is the key question we are trying to address.

Summation

Dennis Reynolds,
Executive Director, CAPCON

- We have been cautioned that the NII and the Internet are not the same thing. The general consensus seems to be that the Internet is the basis of the NII, and we build from here.

- The NII will be built by the private sector, and we do not yet know the major players.

- It is rather unclear whether the NII will be an extension of the Internet. If the private sector that is to build the advanced telecommunications network for the 21st century decides to do something else, the Internet may become a trivial sideline.

Factors Relating to Libraries and the NII

- An important alternative for libraries is: access to the network, or access to the information available on the network.

- The overall goal is to get libraries connected to the network.

- How do libraries help provide network access and the use of resources available? This is where the concept of libraries as a national access "safety net" becomes very important.

- It is important for libraries to come to the Administration with very specific recommendations. The library community must get better at saying, "We need this!"

- It is important to express concern for money and funding and from where it is going to come.

- The library profession needs to assert its role of librarians and libraries as organizers of information in the NII.

- To whom do we assert this role? To the federal government? To the private sector? Other public sector organizations, for example, the education community?

- Librarians have a long tradition of being concerned with confidentiality and privacy. Need for a privacy protection act.

- What is the role of libraries in user-education?

- How does one educate users? More information and training of users will create more and more demand.

- If libraries are going to play a role, how will it be funded?

- The issue of protecting intellectual property also needs resolution.

Luncheon Presentation
May 16, 1994

Paul Planchon welcomed Hon. Sharon Porter Robinson, Assistant Secretary for Educational Research and Improvement, U.S. Department of Education, who joined the forum to address the luncheon meeting. Dr. Robinson introduced the luncheon speaker, Linda Roberts, Special Advisory on Education Technology, as follows:

Thank you for your warm reception. Several of us must leave after lunch to go to the White House for the signing into law of Goals 2000, along with the provision that reauthorizes the Office of Educational Research and Improvement. We really do feel that today is a red-letter day, and I am delighted to have a chance to pause and talk about a very important aspect of being able to implement Goals 2000.

I had a chance to observe and hear you discuss some of your policy issues. I want to tell you that as I listen to you share your experiences and reflect on your aspirations for the future of library services and the future of information services in communities all across the country, I really do feel proud. I thought, if we can capture your sense of vision, capacity, and commitment, then, all that we do, especially in the reauthorization of LSCA, will be done. I want you to know that your session was quite informative and quite an inspiration to me.

It is a special part of what we do to have a special chance to work with Ray Fry, Jeanne Simon, Peter Young, and Paul Planchon, and all of you, to think about how we combine our energies and knowledge to create access to the support that we must give to the citizens to make decisions, to prepare for their future, and not have it be a tomorrow that we cannot predict. Working with you since I have been in the Clinton Administration has helped me to believe that this is exactly the right direction, and that we have here the right folks to help us create all of that.

I would now like to introduce to you one of my colleagues in the Department, Dr. Linda Roberts. Officially, she is the Special Advisor on Education Technology to the U.S. Department of Education. This is a new position in the Department; one which comes about based on our own understanding of the need to bring knowledge, focus, and energy to issues of innovation, and how technology can serve the innovation that we need to realize in educational services. Her leadership role in the Department has already helped to bring knowledge together from different quarters to bear on the topic.

Dr. Roberts will serve as a facilitating agent in the Department as the various program offices focus on how best to use technology. Of course, she comes with a rich background, as you may expect. She has been a classroom teacher at the elementary level, as well as in adult literacy programs. In addition, she has taught on the University Faculty at the University of Tennessee and Lincoln Memorial University. Just before she joined the Department, Linda was with the Congressional Office of Technology

Assessment as a project director. During the time she was there, she was recognized for her leadership in education and technology. In earlier years, she served under Ray Fry in the OERI.

Linda Roberts has helped us to envision the power of technology. Very recently, she led the assessment of adult literacy. All of these things are important for you to know. On a personal level, I would want you to know that you are about to hear from a consummate professional, a committed public servant, and one who envisions the future of equity and of capacity for all.

Libraries and the National Information Infrastructure: Basis for Reinvention?

Dr. Linda Roberts,
Special Advisor on Education Technology
U.S. Department of Education

The biggest mistake we make is that we think about the library program as it has been and how we can fix it. Maybe we should be thinking about how we can reinvent it.

My argument is that information technology broadens the client base and, in fact, can potentially bring more people into the library.

It is exciting and challenging to be in an Administration that says, "We have a job to do, and we have to do it better than has ever been done before." In some ways this is going to be the theme of my remarks.

Just before I left the Office of Technology Assessment to join the Department of Education, I directed a study on adult literacy. It was the first time that I seriously looked at the needs of learners in the adult community across this country. What I saw was an incredibly valuable effort of very good people trying to do the best that they could with the marginal, at best, resources. What struck me about this study was that requirements and expectations -- in terms of our society, in terms of the reality of life, of being able to compete in the marketplace, being an effective parent, and, most importantly, being an empowered citizen -- had gone up substantially over the past 50 years.

The OTA assessment forced me to think about learning in a very different context, and I hope it stays with me for the rest of my life. The library community has always known that learning is a lifetime proposition. Education is a community endeavor, and the OTA literacy-study highlighted how critical libraries are in communities, although, quite frankly, in too many places we saw libraries reducing their hours and services, and not being able to take on the kinds of demands and services being required, because of funding cuts.

When I think about the purpose of this forum, I would like to say that it is not only that you have to identify the issues and opportunities, but also consider how to get the attention of the people who are in power to make decisions you wish them to make. We have to think about ways to energize actions that, in fact, push not only the library communities' interests, but the larger community as well—the business community, the public sector community, the education community—to all act together.

> ***"I would argue that the more enlightened people become, the more valuable information and information resources are. But, it will be a very unsettling time."***

The biggest mistake we make is that we think about the library program as it has been and how we can fix it. Maybe we should be thinking about how we can reinvent it. Once we come up with the compelling aspects of "the program" or "the services", then you attach the money. Not before. In many communities, library services have been defined by what is available, rather than by the moral imperative of the up-front needs for resources and information in an information society.

In thinking about the future for libraries and the National Information Infrastructure, I'd like to cover several key perspectives:

1. We have to talk about libraries and the National Information Infrastructure in terms of a new context, and we must be clear about that context. It is a context being driven by technology; there is no question about that. A technology that does not limit itself to time or place; where information is available on demand. It is also in a context where we can do very different things with information and that information is far broader than simply print and text. We have to understand this if we are really concerned about information and an empowered citizenry.

   We have to find ways to help people get information, use that information, and create new knowledge and ways to change their lives and the lives of their community. Technology in an information society gives us a whole new set of capabilities, and they are not pie-in-the-sky; they are real. They are here today, in *all* aspects of society. All you have to do is go into a hospital, any modern manufacturing facility, or someone's home, and you can see a whole different world and a set of different capabilities that are being addressed and served.

   But, for us in education, there is another equally interesting phenomenon in this new context that we need to recognize, work toward, and do something about. That is the fact that what used to count for education— the standards for learning and for performing—have really changed. We have a higher set of standards, not for just one part of society, but for every learner in society. The National Education Goals cover the entire spectrum of what makes or breaks this country in the future -- you are talking about a different kind of learning, and a learning that cannot go on from 9:00 a.m. to 3:00 p.m. or from age 5 to 18. It is learning that takes place in a much more complicated and more individualized way. So, you have to think about the technology, the information society, and the requirements needed to participate in that society.

2. We are taking about a new library, which we have to acknowledge and deal with creatively. First of all, what is *in* it? The "it" is the very interesting piece. The "it" can be the services, the information, and the resources for learning and citizenship. If the library is an absolutely essential resource for living, working, playing, parenting, and citizenship, then everyone will support the library. Unfortunately, in far too many communities, there are still people who are not being reached and not being served. My argument is that information technology broadens the client base and, in fact, can potentially bring more people into the library.

3. The library clients are changing. This is reality. And we should be clear about it. In some communities, in the afternoon the library becomes the surrogate school. I would argue that this is fantastic because if the kids were not going to the library, they would be out on the street. On the other hand, we have not really acknowledged this role for libraries. If we are serious about this expanded role, then we need to consider: (1) Is this the best place for a surrogate school?; (2) How does this service get connected with other services?; and (3) How do we maximize the dollars and resources that we have so that what we are doing is truly effective?

   The clients are a more diverse population and will probably be more demanding, with a growing expectation for that information when they need it. Who would have imagined the kind of networks that have sprung up; an information network made possible by technology that relates to this world of information and information resources.

4. When we, indeed, have the Nation's information super-highway, there will lots of different "wheres" for its location. The challenge will be to think about what information goes where, what services are provided, and how are they provided?

   I would argue that the more enlightened people become, the more valuable information and information resources are. But, it will be a very unsettling time.

   In some communities, particularly the more affluent communities, people will bring the library to their homes. This would be a loss because the public libraries are a community. When I was young, the library is where I connected with friends, all ages and all people. It was a very empowering place. The library was built in such a way that it really, truly felt like a community center and, in fact, it was co-located with health care services, public recreation facilities, and a park.

5. We have to deal with the fact that there are likely to be different sets of metrics, and largely economic, that will be conflicting and challenging. For example, the idea of universal service and what that will mean when information travels everywhere. Are you going to pay every time you *get* information *and* when you *browse* for information? This runs very much counter to what we think of as a publicly-driven information set of resources. But, the economies are going to

drive decisions in both of these areas. We have to be very forthright in recognizing where the economies of scale lie.

6. What are the national resources that can be pulled together and developed, particularly through technology, in a more cost-effective way than at present? Let us put this on the table, look at the alternatives, and honestly calculate the costs of services in different kinds of ways. And, discover in this process how we can leverage the dollars we have. The different metrics will be exceedingly important in the future.

"Once we come up with the compelling aspects of 'the program' or 'the services', then you attach the money. Not before. Do not let a dollar amount determine what you think is possible. I think that in many communities, the library services have been defined by what is available, rather than by the moral imperative of the needs for resources and information in an information society."

This is how I think about libraries and the National Information Infrastructure. But, I am a very traditional person at heart. In my ideal world we keep the best of what we already have, and we do even better for those unserved. When I was eight years old I lived in Brooklyn, and I will never forget one special day as long as I live. I had been going to my neighborhood branch library to check out books. I was a precocious child. One day my cousin asked me to go to the library. I thought we were going to my library, but we went on the subway to Grand Army Plaza, the main branch of the Brooklyn Public Library. It was magic. There were *so* many books and shelves. I asked the librarian for the books by Lois Lenski. (I had just read *Strawberry Farm*.) She took me to the section where Lois Lenski's books were, and there was an entire shelf of her books. I remember thinking at the time, "They are *all* here. They are all here *for me*, and I can read them all." I very quickly took as many as I could carry, and the librarian told me I could only check out six books at a time! This is the experience every child and adult should have in their lifetime.

And, we can do it better with technology. We can address people's specific information needs and at the same time share common culture and common values. We can build communities of interest through the technologies and, ultimately, we can build communities of support for our public institutions for education and for learning.

The challenge is here. And, the most important way for the public to address the challenge is to figure out the key choices. I think the notion, "Well, this program is $100 million," is not the right notion to begin with. The notion to begin with is, "What do we have to accomplish? What will it cost? How can we pay for it? If we can find money to put metal detectors in public schools, to fill the pot holes on highways, and to build prisons, then I think we can find the resources to build the public information infrastructure.

Libraries and the National Information Infrastructure: State, Local, and Institutional Perspectives

The following questions were posed in the forum agenda:

> ***What state and local policies are required to achieve the vision of the NII?***
> ***How are libraries involved in the NII/Internet?***
> ***What state and local government programs are addressing connection of libraries to the NII/Internet?***
> ***What statistics are available about NII/Internet institutional use?***
> ***What data and research are needed to support policy work related to libraries and the NII/Internet?***

Louisiana Libraries Network
Building the Right Information Network

by
Ronald Hay,
Director, Computer Services, Louisiana State University
and
Thomas Jaques
State Librarian, State Library of Louisiana

Dr. Ronald Hay: The purpose of the Louisiana Library Network (LaNet) is to make as much information, Online Public Access Catalogs (OPACs), indexes, databases, full text, and Internet, available to as many Louisiana patrons as possible in the most economical manner.

In its first year, LaNet has signed on 19 of the state's 26 colleges and universities, with four more scheduled to be on-line shortly. In addition, three of the state's largest agencies—the Division of Administration, the Department of Health and Hospitals, and the Department of Social Services—are also subscribers. LaNet was designed with the scaleability necessary to meet future anticipated growth. It is a working partnership which ties the State of Louisiana together, academically. If you can connect libraries, why not connect homes? If you can get into the home with education, you will be productive.

A summary of the balance of his presentation follows:

Several interesting facts about Louisiana:

- 4.3 million people
- 245,000 public employees
- 26 colleges and universities
- 4 independent higher education boards
- 64 independent public library systems
- 70 public school districts
- 2000 public and private K–12 schools

The LaNet's context for success:

- An articulated vision
- Federal funding initiatives
- Cooperation
- Coincidence of improved technology at reduced cost
- A public perception of need and value
- A private opportunity for profit

The Louisiana On–line University Information System (LOUIS) is used to incorporate the indexes and catalog information from all participating institutions. LOUIS has 44 files for each institution, and 130,000 CICS transactions daily

Project Status:

- 15 of 26 colleges and universities will be automated and online on the LSU mainframe before the end of December 1994.

- The State Library of Louisiana will be on–line July 1, 1994.

- The first of 18 pilot K–12 schools will be on–line August 1, 1994.

- The first private college and the first medical school joined the Network during May 1994.

- All 64 (county) parish library systems have been scheduled for coming on–line before the end of December 1994.

- Brigham Young University is on–line to network subscribers through ProPAC and PACLink.

- 11 of the 70 school districts have indicated interest in joining LaNet as soon as possible.

Dr. Hay concluded by quoting from Charles B. Lowry's Editors Introductory Note to *Achieving a Vision of a Statewide Academic Library Network*, by Jennifer Cargill and Ronald D. Hay, appearing in *The Journal of Academic Librarianship*:

> *"The basic support of library management systems and inter-institutional telecommunications are vital if libraries are to be effectively positioned for the future. The demonstrable need for these elements of an information technology infrastructure do not necessarily lead to institutional action, nor does common interest always result in multi-institutional collaboration. The Louisiana experience illustrates that the keys to success are leadership, risk-taking, a vision for the future, the search for opportunity, and the creation of an atmosphere of trust and cooperation. Even funding obstacles need not stop technological innovation, which once started can take on a momentum all its own."*

Thomas Jaques reported on the Telecommunications Task Force established to develop a state information policy. The task force described the desired characteristics of the Louisiana Libraries Network as follows:

1. Must provide universal, affordable, equitable access.
2. Must address issues of privacy, security, and copyright.
3. Must be adaptable to individual library policies such as circulation, fees, and other regulations of use.
4. Must include an active marketing strategy.
5. Must be state-of-the-art technology.
6. Must be continuously maintained and offer high reliability.
   Must provide complete Internet access, including E-mail, bulletin boards, and file transfers.
8. Must include standardized protocols and be user friendly.
9. Must be expandable at specific end-sites and to other institutions.
10. Must provide connectivity between institutions from worldwide resources and extend to users at individual, remote sites.
11. Must facilitate resource sharing between institutions.
12. Must include an effective training component.

The desired products include:

1. Internet.
2. Other library catalogs and holdings.
3. Commercial research databases.
4. State and federal publications.
5. Serials, including those in full text.
6. Basic reference tools (for example, encyclopedias, language dictionaries)
7. Newspapers in full text.

LaNet Barriers:

Costs:

- Line charges
- Software
- Equipment
- Product contracts
- Maintenance
- Public demands for service/for staff

Change:

- Library role
- Staff jobs
- Human–to–machine dependence
- Agency–to–agency interdependence
- Language

Statistics are important and the following statistics are needed:

- To what extent is the system being used:
  - —by type of library
  - —by type of user (staff vs. patron)
  - —count of searches by search type
  - —count of help–screens displayed
  - —number and types of error messages displayed
  - —items printed
- What correlation exists between the network and
  - —circulation?
  - —interlibrary loan?
  - —individual library serial subscriptions?
  - —database subscriptions?
  - —staff perception of success?
  - —public perception of success?

Mr. Jaques concluded: The Louisiana Library Network and the Governor's Task Force to develop a comprehensive state electronic network will succeed. Neither the opportunities provided by new technologies nor the challenges of funding these costly innovations are determining factors, however. Instead, success will be predicated on the extent to which cooperation between the major players is sustained. The collaboration between university, public, and school libraries, the Public Service Commission, the State Office of Telecommunications Management, the Governor's Office, private industry as represented by South Central Bell and other telecommunications providers, commercial vendors of electronic databases, and government agency users of the networks is remarkable, instructive, and absolutely essential to the achievement of a state information infrastructure. Multiply Louisiana's commitment 50 times and the NII will become reality. (See Appendix B for additional information.)

Blacksburg Electronic Village (BEV)

Virginia's Electronic Village

by
Steven Helm
Librarian, Montgomery-Floyd Regional Library
and
Bradley Nash, Jr.
Sociologist, Montgomery-Floyd Regional Library

Blacksburg, Virginia, is a mid-size rural town housing Virginia Tech (Virginia Polytechnic Institute and State University (VPI) (SU)), and the Montgomery-Floyd Regional Library (MFRL). This is a one-year project with the Virginia State Library funding $57,000 from a 1993-94 LSCA grant plus donations from private sources. With 8,500 of its 23,500 students living on campus and with the faculty, staff, and support services, there are few people in town not involved with Virginia Tech. Thus, this isolated mountain community is filled with an unusually high percentage of computer-literate people, where 50 percent of the households have computers. A personal computer will be installed in the main lobby of the town hall so that people who do not have their own computers can get onto 'the net.'

The BEV is now in its early stages of linking many of its 35,000 residents to a computer network through its core partners: Bell Atlantic of Virginia; Virginia Tech; and the Town of Blacksburg. Called LREN (Local Research Education Network), Blacksburg's intent is to provide information to both the information rich and the information poor. The telephone company is providing high-capacity service free of charge until the end of this fiscal year to determine when, and under what circumstances people will demand services. At the end of the semester, students will be asked how much they would be willing to pay for the information.

The primary goal of the MFRL participation in the BEV project is to comprehensively evaluate free public access to the Internet in a public library. All project findings will be disseminated throughout the profession. The following evaluation tools to obtain quantitative and qualitative data are currently planned for the respective time periods:

- Public Workshop Survey - ongoing
- Staff Training Questionnaire - February 18, 1994, and after
- BEV Survey - Early April 1994
- Focus Groups - March through June 1994
- Group Interview with Staff - June 1994
- Reference Services Survey - May 1994 (Report July 1994)
- Project Logs by MFRL Staff - ongoing
- Server Logs - ongoing
- Client Logs - ongoing

- E-mail accounts; and number of people attending workshops and/or demonstrations

During the summer of 1994, equipment is being upgraded to Windows Gopher client; Eudora (E-mail client for Windows), MOSIAC; Telnet for Windows; FTP Windows client; Trumpet news reader. (See Appendix C for additional information.)

The first discussant on Blacksburg Electronic Village (BEV) was Douglas Zweizig, Professor, School of Library and Information Studies, University of Wisconsin-Madison.

"The better than 75 percent response rate showed that public libraries are making progress in connecting to the Internet and in extending the benefits of advanced information services to their patrons."

Douglas Zweizig: Without baseline data concerning public library involvement with the Internet, policy makers cannot begin to assess the potential roles for public libraries in the electronic networked environment. Recognizing this need, NCLIS commissioned a study to answer Vice President Gore's question, "To what degree could public libraries serve as a safety-net for providing access to Internet-based information and services?" It is hoped that the findings of the study can help the Clinton Administration and Congress in the development of a national networking plan that defines and guarantees public access to networked information resources and services.

The survey was conducted by a quick-response survey querying 1,495 public library directors on their library's plans for and/or present use of the Internet. The purpose of the study was to determine the nature, extent, and form of public library involvement with the Internet. Data were also gathered on related topics, such as:

- Degree to which public libraries have operational connections to the Internet;
- Type of provider that the public library uses to obtain connectivity;
- Internet services and resources that public librarians use;
- Public library programs or services that have been developed to incorporate Internet use;
- Factors affecting public library use of the Internet;
- Estimated expenditures and costs public libraries incur for connecting to and using the Internet;

- Special arrangements by which public libraries connect to the Internet (such as, state network users, federal grant recipients, subsidized Internet access rates); and

- For public libraries that are not presently connected, the potential for Internet access in the near future.

The study also asked open-ended questions, such as:

1. Tell us your favorite success story on the Internet?

2. Tell us your favorite frustration story on the Internet?

The overall pattern of the open-ended responses was: (1) there was excitement about the potential of the Internet; and (2) there was frustration over the technological problems.

The better than 75 percent response showed that public libraries are making progress in connecting to the Internet and in extending the benefits of advanced information services to their patrons.

Several of the most interesting statistics showed:

- 20.9 percent of public libraries are connected to the Internet
- Public library access to the Internet is not evenly distributed
- Public libraries serving larger communities are more likely to have access to Internet than public libraries serving smaller communities
- There are regional variations in public library Internet connectivity
- Public libraries are using Internet services to
  - -- procure answers to reference inquiries
  - -- access federal information resources
  - -- perform interlibrary loan transactions
- There are wide variations in public library Internet costs
  - -- libraries for smaller populations report annual costs of $412
  - -- libraries for larger populations report annual costs of $14,697
- Federal assistance for connecting public libraries to the Internet is required. [Carol Henderson pointed out that a 1993 American Library Association survey showed that 25 states were using some LSCA funds for connectivity to the Internet and for training.]

(The results of the survey, *Public Libraries and the Internet*, was published by NCLIS in June 1994. Single copies are available on request to NCLIS as long as the supply lasts. The Government Printing Office publication was also distributed to depository libraries.)

Second Discussant:
Paul Evan Peters, Executive Director, Coalition for Networked Information:

I am a representative of a coalition of three associations: The Association of Research Libraries, CAUSE, and EDUCOM. All three associations are devoted to higher education. CAUSE and EDUCOM are devoted to the sensible use of information technology in a higher education institution.

> ***"The communities where the libraries succeed in finding that footing are the ones where the information highway concept will become the most real, soonest, and best."***

Our mission is hard-focused on scholarly and intellectually productive uses of the network. All of the members are heavily invested in mission-critical applications of the Internet. We believe that users are starting to do things with the Internet that were not even imagined, yet alone anticipated. We also believe that as a general rule, people are not getting enough out of existing networking technologies and policies so we are very concerned about driving up the return on the investment in the current technology and policy framework.

My constituency is primarily looking for the NII to do at least what we have in the Internet, but to do it cheaper, broader, and be more diverse. I would like to share several ideas:

1. As far as I am concerned, the state, local, and institutional levels are where the real action is. What is the appropriate government role relative to networking initiatives? What should the government do? What should private industry do? Also, may I say that the politics and funding of libraries and schools is primarily a state and local matter in this nation, it is not primarily a federal matter. If state and local government and funding revenues are your business, it is in your interest to start referring to the *new* information highway system rather than the information highway system in order to call attention to the fact that schools and libraries are primary participants in the existing information highway system. What the nation is really talking about is a *new* information highway system.

   On my belief that state, local, and institutional levels is where the action is, I am painfully aware that access to social resources is distributed quite differently in different parts of this country. Some of the discussion about the information highway and the social resource it represents does not take this into full account. To be more specific, at the federal level, the people are rhetorical. At the state and local level, they are real people. The last mile is the traditional scarce resource, that all of U.S. telecommunications policy has focused on, that is no longer a scarce resource. The last mile is how you get from the high-performance fabric to the individual home or office. Folks who understand and are connected to specific user

communities at the other end of that last mile, are really the people who are in the cat-bird seat. The voters are at the state-local level; and we have to do a lot of work to get the voters on board this train.

2. I am not sure that the library can be, or should be, separated out from public institutions in this debate. I am also worried about whether the library should be separated out from the communities they serve in this debate. I think that library strategies should be not stand-alone strategies; they should be strategies which rely upon coalition-building among public institutions, like museums, schools, and so forth. There should be partnerships with corporate and civic interests in a given geographic area. Funding for library advances in this area may come from non-traditional sources, meaning do not look for all the funding—or even a majority of the funding—to come from the reflagging or reprogramming of LSCA or HEA.

   As a political matter, I have been thinking that virtual libraries have to be positioned as part of virtual communities, and fund-raising activities of libraries should be very closely aligned with the impacts on the overall community in which a given library is set up to serve.

3. I am very concerned that as we think about library matters in this area that we give as much attention to the demand side of the funding equation as we do to the supply side. I fear this may be too technical, meaning I am not comfortable with how I phrase it. A lot of the equity and diversity measures of the existing telecommunications globe in which we live are pitched against supply-side measures, like capacity set-asides. We will reserve a certain number of cable channels as part of this franchising for public use. Or differential pricing, which we like to talk about as though differential prices, like the library book postal rate, do not carry a differential service quality with them. To mention another supply side measure, life-line services, where you ask network suppliers to provide life-line services for people in their community, which we have discovered is a service that the middle class uses a lot more than the people who came up with the supply-side measure had in mind.

   The problem with the supply-side measures is that they tend to favor big suppliers and they tend to be difficult to implement and monitor because you are relying upon the statistical measures of suppliers who have a vested interest in reporting the data in a certain way. The supply-side measures are open to abuse. Should we be thinking about modems in the future? A number of these supply-side measures are very hard to operationalize in a packeted digital network where the capacity is not really as easy to set aside as it was in an analog period.

"The NII is an attempt to produce a new national policy framework for three convergent industries—broadcasting, telephone, and computer."

Without beating-up too much on supply-side measures, I would like to encourage more conversation of demand-side measures which also have their problems, like an information highway trust fund that is built with an assessment (some people might call a tax) on the gross revenues of providers of products and services that rely upon them. Vouchers and stamps, and a number of similar measures are possibilities that are really geared toward increasing the level of demand and improving the diversity of demand from all suppliers of products and services. These are very unpopular, may I say, in Washington where they tend to be cast as entitlements. They almost all require taxes or something that acts like a tax. And, they also make differences of means extremely visible as a matter of public policy and participation, which is a very unpopular and an untidy thing to do.

As we look to transforming how we assure certain public goods, using analog technologies in a previous period, if we look for analogs of the measures we had in the past, we may come up with things that favor big actors and maybe do not operationalize as easily as they do now. I am trying to cast this as a difference between supply-side measures to advance the public good vs. demand-side measures. Again, I would like to say what I am trying to do is encourage more discussion on the demand-side because most of the discussion today has been on the supply-side.

4. Finally, I think these are the kinds of public policy vehicles to assure the values that we care about. I am very mindful that the NII is an attempt to produce a new national policy framework for three convergent industries—broadcasting, telephone, and computer. And, these are not three industries that have existed in a common regulatory framework before, nor share a common technological framework.

   Broadcast is a one-way communication industry that has always provided a very high volume of traffic. It has no tradition of universal service; it does have a tradition of equal access but it is very hard to map one onto the other. The telephone industry has always been a two-way industry that has concentrated on low volumes of traffic. It does have a tradition of universal service, but it did not have a tradition until the Carter phone decision some number of years ago regarding open access. The computer industry is a two-way industry that has concentrated on high volume, but has no tradition of regulation, whatsoever.

   One of the difficulties we all face as we try to plot these measures is that what we are trying to put together is not a new public policy framework for three industries existing in a common public policy framework. We are really trying to put together something new for industries that do not have a common tradition. What this means is an incremental or valuative approach is definitely called for, which means a subject of measurement, particularly formative evaluation rather than summative evaluation, is very topical. I am very glad NCLIS, NCES, and others are staking this out because we need formative measures to watch exactly what happens in each

of these industry groupings because we do not have a common baseline for them at this time.

"I also believe that time will show that for most voters in the United States, if the term 'information highway' is in their head, the word 'library' will be pretty close thereafter."

If you asked voters in the United States what the term "information infrastructure" means to them, I think you should expect the voter you are speaking with to look back at you and say, "I do not know, but for some reason I am suddenly angry." If you asked voters in the United States what the term "information highway" meant to them, I believe most voters would reply, "I do not know, but please tell me more." I also believe that time will show that for most voters in the United States, if the term "information highway" is in their head, the word "library" will be pretty close by thereafter. Most voters in the United States are not spending time thinking about how information highways are going to put libraries out of business. It is a very special moment. It is the state and local level that can turn libraries into a grand interpreter as well as a service provider.

It is my personal opinion that the communities where libraries succeed in finding that footing are the ones where the information highway concept will become the most real, the soonest, and be the best.

Third Discussant:
Eleanor Jo Rodger, President, Urban Libraries Council:

I represent not just the large public libraries in this country, but, more importantly, I represent the people who use them and the people in the cities and their service areas who do not use them. I am interested that Mr. Peters feels that "information highway" is a warm, fuzzy word. For most people, it is not. It is not a positive term. We lose sight of the fact that those people to whom we are supplying these social goods are, in many cases, not talking the same conceptual language as we.

I have several areas of reflection that I would like to share.

If we are still doing the wrong 'stuff,' but with new equipment, is that progress? We kid ourselves that anything we do with this "new stuff" is the right thing to do for people. I am not sure that it is. My experience in being in a lot of libraries is that if you listen carefully to people, the major goal of the library is to get more people to use the library. The other goal is to get more people to fund the library. That is just about as far as a substantial portion of the thinking goes.

In a recent meeting of public librarians funded by NSF, the analogy was: We used to have to go to the well to get the water; now it is being piped into your home. And, yet,

there are a huge number of libraries and trustees who believe that we are effective if we can keep getting people to come to the well. But a statistical problem is what to count when they do not come to the well anymore. I do not know how we move the emotional attachment of going to the well with the experience of now getting cleaner, safer, cheaper water at home, except for those people who are already comfortable with this kind of computer technology (hopefully, many of them are children).

I have heard a great deal of talk today about how important access is and I say people do not want access; they want the 'stuff.' We have not solved the problem when we give them access. People do not want access to housing; they want housing. People do not want access to adequate food; they want food. And, people do not want access to information; they want information.

As we build these systems that deliver better information (which is information about information), that is very satisfying to people who are information professionals. I am cheered that full text services are getting cheaper and so we may actually be able to deliver more and more of the information. But, I think we need to be very careful about feeling our job is done when we provide access, even when we talked about levels of access.

"I think we need to be very careful about feeling our job is done when we provide access, even when we talked about levels of access. I applaud the attention today that has been paid to making it easy -- not just user friendly -- but easy."

I applaud the attention today that has been paid to making it easy -- not just user friendly -- but easy. One of my rules of life is that if you want someone to do something, make it easy. I heard it from the Administration staff. They said, "If you want funding, make it easy for us. Give us specifics that talk about how you can give us more bang for the buck we give you." Years ago, George D'Elia did a study about library use and the thing most connected with library use was perceived ease of access -- and that talked about lighted parking. It did not talk about screen interfaces. I think if we are truly serious, we will worry at some level more about making it easy than about making it comprehensive. The average family has access to 43 channels of television; statistics now show that they use only 13 channels. We do not need everything, and I think that matters.

Another point I would like to make is to remind you of the environment that exists in libraries about which we are so hopeful will take on these new and wondrous tasks if they are given new and wondrous tools. The time and attention is on the information that is of utmost *temporary importance, day after day after day*. The challenge is to help people serving as library trustees who are managing and providing policy guidance to focus on what is of utmost long-term importance. And, that is hard.

Library directors with whom I talk are absolutely drowning in personnel and purchasing issues. Life in large urban libraries, in addition to being complex, is also often rigid, is heavily controlled by union and civil service rules, and by purchasing departments. The technology in libraries, in large cities at least, runs through the data processing departments who *do not have a clue* about what we are trying to do and that it is different from what they are trying to do. And, as a result, they do not know the territory.

The other thing going on in urban libraries and part of the current atmosphere is discussion about policy issues and connectivity for which there are, so far, no answers. There are issues such as homeless people sitting at terminals all day, and staff reading E-mail at least three hours a day. There are a lot of issues for which we need answers. The environment for making this happen is complex, slow to change, and confusing for those who are now serving there.

The funding issues are multi-dimensional. Library funding is essentially state and local. The federal dollar is immensely important as a stimulus, but it is not going to be the answer. In economic terms, the reason we get public money is as a publicly-funded distributor of private goods. Society decides, as you know, to do public distribution of private goods when we believe the world will not have enough if it is left up to the private sector. This is true with immunizations, and it is true with education, and information.

But, the corollary of that is that they have to believe that what they are getting is good, and it is generally good for society. This is why the censorship issues always gets us in very, very difficult waters with our funders because they say, "Wait a minute. I gave you all this money so you could give the good information out and now you are giving all this other stuff out." One of the policy issues on the Internet for public libraries -- and eventually as a part of the NII -- is how we limit access so that we stay within what is politically acceptable with local communities and yet remain true to the values about open access that brought many of us to librarianship.

"I think that part of that, too, will be the development of a statistical package, combined with an anecdotal package, combined with testimony of significant and distinguished beneficiaries that will allow funders to understand what it is we are doing, why it matters, and how it is good."

I think that part of that, too, will be the development of a statistical package, combined with an anecdotal package, combined with testimony of significant and distinguished beneficiaries that will allow funders to understand what it is we are doing, why it matters, and how it is good.

One of the other pieces that no one else has mentioned yet about the funding environment is that there is in this land an immense resistance to taxes. There is much less resistance, I believe, to fees. I think as a people we are reluctant to vote for taxes for decisions that will be

made on which we have limited influence. I do not want to pay another thousand dollars for some elected official to distribute as he or she determines. I do not mind paying a couple of dollars to the library to rent a video. I think that this environment is very challenging for those of us who have believed professionally not in affordable access, but in access at no direct fee. In many of our urban areas that almost has to be the case, or we will simply disenfranchise huge numbers of people. This is a piece of the funding picture that matters.

Another piece of the funding picture is the state and local roles. Dr. Bobby Roberts, NCLIS Member and Director, Central Arkansas Library System, and I prepared a two-page working paper for the LSCA Reauthorization Task Force on federal/state/local roles for funding public library services based on public finance principles.

Another issue is the public/private money issue which is partly about partnerships but it is also partly about how we do that. As we look at partnerships for direct financial gain as well as partnerships in kind, we need to be a bit cautious to ensure that the values of public libraries relating to intellectual freedom, equitable access, and a wide variety of materials are shared by all those partners before we get so far down the road that we can no longer pull out. There are some partnerships that should not go together because the concepts may sound good on paper but, in fact, they really fight each other at a level at which we need to be cautious.

If you look at the rationale of why public libraries are funded locally primarily, it is the same rationale as it is for education—the benefits are local. When we were about books and buildings, we were local. We will be increasingly in the future about networks that cross political jurisdictions. So, one thing that is happening is that there is a heavier infusion of state money, and reduced local funding, partly because of equity issues. I would like to encourage a good few law-suits on equity of access to information resources, because as long as they are funded from local property taxes, they will never be equitable.

There is an increasing role for federal funding as we develop the library for America—the whole big system. Unfortunately, that is coinciding with the time in Washington of reduced federal funding. I am thankful that the Clinton/Gore Administration has said that all libraries will be connected by the year 2000. In law, however, there is no money. At this time, there is the greatest rationale for significant infusion of federal money when there is the least likely prospect of getting it. I think this is a dilemma, unless we can create a vision so compelling about a federal role which we can persuade people to fund.

I do think that we are in an amazing time. It is a time I believe must feel both as exciting and as scary as the discovery of bacteria felt for the medical practice. Our hope is similar to the hope of medicine at that time, knowing this whole new structure. Some information is of more value than others, in terms of public dollars. As we look at priorities and digitization, we need to pay attention. We need to realize that we can not

do it all, and to be patiently insistent about pursuing that which can be done. And, above all, we should be hopeful.

General Discussion

The general discussion was based on the following questions:

1. ***What are the various policy responsibilities of federal, state, local and institutional sectors for library involvement in the NII/Internet?***
2. ***What are the major barriers to achieving the NII vision where all Americans participate in the information revolution?***
3. ***What statistical information is required to achieve this NII vision and how will this data be collected, analyzed, and interpreted to formulate policies?***

Paul Evan Peters: One of the reasons I am into 'local' is that the 'national' conversation is so dominant right now that the 'local' conversation is not being heard. That is because the problem of building an information highway is the on and off ramps. It is not express lanes. In the current way things are funded in the United States, those on and off ramps are predominantly a state and local responsibility. The information highway was built in the 1980s. There is just very low traffic on it right now because of this problem of getting policy onto the last mile.

Mary Treacy Birmingham: The linkages among the institutions are politically connected. The federal government's role is to maintain stimulus.

Marvin Sirbu: The last mile is the problem. But it is also true that there is a variety of technologies competing to provide the last mile connection. The way to best sort out which company and which technology is best in any particular setting, is to give the dollars to the buyers. Not to create an artificially low price for one of the services by giving money directly to the service provider to cut his price. National models tend to get to be supply-side designs. A technological model is not needed.

Neal Kaske: Within the Department of Education there are 3,000 inquiries per week on the Gopher. How do we evaluate libraries, and why? When we go into a library, how do we evaluate it? We usually go into a library because of an information need, and whether we get that information need satisfied or not satisfied is very important. As the library changes into a virtual library as well as a physical library, are we getting the information needs satisfied? I know when someone is satisfied because I can ask them.

I do not have that same ability in an on-line search. How do we know we are meeting needs for on-line service?

Douglas Zweizig: There are a variety of roles that the federal government might take: financial; vision; standardization; and research and development of tools. Where can the federal government apply leverage so that what needs to happen across the country can happen?

Ray Fry: The history of LSCA shows that the state and local libraries did not get into specialized services for the disabled, blind, and handicapped until federal money was available. I think one of the federal roles is to fund demonstrations in areas of national need.

Summation

Joseph Shubert
State Librarian, New York State Library

- We have heard much about vision. Vision is very important. "If you do not really know where you are going, you can find interesting paths." None of us really know where we are going, because everything is changing so rapidly.

- We are very much impressed with the both the Louisiana and Blacksburg Projects; in particular, the swift integration, collaboration between producers and users of information, marketing services, level of involvement, significant level of investment, evaluation attention, and political "smarts". Agencies which have never talked before are now talking.

- The problems that libraries face right now, funding, cutting back on hours, and so forth. We have to let public policy makers know that despite all of these operational problems (which are fixable), libraries are very powerful when it comes to helping people use, find, and generate information. This is tricky business. But, when people start talking about promises of technology and can cite instances of services delivered, then there is excitement. We have to deal not only with this interesting flirtation but with reality.

- The importance of training in fully using the Internet.

- The importance of driving-up the return of investment. With this technology we have the opportunity to do that in terms of the investment that we have in library collections and services.

- As we think about the national data collection systems and fast-response surveys, we need to look at the way local evaluation is taking place.

- The coincidence of technology and need is heard. This is a wonderful concept. Technology is going to affect every single thing that libraries do. There are lots of people who express considerable pessimism about libraries, but, I think, the library that embraces the technology and has the resources will allow the library to be a wonderful place.

Libraries and the National Information Infrastructure: Measuring the Value of Information Services

How can the value of library and information services be measured?
What indicators of performance effectiveness are needed to plan for the transition of libraries to the NII/Internet?
How does the study of information economics differ from economic analysis of more traditional resources?
What is the social value of information in the post-industrial global economy?

The forum resumed Tuesday, 17 May 1994, under the chairmanship of Paul Planchon who introduced the first panelist, Julia Blixrud, Program Officer, Council on Library Resources (CLR).

Julia Blixrud: CLR encourages projects that help libraries recognize the importance of gathering data for decision making. In order for libraries to deliver effective services to their clientele they must not only identify the services to be delivered, but also develop appropriate measures in order to determine whether they are delivering such services effectively. Ms. Blixrud, Project Officer, described a CLR research project at Rutgers University's School of Communication, Information and Library Studies, called, *Study of the Costs and Beneficial Impacts of Library Functions,* being conducted by Paul Kantor and Tefko Saracevic. (See Appendix D for additional information.)

In the project proposal, the study was summarized as follows:

> Libraries today must make planning allocation decisions concerning both new and old modes of access to information. These decisions require knowledge of the expected impact and the expected cost of each course of action. Some of the factors that may influence decisions include timeliness, thoroughness, convenience, accuracy, and precision.
>
> The goal of this project is to develop and apply tools and procedures for measuring costs, classifying benefits, and measuring benefits of diverse library functions by:
>
> (1) Adapting a functional cost analysis to all types of library functions and services;
>
> (2) Developing a taxonomy to classify library beneficial impacts; and

(3) Developing a metrology (measurement science) for measuring benefits as described by the taxonomy.

Specifically, the investigators will develop and use a dictionary for classifying the impact of libraries on individuals and organizations. They also plan to develop and use a manual, which will enable library administrators and staff to use the measurements which are defined by the investigators or defined by their own dictionaries and measurement scales as appropriate.

It is recognized that applying economics to the library area is a complex issue. To date, little has been done to classify, measure, and quantify the beneficial impacts of library functions. In a recent article in *Library & Information Science Research* that reviews previous research on impact assessment of university libraries, Ronald R. Powell, School of Library and Informational Sciences, University of Missouri–Columbia, concludes that "In an era in which academic libraries are more and more in competition for financial support with other important enterprises on their campuses, it is becoming increasingly important for libraries to be able to justify their costs, if not their existence. . . . An inescapable conclusion seems to be that neither measures of input, nor even measures of output or performance, are up to the task of justifying the tremendous expenditures of university libraries. What does appear to be needed are valid, reliable measures of the actual impact libraries are having on their users."

The Rutgers study will involve five research libraries located within a reasonable geographic area of the investigators. Confidentiality will be maintained for specific cost information from the institutions, but the data will be reported in simulated form.

The first task will be to conduct a cost analysis at each institution by analyzing the flow of funds from all sources through each library's organizational structure and its expenditure categories. This method has been documented by Kantor in previous work. The data will be collected in site visits and through structured interviews. The resulting information will be used to develop a manual that will enable replication of the process at other sites.

A taxonomy of beneficial impacts will be developed during the second project task. This taxonomy will be empirically derived, tested, and documented in a dictionary which will include: a) tasks undertaken by library users, b) related immediate beneficial gains, and c) related longer term beneficial impacts. Samples of library users will be studied through observation, questionnaires, and interviews as they perform a variety of library tasks or functions to resolve their information problems. The techniques to be employed include critical incidence, conjoint analysis, modified focus group, grounded theory building, and problem solving.

The project's third task is to develop measurement scales for assessing the value to users of the various library services. Investigators plan to use conjoint analysis as a tool to determine the perceived value of tradeoffs among services, and of quantity or quality of services versus speed of performance. A set of scales, conjoint analysis instruments, tabulated results of analyses, and an interpretive essay will be provided as deliverables for this component.

An evaluation plan has been developed for the project that includes quarterly reviews of the process by participants and external reviewers, reviews of the instruments and tools developed, and development of seminars for training in the utilization of the tools. Council staff and/or representatives will be included in all phases of the project.

"Libraries are such interesting institutions. We are a great laboratory for studies, but we have not used our own data to our own advantage."

To date, 318 library users have been interviewed, including open-ended questions on describing what information they were looking for and the resulting experience in terms of beneficial impact. Preliminary data indicate that it is more difficult for undergraduates to have a beneficial result. This study is considered a beginning. A specific objective is to ultimately apply dollar figures to benefits.

Libraries are such interesting institutions. We are a great laboratory for studies, but we have not used our own data to our own advantage. People tend to think that the only things for which you can use statistics is for number counting, and, therefore, there are certain kinds of services or activities that you just can't measure. At the Council, we believe that it is important that we find those kinds of measures, because if we do not, someone else will make up measures for us. It is our responsibility to find the right kinds of words, language, and tools to use to develop useful measures to tell us the effectiveness of our institutions. We are hoping that this study will help us, at least, get a start.

Second Panelist:
Marvin Sirbu, Engineering and Public Policy, Carnegie Mellon University: [Dr. Sirbu described various Carnegie-Mellon (CM) studies on the economics of scholarly journal publishing and its relationship to electronic delivery. The studies have been conducted, largely, by groups of Master's students in CM's Information Networking Institute.]

In the summer of 1990, a group of 23 students did an intensive study design of a future electronic digital library which would be capable of supplying all of the scientific and journal literature to users directly through their work-station screens.

The challenge of delivering a full-page image to a screen, while, four years ago was seen as just on-the-verge of being possible, today, in fact, it is quite routine. At CM

we are delivering full-page images of documents to user's workstation screens in a client-server architecture based on low-cost unit workstations. Indeed, we have a proposal into the National Science Foundation to scale that activity up to several-thousand journals over the next three years.

Looking at the economics of this kind of delivery, we imagined that, over time, most scientific and technical journals might be distributed this way, and that there would eventually be a three-level hierarchy of providers. National organizations could handle the entire repository of journal literature, such as University Microfilms. Institutional libraries which would keep the most recent (six months) of assignments for classes in local storage. The need for an institutional library is strictly an economic one, where the cost of storing it locally may be less than the cost of fetching it each time one needs it from the national server. As the cost of Internet communications continues to decline whether, in fact, you need such local storage is questionable. We looked at the economics of journals and found that many of the scientific and technical journals have only a few thousand subscriptions, largely the libraries, and the more esoteric journals may be read by only a small number of people on each campus. Indeed, when we attempted to do an analysis at CM's own library of what it cost *per article read* in some small journals, it was as much as $50.00. This suggests that making those journals available electronically, if you could do it for anything less than $50.00, you would be way ahead of the game.

The other thing we observed is that, for much of the scientific and technical literature, 33 percent of the cost is before the first page is ever printed:

30 percent	—peer review and editorial;
40 percent	—typesetting, page make up, page layout, proofreading; and
30 percent	—print run and mailing.

Given this observation, we then asked, "What, then, will electronic distribution and delivery do?" First, it only attacks the one-third of the cost, and that is the printing. But, it also attacks the cost of warehousing the journals in the physical library (acquisitions, storage). We imagined that over a 20-year period all journals were published electronically, and disseminated in this three-tier hierarchy that I described and enough revenue was collected to compensate for the costs involved. This is not allowing for the fact that some of those costs are declining as we use electronic typesetting.

We concluded that you could provide to a typical science and engineering student, at a large institution like CM, to access to every technical article written over a 20-year period for about $20.00/month per student (or about $240.00/year), to support unlimited access to scientific and technical literature.

This was a rather dramatic finding. In fact, if you compare that number to what we are actually spending for journal subscriptions and the physical housing of the literature, it

is about the same order of magnitude. We concluded: (1) electronic dissemination of information was likely to be just as cost effective as print distribution, while giving access to a far larger corpus of articles; and (2) the costs for this system are largely fixed costs. Two-thirds of them, after all, are costs incurred before you do any distribution. In the technical system itself the costs also were largely fixed. They were the costs for the operation and maintenance of a large computing facility and for the storage of the image of each document page. The actual result was that we concluded that the right way to price such service was on a subscription basis, not on a per article basis, because the costs had nothing to do with the number of times someone read an article.

There is a down side to that price, of course. Smaller institutions that cannot afford to build an intermediate library cache because of large fixed costs. They cannot benefit from the rather low number of occasional users of information needing to be served. So, there is a need for mechanisms for providing information by the page and collecting funds that can be used to compensate those system operators and the intellectual property owners. Largely the costs in a system are fixed, and a subscription-based service delivery has lots of advantages.

The study also suggested that the right way to sell service might, in fact, be by tiers of subscription so that one might subscribe to a basic tier of 1,000 journals at $5.00 per student per month. But, the most esoteric tier (the next 2,000 journals) might cost $15.00 because they were less frequently used, thus fewer subscriptions to absorb those fixed costs. We have been moving technically to implement such systems, since receiving the results of that study.

CM has submitted a proposal to the National Science Foundation to build a system which would mount some 2,000 journals in both business and science and technology in full image page format, and also some 200 gigabits of full text information, where we actually will have the possibility of delivering to a scientist or a student at their workstation the bulk of the corpus in certain selected disciplines. The fact that we can do that at CM is not so extraordinary; technology is maturing relatively rapidly. What has been extraordinary is the cooperation we have gotten from publishers to make the information available, and it has been made available largely on a site-license basis. Once you have put the information into electronic form, running the client software and workstation in Australia or California is just as easy as running it across campus, particularly with the Internet having backbone speeds that are faster than our campus network speeds.

The only impediment to providing that service nationwide is that publishers want to get paid. Imagine that! Publishers fear that if we make it available nationwide, other libraries will drop their subscriptions. And, they are right! We are looking at building mechanisms for providing service over the Internet for a fee—mechanisms that would allow institutions to site-license access to this material or for individuals to buy it by the page.

Buying information by the page is a rather challenging problem. If you look at all of the World Wide Web Service that is out there now, there is a ton of information and much of it is worth what you pay for it. Which is to say that there would be much more valuable information out there if only those Web-server operators could get paid for it. What is missing is a billing system. The equivalent of a Master Card that I could present to a World Wide Web operator. I say Master Card because I do not want a department store credit card that only works at one Web Server, where I have to obtain a different one for other Web Servers with whom I deal. I need one credit card that can be used at all the servers. Conversely, many of the operators at Web Servers really don't want to be in the business of handling money on a day-to-day basis. They would rather concentrate on providing information.

A second project in which we are now very much involved is the development of the NetBill System, a system for billing for information delivered on the Internet. This is a transaction-based billing system and differs very much from systems which build by connect-time.

From a computer technology perspective, designing a billing system is a formidable challenge. The marginal cost of a Visa transaction is twenty cents. If the marginal cost for a transaction is twenty cents, how can I possibly sell a page for ten cents? We are looking at order-of-magnitude breakthroughs in reducing transaction costs.

The Internet presents some formidable problems in security. You have untrusted users, and information providers who may or may not be honest and who might fraudulently put charges on credit cards. So, there are interesting challenges in security that have be resolved before such a system can be realized.

What will providers charge for information? How will that affect the way people make use of information? We do not know. We have never had markets for information at this level. Once we have a system in place, we plan a fair number of experiments in which we give people 'funny-money' to buy the research materials needed. Some will buy by subscriptions and some will buy by the article, and we will try to understand how user behavior changes in those environments.

There are potentially important implications here. Libraries, typically, have paid a one-time price for their holdings, and they have been able to make them available in amounts limited only by congestion to users at no marginal costs (including the user's time). In the virtual electronic library, if all information has a fee, that model may go by the boards, except as some number of institutions who may pay one-time prices for site-licenses and then allow unlimited use to their communities. What would be the site-license for the New York Public Library? How would you measure the size of the community? How would you measure the size of the community of CM where if the literature is mainly for science and technology, do you count the fine-arts students in determining the size of the community?

There are a wide range of issues that have to be resolved in terms of developing models for terms of access to electronic information. We have done some formal economic modeling in this area, and it is discouraging. One can show, for example, that certain kinds of electronic distribution technologies that would substantially lower the costs of making information available, increase reader welfare, and reduce publisher profits. If they can use the copyright law to inhibit the creation and use of those systems, they will have every economic incentive to do so. Finding new economic models that work will not be easy.

The thrust of my message today is that within four years it will be quite economical to be at your workstation and not just get citations but receive the actual information. New forms of paying for that information are likely to emerge that are different from the forms to which we are now used to using.

Hon. Robert Willard of Mead Data Central, Inc., commented that commercial services now have many different ways of charging. The processes are complicated, for example—by the search, by the hour, and so forth, but they are currently using many of the subscription-based concepts.

Third Panelist:
Brigitte Duces, Senior Operations Officer, The World Bank:

The World Bank is an international organization in Washington, D.C., with membership of all but three or four countries in the world. The World Bank lends money to developing countries for economic development. It is money that is borrowed and paid back. They lend money for projects that beforehand are well defined, prepared, and justified. Projects are in agriculture, energy, infrastructure (such as, roads and bridges), human resources (such as health, family planning, and education). The project has to be justified in terms of economic rate of return, that is, there has to be an economic benefit to the money that is lent to the country.

The money is lent to the *government* in the country. So it is the government that borrows the money, and it is the government that repays. For example, if the government borrows money to develop irrigation canals for farmers in agriculture, then the project is justified in terms of the increased yields from that irrigation. The cost of the investment is calculated against the rate of return and how long it will take for that investment to be recouped out of the increased yields.

In the projects in human resources (health, family planning, and education), in the beginning, the Bank's economists were very hard-headed about this and wanted to have the same kind of calculations and analysis on the economic rate of return. However,

gradually, they have gone away from this because it is really impossible to develop this kind of cost and benefit calculation. Nevertheless, whenever a project is done in education or health, there has to be a sound justification as to why this money is being lent to that country. The World Bank is increasing its lending focus on the social sector and less for agriculture. Funding is based on quality improvement in primary education; improvement of teachers, laboratory equipment, developing information systems in secondary schools; massive training opportunities overseas, improvement in laboratory equipment, and developing teacher education in higher education. These components need to be justified, and convincing arguments have to be made that this investment would be worth the cost.

The World Bank is involved in an Indonesia project proposal developed with the Agency for the Assessment and Application of Technology for a science and technology network is called IPTEKNET. This is the first proposal for developing a science and technology electronic network among research institutes and major universities including Internet access.

The major objectives of the IPTEKNET proposal, developed with the assistance of the National Academy of Sciences, are to: (1) Provide smooth and cost effective access to global resources of problem-solving information; (2) Bring about a major transition from the traditional communication practices to electronic communication; and (3) Create and maintain for computer access, electronic repositories of domestic and international data and information. These services would then be marketed in the science and technology community to promote user participation in electronic communication.

How is this to be justified for a country like Indonesia? Should we not rather spend our money on developing primary and secondary education? From the perspective of The World Bank, we would be most happy if the proposal that they presented to us had in it an argument, for example, *we think that private industry will gradually use this service, and we will gradually be able to charge for this service and, therefore, over time it will become self-sufficient.* This was not something the Indonesian Government was willing to do. They were not confident enough that this could happen. We in the United States have overcome this, but this is not the case in many countries.

What kinds of justification should there be for such an investment? The project people came up with the following justifications: (1) The information services are a national necessity; (2) Historic changes in scientific communications reflect that we must have the electronic information within the country; and (3) Changes in the economics of information services.

These are good arguments, but they do not completely convince us to invest in this project at this time. This project has to be justified within an overall package because by itself it may not be approved. This is the problem with many of our information proposals.

The first discussant on Libraries and the NII: Measuring the Value of Information Services was Hon. Hugh T. Farley, New York State Senator:

Hugh T. Farley: I have spent most of my adult political life trying to get funding for libraries. As a lawyer and a law professor, I am concerned that copyright problems are not fully understood. I was much impressed by Mr. Sirbu's presentation and wonder if, perhaps, we should all sell our publishing stock, as we seem to be in the middle of an absolute technology revolution.

Libraries are going to have a much different role than in the past and that new role may include collecting fees. When that happens you wonder if government will say that libraries should be more independent, which begs the question of funding. Will libraries become independent? Libraries *are* education and they should remain included in education funding.

Earlier it was stated that there are many paths to explore when you are going into uncharted areas, and I think that is what we have to do. We have to go forward and not necessarily know where we are going, but just hope that we do not get waylaid on the way.

I was impressed with the billing system concept for charging for information. Most of the students I know wonder where their next meal is coming from. As far as getting information from the university's resource is concerned, I do not know how the students can pay. I can also envision the private sector getting into this, knowing how fast they can move if and when they see an economic advantage. They may push libraries right out of the way. We all must think about this. Should that happen, it would be most unfortunate if libraries just became warehouses for paper that no one is using.

It was also interesting that The World Bank is really operating within an overall strategy as opposed to hard statistics as to whether there is merit in what they are doing. I think this could be a beacon for us and for libraries; look at our overall strategy for providing information to the general public. *Libraries are cathedrals of learning for the public.* There is no question. The electronic library is coming on-board. The youngsters are excited about this new information technology, and we must keep their attention. Unfortunately, many teachers are lagging behind the students in this area.

Second discussant:
Hon. Frank Lucchino, Controller, County of Allegheny (PA), and Commissioner,
U.S. National Commission on Libraries and Information Science:

We are addressing the question: *How can the value of library and information services be measured*? My response is, "For whom?" Is it for special, academic, school, or public libraries? It seems to me that measurement is different for each type of library. Likewise, the discussion is different depending on the type of library you represent. A corporate special-librarian would justify their particular library service measurement differently than a public librarian. Another difference is measurement for purposes of analysis, versus measurement for purposes of funding.

In the public library world, we are always looking for additional funding. Senator Farley and I are in agreement when it comes to convincing our colleagues that they should give more money to public libraries. In 1980, Allegheny County's budget included $3 million for public libraries and $3 million for operating the county jail. By contrast, in 1994, there was $5.5 million for public libraries and $28 million for operating the county jail. And, nobody has questioned why we are spending $28 million for the county jail. There is no one saying, "Spend whatever you must to help divert people from jail." I view public libraries as not making the case and becoming a part of that problem. I am an adherent to the idea that we need statistics and data which are vital to our existence.

Remember with whom it is that you are dealing in the public funding world and talk in plain terminology that can be easily understood. Make the points that help sell public library funding—libraries can and do help save lives. Our constituents think that libraries are wonderful places; people love libraries, and young adults have a real need for the public library. In talking to the young adults about health care, for example, the value of information is critical to what we need to measure to get funding.

Funding is what public libraries need. And, that statement is also true for academic, special, and school libraries. But, funding comes from non-librarians, and some of these people are indifferent toward libraries. In Allegheny County, we are completing the linking of all of our libraries at a cost of $9.5 million. When we talk to foundation people about funding for this project, they tell us to make our case, based on how this transition can make an economic impact in Western Pennsylvania.

What indicators of performance effectiveness are needed to plan for the transition of libraries to the Internet? My response is, "We cannot afford not to plan for the transition, whatever the indicators of performance".

How does the study of information economics differ from economic analysis of more traditional resources? Substantially.

What is the social value of information in the post-industrial global economy? In Western Pennsylvania we have probably suffered from that more than anyone, when our mills closed. It is obviously a greater need now that you are working much more with information intellectually in your mind than our people are working with their hands.

Please keep in mind the people you need to convince for funding. Do not make proposals so technical, for example, using words like taxonomy and metrology. Be persuasive and help make a difference. Our county should be taking library funding from $3 million to $28 million. This would make a difference to our young people and in dealing with crime; much more then warehousing people in jails.

Third Discussant:
Hon. Robert S. Willard, Director, Government Marketing, Mead Data Central, Inc., and Commissioner, U.S. National Commission on Libraries and Information Science:

There is a difficulty in establishing values. And, this difficulty is motivated by our history, paradigms, and the way we look at the world. We heard Marvin Sirbu say that $10.00 is too much to pay for an article and that 10 cents is about right. That is a value judgment. Everyone around this table has a different approach toward establishing the benefit of value. They are individual decisions, and these individual decisions determine the value of libraries and the value of electronic access to information.

"There is an old cliché, 'If you give a person, a fish you feed him for the day; if you give the person the knowledge about how to fish, you feed him for a lifetime.' This is one of the social benefits that we see out of these institutions called libraries. Libraries do not just transfer an object, rather they are creating a knowledge base for the future."

The motto for President Clinton's campaign was, " It's the economy, stupid". If there were to be a sign on my wall, it would say, "It's the market, stupid". This is a very shorthand way to say that there needs to a mechanism to make intermediate decisions, principally economic decisions. Some of the earlier participants asked if we could really ascribe an immediate economic benefit of the whole? For example, does someone write a paper and then years later win the Nobel. Can you really say that the time spent writing the paper in the library led to the economic future benefit. I don't think so, but it is part of the process.

We need to have vehicles for making economic decisions. Economists talk about voting with dollars. You may choose to buy a book and own it forever, versus borrowing that book from the library. This is an economic decision. We also make societal economic decisions. We vote not with our dollars but with the public-policy process. We elect people to act in trust for us to take some of our dollars that we willingly, or not so willingly, give up through the process of taxation to make decisions about how those dollars will be invested and spent for us.

We get things that are of value to us by personal investment of our dollars, or we get things that are of value to us by our entrusting, through the public policy mechanism, that certain things will be done. This is the nub of the argument that has swarmed around this city and will continue to do so in the continuing debate about the National or Global Information Infrastructure. What are the appropriate roles for the public and private sectors in the provision of information? Everyone around this table has a different opinion.

How does something of value get delivered to someone in need? In three ways: (1) By direct funding. I need something and I pay for it: (2) Indirect funding (third-party funding), for example, the daily newspaper. Another version of third-party funding, market development. For example, Mead Data Central makes available access to our Lexis Service at an extraordinarily inexpensive rate for law students. There is no doubt that Mead Data has an ulterior motive. However, it is clear that the short-term value of that information is far more than what we receive from the educational institutions. Similarly, there are marketing tie-ins, that is, a free subscription to the *Wall Street Journal* for a year. You have the information, but it is because someone has paid more for the product; and (3) Government funding. The government determines it is important and they reach into the taxpayer's pockets and use that money to procure the information. So, it is not necessarily paid for by the end user, and certainly not in proportion to its value. Rather, it is paid for by society-at-large. One example might be, a government document is purchased by a non-depository library. The government has paid for the editorial content; and the Government Printing Office has run the presses and incurred printing costs; the institution buys a copy. So, there is money from both the government and the institutional second party. The user comes into the institution and requests 25 pages of the government document and proceeds to pay for photocopying. Now, there are costs which are partially direct, partially indirect, and partially government.

I would like to speak to the issue of recognizing benefits. I have long said that it is too bad that you cannot put meters on books, and that every time a book has been used, the benefit is realized. One of the realities of institutional information sources, like public libraries, is that tremendously complex buying decisions are made about the collection. The weeding process is an opportunity cost. When you take a book off the shelf and no longer incur the real estate cost, you save opportunity costs. So, there are complex decisions about collections, and there are clearly economic implications. The difficulty of economic analysis is another issue of concern.

Around 1982, during World Communications Year, there was recognition by the World Administrative Radio Conference that they would spend an amount of time on the benefits of communications. There is an old cliché, "If you give a person, a fish you feed him for the day; if you give the person the knowledge about how to fish, you feed him for a lifetime." This is one of the social benefits that we see out of these institutions called libraries. *Libraries do not just transfer an object, rather they are creating a knowledge base for the future.*

Finally, we must determine when things are done appropriately under the aegis of public mechanisms and when things are appropriately done as risk-based entrepreneurial activities. There is no doubt that there will always be a role for government and for not-for-profit institutions in advancing societal needs. I have no argument with that. One of my favorite examples is celebrating its 150th anniversary—Samuel Morse typed out the message, "What hath God wrought?" That was only possible because the United States government put $30,000 into Samuel Morse's pocket so that he could develop the practical demonstration of a system that worked. Within ten years, private investment had made the telegraph, using the Morse Code, into a viable broad scale operation.

We come back to the debate, "What are the appropriate roles for the public sector/private sector?" It is a debate that will never be resolved; there will always be issues that go back and forth. But, it certainly is on the agenda as we deal with issues like the National Information Infrastructure and the role of libraries in this world.

General Discussion

Carol Henderson: Sometimes the anecdotal evidence is very compelling and there are times when a really good anecdote can be more useful than a lot of statistical evidence. We cannot always tell the effect of these various services, but we should clearly identify the services. When you can tell some effects, it is very useful to publicize those. Mr. Pascarella, a user at the Monessen Public Library, Pennsylvania, recently testified at a Senate Education Subcommittee Hearing during National Library Week. The hearing was about the role of libraries in the National Information Infrastructure. Mr. Pascarella was there having been identified by librarians as a user whose life had been changed by libraries and how benefits flow across boundaries. He is now the manager of a Cable Television Station in a small town in Michigan, and he found that job through the use of a jobs data-base in the Monessen Public Library. His story was just wonderful.

Mr. Pascarella grew up in Monessen, left, and returned. He had to make a career change because his elderly parents were very ill. He knew that a library could help him in his job search, and stopped by the Monessen library to see which larger library, perhaps Pittsburgh or Philadelphia, could assist him. He was astounded when he walked into the Monessen library because the place had been transformed since his last visit. With the help of the State Library Agency, the Kellogg Foundation, and LSCA funds, the library had established a work-place center. So, he was able to use their computers to update his resume and use the jobs data-base to find employment opportunities. He was willing to come back to tell people about this experience, and the ripple effects of his having publicized his success story are really quite remarkable.

Since the publication of that hearing through the Internet and the ALA electronic newsletter 'ALAWON', Mr. Pascarella has been called by his hometown Michigan library to help by becoming a local library supporter. He has also been called for help by a community college about 50 miles away interested in obtaining funding for a distance-learning project. In fact, his new employer is instituting a corporate-aid program for libraries.

We really need to systematize the collection of these stories. ALA has been spearheading the local collection of "Libraries Change Lives" stories, and I think many more people could easily become much more active supporters of libraries, much like Mr. Pascarella, if we knew who they are. Sometimes that compelling anecdotal evidence is exactly what we need, because everyone can understand it.

Douglas Zweizig: I see the concerns of the NCLIS study, *Public Sector/Private Sector Interaction in Providing Information Services, 1982*, as an ongoing activity for the Commission in sorting out some of the issues we have been discussing. We need to be looking at the value of information in terms of library type, and at the value of

information in terms of the individual and community concerns. These form the basic rationale for support of library services.

As a citizen of the United States, I do not want our undergraduates sitting at terminals wondering whether or not to spend another ten cents to look at another page. I want to pay that ten cents and have the student experiment, explore, and be stimulated. That is money well spent. I am not saying the government supplies that information; it may purchase the information. But, we need to parse out who is receiving the benefits and who should be paying. We are all better off when students consume as much information as they can handle. The problem with information is that we do not know its worth until we have it. So, you are asking people to gamble on getting ten cents' worth of information which may or may not change their and our lives, subsequently.

What are the rules to determine when it is in the societal interest to support giving out the information and when is it in the societal interest to have individuals pay the major part of the cost?

Martin Dillon: I am always puzzled by our willingness to entertain the economic models where we continue to pay for information by the sip. To me, it is objectionable to charge incrementally for a commodity that costs nothing for incremental use. The value of the library model, as it exists today, is that you pay a subscription and its use is unlimited. The information industry is moving toward a similar way of charging for information.

Hon. Hugh Farley: Most legislators and politicians are very people-oriented. There is no question about that. The anecdotal approach is very, very effective in selling something. But, like so much in life, there is a balance to maintain. Whereas I may look at the anecdotal, the staff that truly runs the legislative body has to have some hard facts before they move forward and make action happen. A good phrase or slogan can sell something many times more than the statistics or the hard facts. But, again, you have to work with both of them.

John Lorenz: What data are needed by public officials who make appropriations to public libraries that will convince them to make the right decisions?

Hugh Farley: I would ask what is in it for us? Is this what the general public wants? Politicians are altruistic up to a point. We do need information, hard facts, and data. We have to look at the overall policy, and determine cost and what is good for the general public. Too often, the government has gotten into situations where they almost fell on their swords; Medicaid is one example.

Libraries are an integral part of education and we have a responsibility to the general public. I do not know that this has been fully realized at all levels of government. I have been promoting that New York State needs to provide a larger portion of aid to libraries. Local governments are absolutely impoverished, and have problems. If you are not safe in your home or on the streets, libraries come in second and someone must pick up this role. We love to shovel this role onto the federal government. I think the states have a greater role and responsibility to their libraries than they have been taking. I worry about the urban libraries because the cities have much greater problems than funding for libraries.

Hon. Frank Lucchino: It is really comforting to hear Senator Farley talk about the same thing I am thinking. He is absolutely correct in saying we need to convince constituents of the importance of libraries. The issue is not 'can you prepare information that convinces the elected officials'; the issue is—can you prepare information that convinces the people who vote for us. As bold as we like to think we are, we really are not going to run much further ahead of the pack than we think the pack is going to go. We run in front of the pack, and get to where the pack is going to be.

In my view, you should put information together—whether it is anecdotal or statistical—for the general public about how they should support libraries in a way that is marketable. We do not understand the way in which the public forms their opinions. Libraries have never been able to find the way to communicate that marketability in an effective way. Libraries have to compete in the advertising forum. If you could put that information together, you could convince our constituency (which is the library's constituency) to fund more money to libraries. Then, we public officials will really be brave; we will do it.

Hon. Hugh Farley: Libraries have a distinct advantage that politicians and many others do not. The media likes libraries. The print media, in particular, as they tend to be more literate than the electronic media. The media supports and likes libraries, and they can be your friend. I do not believe the library community is really taking advantage of the media support in this respect.

Hon. Emerson Elliott: It seems to me we are hearing from the political leaders that we need to develop policy for the general public; take advantage of the media support; and convince constituents of the importance of libraries. But, this does not answer the question posed by John Lorenz. What is the question that information suppliers or librarians who are in a position to make the case, can answer that will respond to any of these general points as seen by people who are in the political spectrum. I offer these questions: (1) What services are actually provided to the public? (Rather than, say, how many books are in a collection or distributed. This needs to be answered in a way

that can be understood); (2) Who benefits? Is it people who are in business? Is it the entire general public? (This could be very important to those officials running for office.); (3) How much do they benefit? (Describe the amount of the benefit.); and (4) Is there equitable opportunity of access to the services?

There has to be a joining of the points heard from Senator Farley and Commissioner Lucchino. There is a translation here that is required which is often ignored.

Eleanor Jo Rodger: I believe that the information that may be the most persuasive is not the kind that we are ever going to get from collecting numbers from libraries. The library's role is not to deliberate. It is to cause something to happen. We need to quantify our anecdotal image. We need to be able to say how many people obtained jobs from the library's job-line or how many people used the child-care provider directory and found appropriate child care. As the government gets tighter and tighter about opportunity costs, I think anecdotes are going to get us less and less down the pike. Everybody has anecdotes. The question is do you give your dollars to the library or to Head Start?

Hon. Frank Lucchino: In our public-housing communities, we have started "Knowledge Connections". They are mini-libraries that have computer capabilities, including CD-ROM, housed in the actual public housing community. We have tried to get media attention for these mini-libraries because we believe if we can get their attention we can get more funds for expansion. When we talk to the media, the question they most ask is, "What evidence do you have that establishing the 'Knowledge Connections' helps the children when they are in the second grade?" If an in-depth study was conducted that followed these children from age three to second or third grade, we could use those statistics very effectively. Right now, they can only take our word that the mini-libraries have helped them by the time they reach second grade. See, despite my reputation with some, I <u>do</u> believe in statistics!

Martin Dillon: To look at who benefits, we also have to look at information needs. The information needs of a 6 year-old child are vastly different than those of a 16-year-old student seeking information on a vocation, or a 36-year-old man seeking information on building a carport. If I am a salesman, and I need to find out about my next client, I may be willing to pay $25.00 for that information, but I'm not willing to pay $25.00 for information on how to build a carport. My point is that information needs are different, and they are different for each of us at different times.

We can measure the services, but we cannot really measure the impact; the impact happens later. The impact is also confounded by other things, such as the information we pick up from neighbors, friends, and colleagues. We really need to look at the services offered and count them in meaningful ways so we can answer the following

questions: (1) What services are provided?; (2) Who benefits; and (3) How much do they benefit? This last question is really the most difficult to answer. It can be answered to some extent by persons using special libraries in private corporations. Within a short amount of time after receiving the information, they can determine that the information was beneficial because it helped to win a law suit or helped produce a product.

But, how do we measure the benefit for the general public? We have to ask the right people if there is a benefit. You can ask the child about the benefit, but you must also ask the parent.

Eleanor Jo Rodger: I think we get hung up justifying benefits. Everybody knows that methodologies for assigning values that are dollar-related are approximations and not as trustworthy as saying the citizens have said thus and so. Have the citizens rank the library's service: essential, important, moderate, or, expendable. The profession needs to ask because they need to know, and I do not think it is that hard to do. We need to develop the capability through our conversations here, and not just talk to ourselves, but to also listen.

Martin Dillon: I agree. There is a lot that could be done which is not that difficult. Up until now we have not had a culture that supported evaluation and observations of impact. Studies show that over 50 percent of the adults in a community use the library each year. I do not think the adults are aware of this. If this message is not fed back to the community, the community cannot give the message to the political leaders that this is a service that the majority of our citizens are directly benefiting from every year and needs your support. We have not publicized that enough. I know of one public library that just conducted a systematic sample of reference questions and wrote them up for distribution to the library administration board. The board learned much from this sample and were very impressed. We could do a lot of development in terms of improving the culture of evaluation in libraries.

Paul Planchon: NCES recently awarded a contract for an early childhood longitudinal study. We would like very much to work with Ms. Rodger and her colleagues to explore this study. This study is not an experimental design but would support a quasi-experimental design analysis.

Joey Rodger: I would be delighted.

Ray Fry: Yesterday someone mentioned the Government Performance and Results Act. That is on track! By 1997, federal agencies must develop performance indicators for every federal program.

Summation

Libraries and the National Information Infrastructure
1994 Forum on Library and Information Services Policy

Dennis Reynolds, Executive Director, CAPCON

Yesterday's discussion focus was very different than today's. Yesterday we talked about the National Information Infrastructure and the library's role and how to promote that role, whereas today's discussion focused on evaluation. Where do these two topics intersect? We did not look at how the evaluations tie into promoting the role of libraries in the NII and, perhaps, that is because there is very little difference than promoting the role of libraries at the local and state level.

"We really do need detailed studies, but we need to be able to translate their findings into understandable terms and plain language. The role of the libraries in the National Information Infrastructure and promoting that role has very much to do with our evaluation of libraries, in general."

We seem to have said a little bit of 'yes' to everything. We need more specific research, and we need studies that are more than just an aggregate of statistics. However, these aggregate statistics can be very useful at times. The general public wants straightforward and dramatic statistics, and they do not necessarily want to be aware of the detailed studies.

In terms of tying the evaluation to the NII, I appreciated receiving the handout with recent examples illustrating the value of library and information services. These types of examples are close to being "anecdotal statistics". We really do need detailed studies, but we need to be able to translate their findings into understandable terms and plain language. The role of libraries in the National Information Infrastructure and promoting that role has very much to do with our evaluation of libraries, in general.

Joseph Shubert, State Librarian, New York State Library

At this forum I have heard five concerns of utmost importance:

1. Establishing values. We have focused on the Internet, and have not mentioned Goals 2000. And, perhaps, we should reflect on the relationships of library and information services policy to the education goals and to the context of community, state, and national values.

2. Coincidence of technology and need. There is a coincidence in time in which every single aspect of our lives is subject to dislocation.

3. Passage in uncharted territory. This is a modest way of presenting an approach to opportunity and in each case those paths have been based on a total experience and re-evaluated in the light of a very changed situation. It is the integrating of a prior investment and ingenuity and using thousands of old records of planning but not being constrained by them.

4. Education and re-education of library professionals, trustees, and friends of libraries.

5. The genius of the LSCA program. This program still enables a library in Utica, New York, to obtain a small grant and demonstrate the value of library services in a nursing home. The service reawakens the elderly and helps them to become interested again in themselves and other people. It is a state-based program that relates to state and local interests.

I appreciate the leadership of NCLIS, NCES, and the Office of Library Programs in calling this annual policy forum. I am enormously grateful for making it possible for me to participate.

Martin Dillon
Director, Office for Research, OCLC, Inc.

As I see it, there are two problems. Problem one is evaluation, and problem two, in some respects the larger problem, is communication. We are not getting the story about libraries across to the politicians or the public. And, to some extent, we do not get the story across even to ourselves. That is, we are hard pressed to have a crisp communicable understanding of the power and effectiveness of the library community in accomplishing its objectives.

". . . we are promised *life, liberty, and the pursuit of happiness*, and I really think that libraries are deeply involved in *liberty and the pursuit of happiness.*"

One of the key insights that we should take away with us is that when we are evaluating, we are evaluating for the purposes of decision-making by those who govern. Any evaluation that does not have in it the objective of helping make decisions down the road, probably is not doing the job it could. You either want to know if you should repeat the activity in which you are evaluating, make it much larger, expand it geographically, or in terms of users, and so forth. The purpose of the evaluation is, invariably, to help decision-making.

My remarks will deal with how those items that fall under "evaluative mechanisms" can be used for decision-making.

I have organized my suggestions and remarks in a simple framework. I would like to start by adopting an analogy based on the Kevin Costner movie, *Field of Dreams*. In the movie, Kevin Costner hears a voice say, "If you build it, they will come." So, the first level of evaluation is availability. We do a lot of measuring of what is available. That is the question, "Did you build it?" In the Blacksburg case, for example, the question is "How many houses did you tap into with your telecommunications network?" In Louisiana, the question is, "To how many Parishes (counties) are you supplying that service?"

Government equity asks the question, "Are you providing equitable services to all people?" Likewise, many of the library measures that have been traditionally collected through surveys have to do with availability, for example, collection size. We have heard the suggestion that we should analyze the services and specify the services available.

"Did you build it?" That is the most basic and least satisfying measure for evaluative purposes. What is better? The next level up?

"Did they come?" That is 'use', and we have many examples of use. In fact, we often build in counters to automatically extract levels of use, for example, circulation. If the library has automated systems, we can capture detailed statistics on circulation, document delivery, interlibrary loans, and collections. We are finding out a great deal about how collections are used.

"Did you build it, and did they come?" Did they actually make use of it. You might ask what could be better than that.

The third level of evaluation is, "What was the attitude of the people who used the service?" We had a terrific example from a federal survey of the general public of public libraries serving communities. One of many conclusions of the survey was that education is job #1 of public libraries. The attitude people have toward service after they have used the public library is one measure of evaluation.

The NYSERNET Project in New York State had built-in a very sophisticated set of survey tools to determine the attitudes of the users of the system. The Blacksburg project made use of focus groups and surveys. Marvin Sirbu talked about providing on-line survey instructions, which I think is a fine idea because it enables us to collect information about a system's use shortly after the system is used in a very cost-effective way.

The fourth—and most powerful and difficult—level of an evaluation is "Did it work? Did it accomplish the desired objective?"

With respect to the baseball diamond, "What was the purpose of that? How would you measure its effectiveness?" At the risk of sounding silly, we are promised *life, liberty, and the pursuit of happiness*, and I really think that libraries are deeply involved in *liberty and the pursuit of happiness*. It is very difficult to measure the effectiveness of agencies that are contributing to that.

We have talked a great deal about cost effectiveness, and I believe that the economic impact of something is used as short-hand for reflecting the benefits of a system (like a library system). Money does not buy everything, but it certainly enables one to stay alive more comfortably. The economic impact of a library certainly measures one of the good consequences in the world and it is a very valuable measurement. No one would argue that the economic impact of an education is the beneficial consequence to humanity of having education; likewise. . . with libraries.

One aspect of the effectiveness of the library in delivering information is the economic value of the information it supplies. But, it provides many other benefits as well and we should not deceive ourselves into thinking if we capture that one ingredient that we have told the whole story. We have only told a part of the story.

On the cost side however, it is very valuable to investigate in detail the cost of our services. We do not want to be accused of knowing the cost of everything and the value of nothing, but the opposite of that is true, as well. Assessing the costs of library services is an important starting point for evaluation. Dr. Sirbu provided us with a very detailed analysis of the cost of an alternative way of delivering scientific and technical information, and this is an important contribution to understanding alternatives.

"No one would argue that the economic impact of an education is the single beneficial consequence to humanity of having education; likewise, with libraries."

The Council on Library Resources evaluation study directed toward scholars is a very important step forward in terms of trying to link inputs with outputs. We have had similar studies in special libraries, and similar research in public libraries is needed. I do not know if there are important studies that try to measure the impact of public library services on the community, but, if not, it is about time that we undertake to fund such studies. Again, I would caution that anecdotes are going to be more powerful in communicating than statistics. We are really trying to tackle the evaluation of something that is very difficult to evaluate.

Forum Review, Evaluation, and Future Plans— Implications of Development and Changes in Library and Information Services for Data Collection and Analyses

Mary Alice Hedge, Associate Executive Director,
U.S. National Commission on Libraries and Information Science
and
Carrol Kindel, Chief,
Library Statistics Unit
National Center for Education Statistics
U.S. Department of Education

Mary Alice Hedge: We are well on the way to putting into place a policy forum to finally achieve Emerson Elliott's vision. Thank you, Emerson, for having that vision and for holding on to it."

Ms. Hedge summarized the following key concerns and issues expressed in the forum which need to be addressed:

- It should be called GII (Global Information Infrastructure), rather than NII (National Information Infrastructure).
- Address global issues/costs.
- Address the appropriate roles in achieving the vision for all levels of government. The federal level should maintain the stimulus, develop standards, research and development, and keep developing the vision.
- Address feasibility of tariffs for users and not-for-profit organizations.
- Address the demand-side of funding.
- Address the major challenge of rural area services.
- New technology spin-offs make it possible for libraries to do a better job of education in general and to educate the public and public officials who fund library and information services.
- Show the relevance of library services to elected officials.
- Identify how library and information services relate to other areas of concern in the local community.

- Use statistics to show how library and information services are relevant to the local community and how they make a difference.

- Show the relevance to the elected and appointed officials, policy makers, funders, and members of the public utilities commissions (PUC's) and boards.

- Make library and information services objectives known at the Federal Communications Commission level.

- Develop active marketing strategies.

- We need to get the information into homes.

- Communication is critical. We need to develop evaluation capabilities and instructions.

- We need to develop strategies for working closely with public utility commissions (PUC's) and boards.

- Develop statistics on library networks—to what extent they are being used; by type of library; by type of user; correlation between networks and circulation; interlibrary loan; individual serial subscriptions; data base subscriptions; staff perceptions of success; public perceptions of success.

- Develop thorough evaluation mechanisms.

- Define universal access and universal services.

- Distinguish between value, price, and cost.

- Partnerships are important. There need to be coordinated and distributed responsibilities The partners need to share the value of libraries, intellectual freedom, and equitable access.

- Look at non-traditional funding.

- Include the broadcast industry, telephone industry, and computer industry in planning and development.

- Fund-raising activities should be closely aligned with impacts on the community.

- There needs to be collaboration between producers and users of information.

- Agency interdependence is critical. Interagency cooperation and collaboration at every level of government.

- The action is at the state, local, and institutional level.

- What should the private sector do?

- Barriers are: costs, line charges, equipment, software, product context, public demands for service, public demands on staff.

- Barriers to change are: traditional library role and staff jobs, human-to-machine dependence, agency independence, and language differences.

- Context for success:
  An articulated vision;
  Federal funding initiatives;
  Cooperation;
  Coincidence of improved technology at reduced cost;
  A public perception of need and value; and
  Private opportunity for profit.

Major issues expressed in this forum were:

- Digitization;
- Archiving;
- Preservation;
- Privacy;
- Privacy Protection Act or Board;
- Protection of intellectual property rights. (Also an international issue);
- Security;
- Copyright;
- Dissemination;
- Access;
- Equity;
- Sharing cultural diversity and richness;
- Standardized protocols: user friendly, easy access to technology;
- Technical support and training;
- Regulatory structures and environments;
- Feasibility of tariffs for users and for not-for-profits;
- Coincidence of technology of need;
- Create a compelling vision.

We also need to look at the goals of implementing the 96 White House Conference recommendations. The Commission did vote to publish the March 1994 *Snapshot of the Summary of Actions Taken Toward Implementing the 96 Recommendations and Petitions in the Nine Areas of Major Concern of the 1991 White House Conference on*

Library and Information Services as well as the progress made toward implementing the 25 Topic Priority Issues.

Of the 96 recommendations and petitions, 56 have been implemented in part or in total, mostly in part, with 58.3 percent success rate. The nine areas of major concern are:

1. Availability and access to information. There were 23 resolutions and 15 have been implemented in part (65.2 percent);

2. National information policies (10 of 20: 50 percent);

3. Information networks through technology (11 of 15: 68.8 percent);

4. Structure and governance (6 of 12: 50 percent);

5. Services for diverse needs (5 of 10: 50 percent);

6. Training to reach end users (2 of 5: 40 percent);

7. Personnel and staff development (3 of 4: 75 percent);

8. Preservation of information (3 of 3: 100 percent); and

9. Marketing to communities (1 of 2: 50 percent).

As stated earlier, this is an annual policy forum. We need to continue thinking about the focus of the next forum and how to continue the dialogue in working toward progress. We need to focus on two or three areas and establish subgroups which can continue to work together throughout the year and report on their work at the next annual forum.

Ms. Hedge reported that Leon Panetta, Director, Office of Management and Budget, recently spoke before the National Endowment for the Arts, and *The Washington Post* reported:

> "NEA Chairman, Jane Alexander, has calculated that the agency's funds have declined 46 percent in real dollars in the last decade." Mr. Panetta replied, 'I hope there is an opportunity to provide increases down the road'. Instead of cash, Panetta brought a canvas of advice. He urged partnerships for state and local governments and the private sector; joint projects with other federal agencies, and programs that focus on young people, including arts education. He told the Council to develop arguments demonstrating the arts economic impact and successes."

Ms. Hedge stated that Mr. Panetta's statement translates to exactly what we have been discussing in this forum, only substitute the subject of library and information services for arts education and economic impact and successes.

Carrol Kindel: The original objectives for the forum were to have an opportunity to: (1) discuss some of the critical issues facing libraries over the next several years; and (2) look at the statistical information needed to help in measuring and planning library services, performance, and effectiveness. What data implications fall from the two-day discussions? What data items are of interest, and what would be the critical components to think about measuring?

I recommend establishing informal working groups to help identify data to collect on the discussion issues. Members of these working groups would work together to provide a list of data items or statistical information that would inform those issues, for example, technology, the National Information Infrastructure and the role of libraries. I suggest three working groups, though that is open to discussion. If anyone has any ideas or suggestions, let's hear them.

The first working group could develop recommendations for *statistical information* needed for informed policies on the National Information Infrastructure issues, technical issues, and the kinds of data that would be helpful. [Martin Dillon offered to serve as initiator for this group.]

A second working group could discuss what kinds of data would be useful for *measuring economic impacts of library service.* Issues to be studied are: How do you measure economic impact? What items of information are needed for measurement? Do you collect information from users? From libraries? Is there a difference in what you collect from school libraries and public libraries? There are two parts to this topic. I am not sure that we are quite ready to deal with the second part dealing with how to model those pieces of information in order to arrive at some assessment. With this, we will need the help of our statistical colleagues (those persons interested in the issue but were unable to attend this forum). [Mary Treacy Birmingham offered to serve as initiator of this working group.]

Recognizing that these two subjects are related, the working groups would focus on data necessary for policy making purposes.

A third possible group would be on *dissemination issues,* focusing on dissemination tools that would be useful for purposes of presenting information for funding. Presentation of data could be part of the dissemination activity. [Dennis Reynolds offered to serve as initiator and Hardy Franklin also volunteered for this working group.]

With reference to the first two groups, I would ask the participants contributing to those two issues over the last two days to see if they would contribute to a listing of data items and statistical information they feel should be collected. One possible way of achieving this would be ask someone to initiate the activity in each of the two areas, at least, and then E-mail with the rest of the group, adding to, subtracting from, a general list and getting back to us at NCES, and we would, in turn, share it with the forum participants for additional comments.

We plan yearly forums, similar to this one, during which we can revisit the issues and discuss progress in the intervening time. Mary Jo Lynch suggested that future forums include discussions of school and academic libraries involvement with the NII.

As a result of the two-day forum, we want to come up with a product that can be folded into data collection programs, statistical analysis, making information available for policy purposes, and making sure that information is relevant for policy purposes.

(See Appendix E, "Statistics about Libraries and the NII", memorandum from Mary Jo Lynch, summarizing data items collected currently by NCES on the use of telecommunications technologies.)

Luncheon Presentation
May 17, 1994

Implementing the Institute for Postsecondary Education, Libraries, and Lifelong Education

Dr. Martin Dillon, Director, Office for Research,
Online Computer Library Center, Inc.
and
Dr. Douglas Zweizig, Professor,
School of Library and Information Studies
University of Wisconsin–Madison

Dr. Martin Dillon quoted portions from Public Law 102–227, Goals 2000: Educate America Act:

"PART C—NATIONAL RESEARCH INSTITUTES
SEC. 931. ESTABLISHMENT WITHIN THE OFFICE OF EDUCATIONAL RESEARCH AND IMPROVEMENT.

Establishment of Institutes—In order to fulfill the research and development purposes of the Office, and to carry out a program of high–quality and rigorously evaluated research and development that is capable of improving Federal, State, Indian Tribal, and local education policies and practices, there are established within the Office the following Institutes. . .

(5) The National Institute on Postsecondary Education, Libraries, and Lifelong Education.

(c) AUTHORITIES AND DUTIES.—

(1) The Assistant Secretary is authorized to conduct research, development, demonstration, and evaluation activities to carry out the purposes for which such Institute was established—

(A) directly;

(B) through grants, contract, and cooperative agreements with institutions of higher education, regional educational laboratories, public and private organizations, institutions, agencies, and individuals, or a consortium thereof, which may include—

(i) grants to support research and development centers which are—

(I) awarded competitively for a period of 5 years and which may be renewed for an additional 5 years;

(II) of sufficient size, scope, and quality, and funded at not less than $1,500,000 annually in order to support a full range of basic research, applied research and dissemination activities which may also include development activities; and

(III) established by institutions of higher education, by institutions of higher education consortium with public agencies or private non-profit organizations, or by interstate agencies established by compact which operate subsidiary bodies established to conduct postsecondary educational research and development;

(ii) meritorious unsolicited proposals for educational research and related activities;

(iii) proposals that are specifically invited or requested by the Assistant Secretary, on a competitive basis; and

(iv) dissertation grants, awarded for a period of not more than 2 years and in a total amount not to exceed $20,000 to graduate students in sciences, humanities, and the arts, to support research by such scholars in the field of education. . .

(2) SCOPE AND FOCUS OF ACTIVITIES.—In carrying out the purposes for which each Institute is established, the Assistant Secretary shall—

(A) maintain an appropriate balance between applied and basic research;

(B) significantly expand the role of field-initiated research in meeting the education research and development needs of the United States by reserving not less than 20 percent of the amounts available to each Institute in fiscal years 1996 and 1997 and 25 percent in fiscal years 1998 and 1999 to support field-initiated research;

(C) provide for and maintain a stable foundation of long-term research and development on core issues and concerns conducted through university-based research and development centers by reserving not less than one-third of the amounts available to each Institute in any fiscal year to support such research and development centers;

(D) support and provide research information that leads to policy formation by State legislatures, State and local boards of education, schools funded by the Bureau, and other policy and governing bodies, to assist such entities in identifying and developing effective policies to promote student achievement and school improvement.

(E) promote research that is related to the core content areas;

(F) plan and coordinate syntheses that provide research knowledge related to each level of the education system (from preschool to postsecondary education) to increase understanding of student performance across different educational levels;

(G) conduct and support research in early childhood elementary and secondary, vocational, adult, and postsecondary education (including the professional development of teachers) to the extent that such research is related to the purposes for which such Institute has been established;

(H) conduct sustained research and development on improving the educational achievement of poor and minority individuals as an integral part of its work; and

(I) coordinate the Institute's activities with the activities of the regional educational laboratories and with other educational service organizations in designing the Institute's research agenda and projects in order to increase the responsiveness of such Institute to the needs of teachers and the educational field and to bring research findings directly into schools to ensure greatest access at the local level to the latest research and development. . .

(1) FINDINGS.—

(D) The development of a "Nation of Students" capable of and committed to the pursuit of formal and informal lifelong learning and literacy is essential to sustain both national and individual economic success and to provide a nurturing environment in which all children and youth can learn and achieve. Historically, the most effective community resource for lifelong learning, the public library system of the United States, should expand and restructure its delivery of services to take full advantage of the potential of new information technologies to meet the needs of learning communities. . .

(2) PURPOSE.—The purpose of the National Research Institute on Postsecondary Education, Libraries, and Lifelong Learning is to promote greater coordination of Federal research and development. . .Such program—

(A) shall only support research and development in those areas of postsecondary education, libraries, literacy, and lifelong learning which are not being addressed by other entities within the Federal Government;

(B) may include basic and applied research, development, replication, and evaluation activities in areas such as—. . .

(x) new models of service delivery for public library systems which expand opportunities for lifelong learning. . .

(xv) methods for evaluating the productivity of different types of institutions of higher education at all levels and the roles and responsibilities of regional and national accrediting agencies. . .

(xviii) opportunities for adults to continue their education beyond higher education and graduate school, in the context of lifelong learning and information-finding skills;

(xix) preparing students for a lifetime of work, the ability to adapt through retraining to the changing needs of the work force and the ability to learn new tasks. . ."

A very interesting piece of legislation!

Douglas Zweizig: I would like to present to you some brainstorming ideas from Martin Dillon and I. We believe that such an Institute might address the following types of activities:

- Summarizing the state of knowledge in libraries and information science to create launch-pads from which further research can take off. (We have too little summarizing activity and, as a result, we keep re-studying.)

- Identify areas in which research might make a contribution. (We would not like this Institute to produce agendas for conducting research, rather we stress field-initiated research.)

- Conducting inventories of research capabilities.

- Administering a strong program of field-initiated research with a high-quality referee process. (We realize this is costly and needs to be a specific budget item.)

- Multidisciplinary participation in research and support for young scholars.

- Providing a program of support for research activities in developing research methods, training at research institutes, providing a mentor program for young scholars, and emphasizing presentation for part of the outreach program.

- Promoting publishing in professional literature, scholarly literature, related fields, and in the general press. (A general strategy of placing reports of library and information science research where people are likely to see it.)

- Increase accessibility of research literature in academic libraries.

- Harness the energies and attentions of scholars from other fields on problems of joint interest in the library and information science area.

- Establish one of the statistics centers to be responsible for providing archival mechanism for library statistics, consulting, software, assessment of quality of statistics, and training.

- The statistics centers would also provide experimentation and new measures. (What new measures can be developed to support decisions?)

- Establish one of the statistics centers to promote the development of policy in needed areas.

- The research and development centers would be small-scale specialized institutes located within university environments, probably related to library schools.

For purposes of discussion, we established the following three indicators for evaluating the Research Institute:

1. We hope this Institute would harness the energies of a broad range of scholars and create a culture of research in libraries and information science. Therefore, we look at the number of publications resulting, the diversity of their locations in the literature, use of research results in articles in general professional literature, grant proposals, and so on.

2. We would expect annual reports of research activity. Annual summaries of the research conducted in library and information science should show a growing level of activity and richness of research questions and approaches.

3. We would expect the number of questions by researchers addressing libraries and information science to grow dramatically when they are able to conduct research and as researchers from other disciplines are attracted to our questions.

Hon. Emerson Elliott: I have never once, in all our conversations at the Department, heard about the library part of that Research Institute. People simply do not mention libraries, because they are always looking at either the adult continuing learning part or the postsecondary part. My point is that unless people in the library community keep pointing this fact out to people, like Sharon Robinson, they will never know. You need to keep talking about this.

In addition to the part regarding libraries, there is an internal part in which Ray Fry and I are very much intertwined. Our concern is how the Office of Educational Research and Improvement will be able to run this operation without the proper amount of staff and without the substantive expertise needed in each area. One suggestion is the possibility of contracting out the entire Institute. This is a very serious issue. In this time of reinventing government, we will have fewer staff with which to do a bigger job.

John Lorenz: As you know, the professional library interest in this Institute goes all the way back to the original formation of the U.S. National Commission on Libraries and Information Science (NCLIS). You may recall the 1968 report of the National Advisory Commission on Libraries, *Library Services for the Nation's Needs: Toward Fulfillment of a National Policy*, recommended not only the establishment of NCLIS but also a Federal Institute of Library and Information Sciences.

The forum was adjourned.

Libraries and the NII

DRAFT FOR PUBLIC COMMENT

Policymakers must determine how to sustain, in the electronic age, the democratic and equal access to information that free public libraries have provided in the age of print.[1]

PART I: What Is the Application Arena?

Description of Libraries

The Traditional Role of Libraries. Libraries are central to the storage and sharing of knowledge, history, and culture. They offer access to knowledge and information representing diverse sources and viewpoints. Libraries are adjuncts to education, a base for generating innovative thinking, a stimulus to culture, and an aid to the individual self-development of citizens. They are also keepers of the intellectual, cultural, and historical memory of their community. Libraries acquire, catalog, make available, and preserve collections in all media. These collections traditionally consist of material items stored in site-specific facilities which limit access to those who can travel to the site of that library or receive the items through interlibrary loan. Whenever an item is in use, it is temporarily unavailable to all other people.

Libraries have developed in response to the nature and character of the publishing communities. In the United States, libraries have served as information "equalizers" or providers of equal access for all, permitted by the first sale[2] doctrine of copyright law to lend copies of copyrighted works after their initial distribution.

The Role of Libraries in the NII. The ability of digital libraries to store and share knowledge, history, and culture will be central to the success of the NII. The digital library[3] is really a library with extensive electronic collections in a variety of forms in different locations. Increasingly materials are being acquired in electronic form; libraries are beginning to convert their paper and analog collections to machine-readable formats for both preservation and spatial reasons.

As today, the role of libraries in the future will be to advocate and help provide information equity for the public. Libraries will continue to coordinate and facilitate preservation of the records and expressions of the nation's intellectual and cultural life both in traditional and digital formats. Libraries will be sources of free or inexpensive digital information; provide access to an improved flow of electronic government information

[1] Statement by James H. Billington, the Librarian of Congress, at the "Delivering Electronic Information in a Knowledge-Based Democracy" (DEIKBD) conference; proceedings, 4.

[2] The first sale doctrine of copyright is the information equalizer in that it limits copyright owners' rights by making only the initial distribution of a particular copy of a work subject to the owner's control. Section 108 of the copyright code allows libraries to make copies of certain works under certain conditions both for patrons and other libraries.

[3] "Digital library" is used here as an aggregate, implying electronic access to many sources of digital information. This includes libraries but does not exclude other sources such as corporate, government, and research entities.

and world-wide digitized resources; request and be sent copies of remotely stored documents and other publications as allowed by copyright licensing and other agreements; make digitized reproductions of rare and unique material that is in the public domain or for which permission of the copyright owner is available as allowed under the copyright law; and provide long-term access to the records and expressions of culture and scholarship.

The evolving information infrastructure is already dramatically changing traditional operations within and relationships among libraries and their providers and users. It is also offering new challenges. New forms of unpublished, and often unauthenticated, digitized materials are emerging as millions of people are linked by world-wide networks. The volume of new digital material, if it were on paper, would eventually dwarf the existing physical collections. The situation is additionally complex because digitized information can be easily updated, manipulated, and combined with other materials, and displayed in multiple ways. Digital data thus creates enormous new amounts of knowledge that may be accessed and manipulated by computers, existing temporarily and never stored anywhere permanently. Institutions, including libraries, may provide access to these materials without ever physically controlling them, and readers at multiple sites have access to the same material at the same time.

Future Role of Librarians. The role of librarians will change significantly as they become increasingly viewed as managers of both information and knowledge. This forward-looking perspective was underscored at the Library of Congress (LOC) conference on "Delivering Electronic Information in a Knowledge-Based Democracy" [proceedings, 5]. These knowledge management skills may take many forms and can be expected to involve librarians in all facets of the information chain. Librarians may be present at the information generation process; they will help manage digital materials and assist people in dealing with the plethora of information. Librarians will increasingly function as facilitators, enablers, and teachers of network users; library systems and consortia will negotiate information access rights[4] on behalf of public users of the digital library. Librarians will become guides to network tools in much the same way as they have acted as guides to the use of traditional materials.

New Roles and Alliances. New roles and alliances are expected to emerge. The originators of published and unpublished information are being empowered by the new digital information tools to carry out many of the services previously fulfilled by libraries: from subject-driven information delivery to navigational services and from onsite access to virtual access as providers of research tools. This could expand the concept of "libraries" to include not only collections maintained by traditional libraries but also those held by publishers, research organizations, universities, commercial enterprises, and new players of all kinds.

While the digital library within the context of the NII is a national initiative, there are significant international implications both for the sharing of information across national borders and for the shift in the organization of intellectual creativity. Questions of international cooperation and economic competition will arise. Because the infrastructure permits international access to digital information in a way that is impossible in the traditional library model, new international relationships and models can and will emerge.

Without taking into account from the outset rules for effective protection of intellectual property, the development of an international system (the Global Information Infrastructure (GII)) will be severely hindered. In a global system a user in

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[4] "Access" implies a complex of possibilities. It includes online viewing either by one or many users, printing, downloading, transmitting the work to ther libraries, modem access, public performance, and public display. This list while not all-inconclusive does suggest the complexity of the access issue which must be addressed by copyright law as well as by vision and technology. To paraphrase Barbara Ringer's statement at the Senate Committee on Rules and Administration Hearing on March 3, 1994: It is obvious that we are at the beginning of an enormous revolution in communications. What isn't obvious is that the copyright law is at the center of this revolution and will determine the course it takes. The bulk of the material to be transmitted on the superhighway is copyrighted, it is intellectual property that is owned by someone.

one country will be able to manipulate information resources in another country in ways that may violate that country's copyright laws. Copyright laws are territorial; international copyright conventions and other multilateral agreements allow for significant differences in national laws. Work must begin on international harmonization of copyright laws to accommodate a digital world.

The Application. Digital libraries in the NII will contain vast amounts of digitized data: text, pictures, audio, and video. The data will not be located at any single site, but rather will consist of digitized materials and processing methods from many sources. The development of digital collections in libraries will depend on the following components:

- **Interconnected and Interoperable Networks.** Digital libraries are premised on the existence of a network of networks, interconnected and interoperable.

- **Decentralized Data and Processing.** A second assumption concerning the digital library is that information and knowledge can exist and processing can take place at multiple, decentralized sites.

- **Databases.** Digital libraries will contain data that only exists digitally and digitized data that has been converted from another medium such as print, sound, or audio. Developing techniques to consistently collect, store, and archive digital material using automated methods is an important first task for the digital library community. The conversion of existing material to digital form also is important. This converted material will form the nucleus of the digital database and provide a bridge to traditional collections.

- **Navigation and Retrieval Tools.** Navigation and retrieval tools capable of identifying, accessing, and retrieving the digital resources must be developed. When practical, major navigation and retrieval tools will be based on standards that ensure the ability to communicate in order to share both data and processing.

- **Document Delivery.** The ability to deliver physical copies in print or in any of several fixed digital formats must be supported.[5]

- **Presentation.** Presentation standards and techniques to assure reliable and effective representation of intellectual content must be created.

- **Mass Storage.** The ability to store increasing amounts of data at steadily decreasing costs is a technological trend that is vital to the massive amounts of data that digital libraries will need to store and support.

- **Human Resources.** The most critical success factor for the success of digital libraries will be the human resources component. This component assumes the education of a new generation of librarians as knowledge navigators; training and retraining of current librarians; and training of the public in the new technology and the use of electronic information resources.

Benefits of Applications in This Arena

The benefits of linked digital libraries include continued and expanded access to current information and access to historical material in unparalleled detail. Technical barriers to information sharing will largely disappear. Using libraries as gateways to the digital network can help ensure that information is accessible to all and prevent the formation of a society divided into information haves and "have-nots." Libraries must continue to play their vital role of information safety net for the public by providing access to and promoting literacy of digital materials much as they have for printed materials. This is particularly true of libraries' role in providing access to and navigation of the plethora of government information that is to be made available electronically.

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[5] Document delivery, while a technical component of the applications, involves significant copyright issues that must be resolved. Downloading substantial amounts of copyrighted material will require license agreements with related questions of who will pay and how will they be administered. Guidelines must be developed as to what are insubstantial amounts of downloaded materials, subject to fair use exemptions.

As Senator Edward Kennedy recently stated [quoted in McClure et al, 38]:

> Public libraries are a vital information link between the government and the public...libraries must continue to play a critical role in providing broad access to the public...[and guiding] citizens of all ages through the world of computer networks...[L]ibraries will make the government less remote and more responsive to the needs of individual citizens.

Measures of Success of Digital Libraries

An important measure of library success is use. An example of this is LOCIS, the Library of Congress Online System, that was made available via the Internet in April 1993. While Internet LOCIS was only available for 8 months of fiscal year 1993, Internet transactions accounted for 6 percent of the total number of LOC mainframe computer transactions in 1993. It is projected that Internet transactions will account for more than 12 percent of the total number of mainframe transactions in fiscal year 1994. Rising usage statistics and positive public response demonstrate that Internet access to LOCIS is a success. The same type of measurement must be applied to the digital environment. When there is substantial use of electronic information, particularly of items not otherwise available, then success that can be measured has been achieved.

Other indicators of success of digital libraries are changes of patterns of patron service and demands. If patrons indicate a preference for digital forms, then this new form of material is a success. This has already happened in large part for library catalogs.

Some indirect measures of success include decreased costs of processing, managing, and storing materials and increased availability of resources.

PART II: Where Are We Now?

Libraries

Demographics. There are 87,000 public and private school libraries, 9,000 local public libraries, 4,600 college and university libraries, plus hundreds of specialized business libraries and federal and state libraries in American today. More than 182,000 professionals work in libraries [Billington, 109].

Connectivity. Based on the preliminary results of a national survey of public libraries sponsored by the National Commission on Libraries and Information Science (NCLIS) and executed by Professors Chuck McClure (Syracuse) and Doug Zweizig (Wisconsin-Madison), approximately 21.1 percent of the responding libraries are currently connected to the Internet and 78.9 percent are not. However, 84.6 percent of the responding public libraries serving populations of 500,000 or more are connected, while only 13.3 percent of the libraries serving populations of less than 5,000 have Internet connectivity.

Of the 1,400 depository libraries, 929 (68.1 percent) have access to email via Internet, Bitnet, or other electronic service; 716 (52.5 percent) depository libraries have file transfer; a survey question concerning telnet or remote database access capability was not included in the survey [US/GPO].

Government Applications

Several federal agencies of importance to libraries have been mandated to develop applications using the NII. The applications have involved electronic publishing and conversion, navigation and retrieval tools, interoperability standards for information transfer between different networks or different hardware and software systems with reliability and accuracy, copyright management in an electronic environment, and archival efforts. Of the programs cited, the Government Printing Office (GPO) Access Act and the National Telecommunication and Information Administration (NTIA) Grants program support operations. All of the other programs noted are research and development (R&D) efforts. Some agencies, recognizing the potential of networked information, have begun network efforts as part of improving existing services. These are listed under Operational Efforts.[6]

[6] Most government funding of the NII to date has supported R&D rather than operations. The notable exception is the funding for the telecommunications backbone funded through the NSF which connects the regionals.

Government R&D and operational programs of note are:

Research and Development.

■ **High Performance Computing and Communications Research and Development.** The Federal High Performance Computing and Communications (HPCC) Program provides funding for research in library and information science and systems required to advance the development of digital libraries. NSF, ARPA, the Department of Energy, the National Aeronautics and Space Administration (NASA) and others participating in the HPCC Program are funding a variety of projects to support the creation of digital libraries and advance the technology base available to operate digital libraries. Under a new program component, Information Infrastructure Technology and Applications, ARPA funds the development of hypermedia systems with intelligent human interfaces; NSF funds digital libraries research; NASA is developing prototype digital libraries and advanced methods for accessing their data; the National Institutes of Health are developing advanced medical database technology; the National Security Agency supports research in mass storage and database management; and the Environmental Protection Agency and the National Oceanic and Atmospheric Administration are expanding access to environmental data.

■ **Research on Digital Libraries.** HPCC R&D includes cooperative initiatives, combining agency funds and efforts. A recent endeavor of importance to libraries is the Research on Digital Libraries Initiative, a joint effort of NSF, ARPA, and NASA. This initiative provides grants for research on systems for data capture, software for searching, filtering, and summarizing large volumes of data in various formats, and networking protocols and standards that can accommodate the high volume and bandwidth requirements of digital libraries.

■ **Other.** R&D projects such as the Digital Technical Reports Library project involving ARPA and other players, and the NSF Digital Library Initiative, have emphasized the manipulation of large data collections, including models for policy and technology tools necessary to make large amounts of data available. The use of sophisticated text retrieval techniques, including statistical and semantic analysis, continues to be explored through activities such as the Tipster project and the Text Retrieval Conference (TREC), both sponsored by ARPA. ARPA also is providing support for the CS-TR (Computer Science Technical Reports) R&D project. This is an effort to share university-generated computer science literature in a linked digital library among the participants (MIT, UC-Berkeley, Carnegie-Mellon, Cornell, and Stanford). The overall project is coordinated by the Corporation for National Research Initiatives (CNRI).

Operational Efforts. The GPO Access Act of 1993 encourages electronic availability of federal information. The NTIA Grants is intended to stimulate the building of the infrastructure. Due to demand and perceived value, some agencies are striving to make use of the Internet to make data available electronically. Some federal databases are only available through private sector vendors, and several of the most important of these are candidates for low-cost distribution to the public (for example, the Security and Exchange Commission's EDGAR database). Several dozen federal agencies already provide points for distribution of publications and other agency-generated information on the Internet. Other efforts include the management and distribution of copyright information pilot and federal preservation and archiving projects.

■ **GPO Access.** The Government Printing Office "Access" Act, which became public law in June 1993, requires the Superintendent of Documents to maintain an electronic directory of federal electronic information; provide a system of online access to the *Congressional Record*, the *Federal Register*, and other appropriate publications; and operate an electronic storage facility for federal electronic information. These services are to be operational by June 1994. Depository libraries are to have free access to the services while others will pay a fee to cover the incremental cost of dissemination. The law also requires the Superintendent of Documents to accommodate, to the extent practical, agency requests to include their information in the GPO online access system.

■ **NTIA.** P.L. 103-121, appropriating FY 1994 funds for the Departments of Commerce, Justice, State, the Judiciary, and related agencies,

includes $26 million requested by the Administration to begin an information infrastructure grants program to support demonstrations of new telecommunications technology applications. Libraries are among the institutions eligible to receive matching grants under this program to expand telecommunications networks and to access existing and new sources of electronic information.

■ **Federal Information Online.** Use of electronic bulletin boards systems (BBS) and online databases has grown rapidly within the government over the past decade. More than 40 organizations within the federal government operate BBS as part of their information dissemination activities. These BBS can be accessed directly through a modem, and, in some cases, through the Internet. The Fedworld BBS, operated by the National Technical Information Service (NTIS), provides easy access to a plethora of government information sites, including digital libraries, more than 130 other federal BBS, and digital documents such as Presidential speeches and health care legislation. The White House routinely posts the text of speeches, press briefings, press releases, reports, and legislative proposals to various bulletin board systems, including some available through consumer-oriented services like Compuserve and America On-line. A few members of Congress have begun posting the text of their speeches and press releases to publicly accessible bulletin board systems; one member has set up a Gopher server. Several dozen federal agencies provide Internet distribution of publications and other agency-generated information through public Gopher, World-Wide Web (WWW), Wide Area Information Server (WAIS), and other servers or File Transfer Protocol (FTP) sites.

■ **Publishing and Data Creation.** More than 50 separate organizations within the federal government were listed as database producers in a 1992 directory of online databases. Among the 175 publicly available federal databases, perhaps the best known are the National Library of Medicine's MEDLARS system, the National Agricultural Library's AGRICOLA system, the Library of Congress information system LOCIS, and the Federal Election Commission's Direct Access system.

■ **Electronic Copyright Management System (ECMS).** ARPA, the Library of Congress, and CNRI are collaborating on the development of an experimental Electronic Copyright Management System to explore the use of high-performance computing systems and networks, tools, and procedures to manage copyright information and other intellectual property and associated rights in a network environment. This system will serve as a testbed for the evaluation of the concepts and issues of electronic copyright deposit, registration, and recordation of transfers of ownership and licensing transactions. This development effort is an interagency effort involving agencies from both the executive and legislative branches.

■ **Archival and Digitization Projects.** The United States National Archives and Record Administration (NARA) continues to evolve mechanisms for management of digital archives. NARA's Center for Electronic Records appraises, collects, preserves, and provides access to U.S. federal records in electronic format. The Center maintains electronic records created by the U.S. Congress, the courts, the Executive Office of the President, Presidential commissions, and nearly 100 bureaus, departments, and other components of executive branch agencies and their contractors.

The National Library of Medicine (NLM) is developing the capacity to acquire, store, and distribute large collections of digital images, including digital pages created as part of the System for Automated Interlibrary Loan (SAIL), diagnostic radiology images used by the Diagnostic X-ray Prototype Network (DXPnet) project, and the 2-D and 3-D anatomic images acquired as part of the Visible Human Project.

Other federal agencies actively exploring efforts to convert traditional-media material to electronic form to improve access and preservation include the Smithsonian Institution and the Library of Congress (American Memory project).

Non-Government Applications

R&D and pilot projects are being undertaken by many non-federal government organizations representing both commercial and non-commercial entities interested in participating in the NII. These efforts are vital both for the continued development of the infrastructure and for the establishment of roles and policy in the electronic environment.

Publishers. There are currently a number of experimental projects under way to use networks to deliver documents or provide access to images of print publications. These include services offered by Colorado Alliance of Research Libraries (CARL), Engineering Index (EI), University Microfilms International (UMI), and Faxon often in partnerships with secondary database access providers such as the Online Computer Library Center (OCLC), the Research Libraries Group (RLG), or Dialog.

EI, UMI, AT&T (InterNIC), Faxon, Elsevier, and Springer-Verlag are also undertaking projects to develop the infrastructure for digital publication and conversion, navigation and retrieval, and interoperability standards.

Several scientific journal publishers such as Elsevier and Springer-Verlag are conducting experiments with universities to make the contents of certain journals available electronically to the university either under site licenses or pay-per-view agreements. Third-party aggregators and relicensers such as UMI and Information Access Corporation are licensing full-text or journal-page images for specific areas directly to institutions. A number of publishers are making the text of their publications available for searching through database access providers such as Dialog or BRS on a transactional basis.

Journals published only in electronic form are well established and growing in number. Most are free; only a few are refereed and those constitute a minor force in the academic tenure process. The growing number of respected free electronic journals and newsletters include *Psycoloquy*, *Public Access Computer Systems Review*, and the *Library of Congress Cataloging Newsline*. Some subscription journals have begun to be published electronically. These include OCLC/AAAS (Online Computer Library Center/American Association for the Advancement of Science) Online Journal of Current Clinical Trials, which is peer-reviewed, and John Quarterman's Matrix News, published both electronically and in print. Copyright issues relating to electronic journals still need to be resolved.

In the sciences, distinguished print journals are now or soon will be published in digital as well as print form. *Mathematical Reviews* and the *Bulletin of the American Mathematical Society* are available in electronic and print form. Plans have been announced to publish digital forms of both the *Physical Review Letters* and the *Astrophysical Journal Letters*. The same is true of several popular magazines (i.e., *Mother Jones*, *Wired*).

Academic and Research. Academic and research institutions and professional associations have also pioneered digital library or infrastructure building projects, with spectacular success in forcing the expansion of the Internet and related electronic mail services, and are becoming increasingly influential in the areas of navigational software development and retrieval applications. All but one of the most common navigational tools on the Internet was developed at research or academic organizations (Gopher, Archie, WWW, and Mosaic; the original WAIS implementation was developed by commercial organizations). Academic institutions are also at the forefront of diverse and active electronic publishing ventures, facilitated both by the LISTSERV software, and increasingly by Gopher and WWW.[7] Gopher was developed at the University of Minnesota. WAIS was developed cooperatively by Thinking Machines Co., Apple Computer, Dow Jones & Co., and KPMG Peat Marwick. WWW was originally developed by CERN (the European Particle Physics Laboratory) and is currently being implemented along with Mosaic, an interface developed at the National Center for Supercomputing Applications (NCSA) facility at the University of Illinois at Champaign-Urbana. The Internet LISTSERV software was developed by Anastasios Kotsikonas at the University of Boston.

Other academia-private sector cooperative ventures are the University of Massachusetts (at Amherst) Inquery and Tipster projects, funded with NSF and other federal money, and developed in collaboration with several major commercial publishing partners. Another tool of interest that is being developed by public and private funds is the Knowbot Information Service (KIS). KIS is designed to act as a personal digital assistant to locate, evaluate, and retrieve

[7] Gopher is used extensively for Campus-Wide Information Systems and is widely implemented in academic and government communities. The hypertext-based WWW is being implemented along with Mosaic software for searching mixed-format data. WAIS is widely used for text indexing and searching on the Internet. The Internet LISTSERV software is used extensively for email forums.

information based on the user's requirements and other constraints (such as the willingness to pay for information). Elsewhere software vendors and database publishers are making important strides in the development of powerful retrieval engines (e.g., Oracle's ConTEXT).

Community. Community projects of interest include the Blacksburg, Virginia Electronic Village (BEV), the San Francisco Public Library Community Electronic Information Infrastructure (SFPL/CEII), and NYSERNet's Project GAIN (Global Access Information Network). Community-focused projects tend to produce a model where library services have an integral (but not necessarily a central) role in a large set of information delivery and communication tools and services. These projects are typically intended to promote interactivity among members of the communities.

The BEV project is a collaborative effort between the town of Blacksburg, Virginia Polytechnic Institute, and C&P Telephone to create a network of high-capacity data communications and services with the objective of linking members of the community with each other and with the Internet. Information available through BEV currently includes electronic mail and access to local and Internet resources. Potentially, all residents of Blacksburg will be able to connect to BEV from their homes.

The SFPL/CEII initiative, is another ambitious community project that is still in the planning phase. This project focuses on the use of worldwide resources to support the information needs of a specific community, in this case San Francisco.

The NYSERNet GAIN project extended Internet access and training to five rural New York State public libraries and one Indian national school.

The project clearly demonstrated that public librarians in a very rural setting with limited resources...could in fact get connected to the Internet, use a broad range of equipment and electronic services, develop new types of services to the community, and create a sense of excitement that came out of the library. Their sense of excitement and discovery translated into programs and applications that often put the public library at the foreground of technology application in the entire community [McClure et al, 40].

Standards

Standards-setting Groups. Several major groups are developing standards for the information technology, electronic information, and computer networking components of the NII. The groups are the International Organization for Standardization (ISO) and its U.S. counterpart, the American National Standards Institute (ANSI); the National Information Standards Organization (NISO), an ANSI-accredited standards developing body serving the publishing, library, and information services communities; the National Institute of Standards and Technology (NIST), which develops and coordinates standards for the federal government and leads U.S. standards development generally; ad-hoc standards groups, which usually focus on a single problem such as UNICODE or the Open Software Foundation (OSF); the Internet Engineering Task Force (IETF), an informal standards making group that generates Internet standards; and the Internet Society which is responsible for the Internet standards process. A newly formed group known as the Cross-Industry Working Team is striving to create a consensus view of the required standards.

Data Description. Standards are needed for the description of data. Tangible, traditional library materials are physically described, classified, and given a physical location code. In the past all these operations have been carried out by libraries. When retrieval is necessary, access is gained by looking up an item's classification number indicating where the physical item is located and where it may be retrieved. Currently, the extension to the USMARC (U.S. Machine Readable Cataloging) record for data description is a stable standard which can be used for electronic items.

In digital libraries both the access scheme and the retrieval needs have changed. To access an electronic item, additional information may be required, including information about the medium or system requirements (such as in the case of a computer program). A standard for this description must be implemented. ANSI/ISO and the IETF are currently working on such standards.

While a formal standard for information description is highly desirable, the cost, the slowness of the process, and the demands and politics of the international networking arena make this a difficult area. With the transition to electronic material, the need for such manual descriptive techniques may be supplanted by electronic methods for abstracting, indexing, or otherwise capturing the high-level descriptive information necessary for efficient access.

Computer-to-Computer Communications. One standard that is stable, and that has the potential to be of use initially, is the ANSI/NISO Z39.50 standard for system-to-system communications for retrieval. The ARPA CS-TR project is exploring new approaches for computer-to-computer communications that go beyond the existing Z39.50 standard.

Cryptography, Security, and Privacy. Cryptographic technology, essential to ensuring electronic information integrity, must exist before large information providers will participate in the network. Standards for cryptography will only be developed in a policy framework that does not impede their development. The issues of intellectual property and export controls on cryptographic technologies must be resolved before proposals in this area are internationally accepted and implemented.

Crude measures such as restriction by password and network address are common ways to provide security for access to restricted information today. Measures for providing privacy to information seekers need to be defined, implemented, and made widely available.

Other Standards. Other standards which must be agreed upon are ones for exchanging and interpreting networked materials formats, and for assuring security of operations and information. There are multiple standards for sound, while standards for images are in their infancy.

Some progress has been made in the area of transmitting documents in specific formats. For text, Standard Generalized Markup Language (SGML) is frequently proposed for use as a document content standard for non-structured text. Standards mentioned for exchanging structured data include ASN.1 (Abstract Syntax Notation One), which is used in library applications, and EDI (Electronic Data Interchange).

Several of the Internet navigation and retrieval tools discussed earlier have become *de facto* standards in a relatively brief period of time. These include Gopher, WAIS, and WWW.

Private industry also is actively developing tools that may provide meta-standards (standards for the conversion of diverse ad hoc standards to a common form), such as Adobe's Acrobat and Common Ground software for the presentation of formatted text and other data.

These examples (not exhaustive) are illustrative of an extremely volatile, complex, active, and sometimes competitive mix of parties involved in building the portions of the NII of concern to libraries.

PART III: Where Do We Want to Be?

NII Long-Term Goals and the Role of Libraries

The long term goal of the NII is a world of ubiquitous information.

The realization of this vision for libraries depends on the reliability and universal accessibility of the information infrastructure. Society must not only have the ability to support projects to gather and control electronic information but must also underwrite funding to assure basic access. The realization of this vision is dependent on technological advances and policy that will allow all of the interested entities to work together within a single network and policy framework, whether corporate, library, government, research, or entertainment.

Achieving this long-term goal requires that commercial providers of information, libraries, and user communities discuss, explore, and develop a new paradigm for their roles in the evolving electronic community. Copyright, funding, standards, and privacy and security issues must be addressed in both the short and long runs.

Short-Term Goals

Copyright. It is obvious that we are at the beginning of an enormous revolution in communications. The copyright law is at the center of this

revolution and will determine the course it takes. The bulk of electronic material will be copyrighted, as is the bulk of published material today. The issue of the protection of copyrighted material must be addressed (effective and administratively feasible licensing systems will be the key). For now, there is a standoff. Copyright owners (publishers, information providers, authors), librarians, and others with interests in this area must come together to model agreements covering on-premise online access, transmission to the public, downloading and reprinting, and feasible payment mechanisms.

Funding. Library budgets have not kept pace with the costs of materials. As the prices for serials, monographs, and other materials have soared, library budgets have declined.[8] If libraries are to participate in the NII, funding is required to support all aspects of their electronic evolution. Funding to continue current operations is basic. To become digital libraries, funding is required to purchase and install equipment, provide connectivity, digitize core materials, and educate both the staff and the user communities.

Standards. The provision for international standards for interoperability, data description and storage, navigation and retrieval, authentication of retrieved material, cryptography, privacy, security, and preservation are essential before information providers will offer their data over networks or users will accept the network as the central provider of their information needs.

PART IV: How Are We Going to Get There?

Today's libraries, facing the challenges of developing improved electronic capabilities and addressing standardization and privacy issues, can work toward making a reality of the long-term NII vision and strengthen libraries' roles as information purveyors by working incrementally on a number of fronts. The government has a leading role in supporting many of these efforts, among them new applications of copyright regulations and law to deal with the emerging digital world; privacy protection; research and development in digital libraries; support for demonstration projects; education, training, retraining for those who will staff digital libraries; and ensured access to government information. Some of these government activities are outlined below.

The Government's Role

Funding of Operations. Governments currently support libraries at the state, local, and federal levels. While the costs of acquiring materials and administering collections have continued to rise during the past 20 years, library budgets have shrunk. Funding, therefore, is vital if libraries are to develop comprehensive electronic capabilities while continuing to offer existing services. Funding is needed to ensure the existence of equipment, connectivity, and education at the local level. This is particularly true of K-12 schools and public libraries. Many school and public libraries currently lack network access and knowledge of how to use the technology once access is achieved. Funding is also needed for prototype projects to explore the roles and relationships of libraries to the commercial and scholarly communities.

Facilitation of Standards Development. The government can play a leadership role by working closely with standards-setting groups to define standards and to clarify and expedite the standards-setting process. The federal government, with its need for broad government-wide consensus on the use of de facto as well as formal or de jure standards, is in a key position to help establish consensus on key standards. The Government Information Locator Service (GILS) group has made progress in this area by identifying and promoting the use of interoperability standards where they exist. For the progress made by GILS to be extended and utilized, government dissemination of information efforts must be coordinated with standards-setting efforts.

Providing a Testbed: Federal Information. The tremendous information output of the federal government is an ideal testing ground for the development of information retrieval and delivery because of its vast quantity and broad utility and interest, and because it is nearly all in the public domain.

[8] See Mellon Foundation Study. For the 24 public and private universities libraries included in the study, library budgets and expenditures as a percent of educational and general expenditures had declined from a high in 1974 of 4.05 percent to a low in 1990 of 3.20 percent [Cummings, 192].

Providing a Test Group: Depository Library Program.[9] Since 1983, the Joint Committee on Printing, the Ad Hoc Committee on Depository Library Access to Federal Automated Data Bases, and GPO have initiated projects to assess the viability of depository distribution of federal publications or products in electronic form. An analysis of the projects concluded that, "The primary implication of the pilot projects is that input from depository libraries is essential from the ground level in future planning efforts if electronic products are to succeed in depository libraries" [Aldrich and Jobe as quoted in Hernon and McClure, 73]. This group of 1,400 libraries is an ideal subset of libraries for a variety of test projects.

Policy Setting: Copyright. Resolution of the complex but important copyright issues will stimulate the growth of the national information infrastructure, including digital libraries. Copyright law encourages both creativity and the open dissemination of the products of creativity. The benefits which accrue to authors under U.S. Copyright law have spurred the U.S. to become the largest creator and exporter of copyright material in the world. From an NII or digital library perspective, the major issue is how to encourage copyright owners to make electronic material widely available under terms and conditions that are not administratively burdensome or unduly expensive. Related significant challenges are to develop guidelines which set forth permitted uses of digital information under the "fair use" exemptions to the Copyright Code (Section 107) and appropriate downloading or reproduction of digital information under Section 108 by libraries and archives.

■ **Dissemination Issues.** Publishers and other information providers are currently addressing many of the issues involved in electronic dissemination of their products and new bases for compensation. Today the answer to the acquisition and use of most electronic materials is individual contracts with publishers or other copyright owners. However, it is impossible for any library to negotiate thousands of contracts, and publishers will not want to do this either. Unfortunately, the results of efforts to standardize contracts, e.g., the Coalition for Networked Information's READI project, have been discouraging. Therefore, the possibilities of an information broker, a clearinghouse, or a collective rights organization for permissions and payments become attractive. Any system must be flexible enough to allow copyright owners to control rates and other conditions of access. Model contracts or blanket or site licenses must be considered. Additionally, the critical issue of fair use in a digital environment must be addressed. The development of guidelines to set forth permitted uses under the fair use section of the copyright law would be extremely useful; such a task, however, is formidable.

■ **Current Material.** For libraries, the issues are different for retrospective and current materials. With government encouragement and support, publishers, information providers, and librarians should be able to work together to develop effective and efficient mechanisms to safeguard the rights of copyrighted digital materials. There are already projects under way that are addressing this problem. One of these projects is the Electronic Copyright Management System sponsored by the LOC Copyright Office and Information Technology Services, ARPA, and CNRI. The system will provide mechanisms for electronic copyright deposit, registration, and recordation of transfers of copyright ownership as well as licensing transactions of works owned in a network environment.

■ **Retrospective Material.** For older materials, different solutions may be necessary. Here, copyright owners are difficult to find, and, indeed, the copyright status of works may be difficult to determine. For a library to convert materials to machine-readable form and make such works available digitally requires permission to reproduce and distribute them. Creative solutions must be developed that do not disadvantage authors and copyright owners.

■ **Definition Issues.** There are other difficult issues that must be explored. Only copyrightable expression is protected. Ideas, methods, systems, facts and the like are not. Works

[9] The Depository Library Program (DLP) is a national resource network designed to ensure free public access to all government produced and published information. Depository libraries are located in each state and congressional district to assure wide distribution of these documents. This commitment to public access to government information can be traced back to 1857 when it was resolved that printed documents should be made available to the public through official sources. The Depository Library Act of 1962 established the network of Regional Libraries and increased the potential number of depository libraries.

with expired copyright terms are free for all to use. Copyright terms vary from country to country; the Internet is increasingly international, and the NII will have international linkages. A national plan must consider the international implications. A number of questions will arise in a networked and digital environment: (1) How is "a work" defined? (2) How is authorship defined? (3) What about subsequent contributions when the author's contribution is similar to what is considered an adaptation? (4) What constitutes public communication or performance? and (5) How should the rights of reproduction, distribution, public performance, public display, and the making of derivative works be adapted to digital technology and networking?

■ **Groups Addressing the Issues.** The Intellectual Property Working Group of the Information Policy Committee of the Information Infrastructure Task Force (IITF) is directly addressing these and other issues. Others working on these issues are: the Coalition for Networked Information; the Copyright Clearance Center; Ted Nelson in his Xanadu project; the Information Industries Association with its "Digital Library" issues paper written by Joseph Ebersole; Gary Griswold of InfoLogic Software, Inc., with his proposal for a copyright tracking mechanism; Peter S. Graham, Librarian at Rutgers; and Carnegie Mellon's Information Networking Institute project for an Internet Billing Server prototype. The Library of Congress through its Digital Library Coordinating Committee also is addressing this area.

Industry Regulation (Cable, TV, Telecommunications). Key industries are currently making and implementing plans to move into the world of electronic information. Among them are the cable companies, the seven regional Bell companies, and various entertainment companies. All have pieces of the electronic infrastructure—cabling, a user base, or digitized data—upon which to build major information-providing businesses. These companies are undertaking mergers and acquisitions to supplement their areas of strength for the information industry they see evolving. Deregulation without safeguards could lead to the formation of oligopolies with price structures that effectively preclude the use of major amounts of timely information by the average citizen.

The federal government has an imminent and critical role in determining that affordable access by the public is assured.

Education.[10] The federal government plays a key role in the nation's education infrastructure, and the priority, direction, and support it provides to educational institutions at national, regional, and local levels will be critical to the ability of these institutions to gain meaningful access to the NII.

Important opportunities exist for the development of network connectivity in schools, and for the promotion of distance learning and other extensions of educational opportunities across age, economic, and geographic barriers. Early steps in this direction could include a program of grants to extend at least primitive access to the NII to virtually every school, and to support a broad program of distance learning curriculum development and teacher and librarian, particularly those who staff public and K-12 libraries, training drawing on the resources of the NII.

Once consistent connectivity exists for educational institutions, the foundation will have been laid for sharing the resources of digital libraries with students and educators. This means that libraries will continue to fulfill their traditional role as adjuncts to education.

Opportunities in the Coming Year

The most important opportunities in 1994 for the application of the NII to libraries may be the confrontation of copyright issues and policies, and the need to monitor and respond appropriately to the shifts taking place in the telecommunications and cable industries. All legislation that is passed in support of NII and NII-library programs is obviously of major importance.

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[10] See study done by D'Elia et al (funded by the Department of Education). The survey consisted of a sample (1,001) of the general public who were asked to evaluate ten roles of the public library (the ten categories included libraries' roles in the community, education, recreation, and as information provider), using four response categories ranging from "not important" through "very important." The three roles ranked most important were educational support center for students of all ages (88 percent); a learning center for adult independent learners (85 percent); a discovery and learning center for preschool children (83 percent).

The Transition of Libraries to the NII

There is great divergence between current library services, technology, and funding on the one hand and the vision of the NII for digital libraries on the other. There will, of necessity, be a transition period in which libraries continue to acquire, organize, collect, and preserve traditional materials in specific geographic sites, and continue to receive funding in much the same ways that they do currently.

The NII envisions "universal access," yet the infrastructure is incomplete. Work to be done includes everything from the fiber optic cabling to installing modems at the local public library, to the creation of software to make the navigation of diverse systems on diverse platforms easy, and the creation of standards to make it all work. It is unlikely that acquisitions will become fully electronic on a large scale—meaning that an information item can be ordered and delivered electronically—until issues concerning the roles and rights of authors, publishers, libraries, and users are clarified. Some type of descriptive record, such as the descriptive and subject record currently created by catalogers, will continue to be required for efficient searching and retrieval until hardware and software can create the abstract data for accurate searching of massive text files; or until libraries' hardware and software platforms are so powerful that searching massive amounts of textual and image data no longer presents a constraint.

Other components which must be addressed during the transition in order to fulfill the vision of the NII is the conversion of existing non-digital data and the assurance of access to and preservation of data in digital form. Due to the amount of material to be considered for digitization (500+ years of printed material, 150 years of photographs, 100 years of movies) and the number of problems associated with conversion (the lack of image standards, selection and organization practices for digital materials, the expense of the process, the strategic problem of mutilating an item in order to digitize it easily, copyright issues), building an efficient model for the digitization of analog must be considered early in the transition. Similarly, material created and only existing in digital form is not being archived or preserved in an orderly fashion. The issues of collecting digital items with a view to long-term archiving and preservation, particularly those without broad market appeal, are of little interest to entities interested in immediate economic reward. Archiving and preserving for posterity are largely being ignored at this time. Methods to assure the preservation of material of value to succeeding generations must be created.

In times of transition, sufficient funding to continue current operations while converting to and adopting new operations is critical. The libraries that make up the U.S. library community are funded through diverse and uncoordinated sources. Public libraries depend on local budgets; research libraries depend on their respective institution for their funding; government agency libraries are part of the federal budget; repositories depend on endowments and donations for funding. In times of economic restraint, such as today, funds to educational institutions, of which libraries often are a part, are among the first to be cut.

If libraries are to continue to perform the services currently provided and, at the same time, adopt technology that will make their participation in the NII a possibility, then a national plan to coordinate and supplement both the required efforts and funding is essential.

After the Transition: Digital Libraries

The transition to an information age will continue to be evolutionary rather than revolutionary. The need for physical access will decrease and demand for network-based access to information will increase. The evolution will occur for a variety of reasons: increasing demand for timely information; increasing costs of traditional material; lower costs and faster and cheaper networks which make digital knowledge networks feasible. Not the least of the reasons for the evolution will be a preference for access to material that is easily searched and manipulated.

The national digital library will be geographically distributed. It will consist of a network of publishers, vendors, libraries, other organizations, and individuals, public, commercial, and private, any of which can offer an item or collections of items. Digital libraries will allow users access to knowledge worldwide. Similarly, digital libraries will make their own databases available to users

of the worldwide network. At the same time, it will provide programs and services that will build a sense of community and meet the needs for access to information and knowledge for that community [Dowlin]. Digital libraries collectively will strive to contain all past and future knowledge in electronic form. In the United States, public libraries will try to assure that digital information is made available to all either for free or at a reasonable cost. Policy makers will have to resolve the copyright licensing issues as well as the issue of fair use in the electronic world to the satisfaction of authors and publishers, and to the continuing benefit of the public.

The role of librarians could evolve from electronic archivist to knowledge navigator of the network of data which is the library. Librarians will continue to acquire, organize, preserve, and make available information, but they also will be required to function as managers of electronic information. This role may require librarians to participate in all aspects of the knowledge chain, from advising authors on outlets, to placing digital material under control, to organizing data for ease of access, to instructing and guiding users.

Issues and Questions to be Addressed

Copyright

The advanced information infrastructure presents three significant and qualitatively new challenges to protecting intellectual property. First, digitization offers an unprecedented, easy, and inexpensive method to produce an indefinite number of perfect copies. Second, information in disparate media can be converted into a single digital stream and can be easily manipulated to create a variety of new works. Third, digitized information can be instantaneously distributed to and downloaded by thousands of users of the network.

If the NII environment is to prosper as expected, then contributions to it must flow from all sources: commercial, private, public, and government. If the information provided by these sources is to be valuable, creativity must continue to be remunerated.

Since the issues of intellectual property rights are critical to further development of the NII, how should the federal government work together with representative members of the information community to provide leadership to clarify the existing intellectual property laws[11] as they relate to electronic information in the networked environment? Should this include a review of the appropriateness of the current public policy objective of the copyright law—the attempt to strike a balance between copyright rights holders and the public good? How should the federal government help create an intellectual property rights model for the network environment? How should such models contribute to future collections of material in digital form?

Any new models must continue to encourage creativity while addressing the public and research communities' continued and legitimate information needs. Authors, publishers, scholars, librarians, information technology and service providers, the Copyright Office, and the public all must be represented in any modeling and decision-making efforts. Consideration must be given to the impact that the recommendations of the Intellectual Property Working Group of the Information Policy Committee of the NII will have.

What kind of pilot projects are appropriate to explore issues, establish precedents, clarify roles, and identify standards, policies, and models for fair use and protection of rights in the digital environment? Such projects should include exploring prototypes that protect the rights of copyright owners while at the same time allowing use of material in research and public libraries (i.e., browsing, research by one or a small set of users for the advancement of knowledge).

The Electronic Copyright Management System pilot currently being developed by ARPA, CNRI, and LOC will provide an electronic means for handling the deposit, registration, and recording of copyright ownership as well as licensing transactions of works already owned. This project can begin the process of building future digital collections and serve as a model for non-

[11] Copyright in the United States is established by the Constitution and confirmed by statute. Its original purpose was to encourage intellectual productivity by securing intellectual property rights for authors while promoting fair public access to their output. Only expression is protected; the manner is which the expression is packaged is not.

participating publishers. Once it is operational the challenge will be how to expand it to include more partners.

Equity of Access and Education

The specter of information "have-nots" in the midst of the wealth of NII information must be averted. Access and education are two key ways to increase the probability that the number of the information "have-nots" will be reduced. What should the federal government's role in reducing the potential for information "have-nots" be and how can it achieve the vision of universal access? How should the federal government fund programs for public gateways and for the education of librarians in the new technology.

What institutions will act as gateways for those not having access or technical knowledge sufficient to make use of the NII? Isn't this the emerging role of libraries? What funding should be extended, refocused, initiated to stimulate connectivity for gateway institutions such as libraries?

What role will the federal government play in funding the education of the NII knowledge organizer-navigator? Isn't this the emerging role of librarians in the NII? Who will be trained to be the knowledge organizer and navigator of the NII databases?

Providing access and strengthening the technical position of libraries offers a strong possibility for providing equitable access. One means of doing this is to extend and re-focus the Library Services and Construction Act (LSCA) through FY 1998 to explicitly encourage libraries, particularly public and depository, to become public gateways to the National Information Infrastructure.

LSCA-funded gateways could begin to provide for universal access to the national digital library's information. Is it appropriate to substitute funding for the purchase of necessary computer and network hardware and software and training of staff by public and depository libraries for the current LSCA funding authority for public library construction?

The LSCA currently is set to expire at the end of FY 1994. The Administration's FY 1995 budget request proposes to continue at level funding the largest LSCA program for improvement of public library services. President Clinton's proposal in the State of the Union address to extend the NII to every school and library is partially addressed in the proposed budget by continued funding of the LSCA program for interlibrary cooperation. Although level funding is requested for this program, the "requested level would enable the States to expand their networking capabilities and library participation in development of the National Information Infrastructure."

What means are there to provide funds for librarians so that they are prepared for the technological challenges of advanced networks and search tools and also able to undertake digitization of unique resources in academic and research libraries?

Funding to provide broader access and to strengthen the technical position of public, depository, and academic libraries offers the possibility of providing equitable access for all. Education of the leaders in the library community could strengthen the technological knowledge of librarians so that they are able to employ the technology optimally and train others to do the same.

Digital Conversion

Much of the concern of the National Information Infrastructure has been with connectivity and access. There is an increasing need to focus on content, as reflected by the Committee on Applications and Technology (CAT) mandate. While discussions of digital initiatives are generally broad and imply the existence of digitized data through the conversion of existing holdings in major libraries, the issues surrounding the digitization of these holdings are frequently avoided. Who is going to do the digitizing? Should this be undertaken by a single institution or by multiple institutions? What institution(s) have the holdings and the expertise to initiate significant pilot projects in this area? What comprises a significant set of material worthy of the funding of such major projects? How should the federal government fund these initiatives? It is clear that market forces are unlikely to produce the resources required to initiate this effort on a meaningful scale. However, are there private entities

that could help supplement federally initiated digitization projects?

One set of materials that should be digitized[12] is held by the Library of Congress. This material consists of more than 200 collections that represent the American cultural heritage. These collections contain more than one million items: books, manuscripts, microfilm, photographs, recorded sound, music, and maps. The suggestion that the Library's Americana collections be considered for digitization is based on the collections' reflection of the nation's heritage, the broad public interest in the material, and their specific value to education. The digitization of these collections presents a less significant problem than many others would in that the materials are either no longer subject to copyright or permissions for re-publication have already been granted. It is also attractive for a project of this magnitude to be broached initially by a single institution. Such a project could serve to establish a model which could then be expanded to other libraries holding important Americana materials. The objective would be to create a networked set of distributed, network-accessible databases on the American experience for education within this decade.

In the long run, creation and implementation of appropriate intellectual property protection models will permit the future collection of material in digital form. This, however, will not address the rich heritage of material that exists now in libraries and which will never be accessible over the network unless digitized. It is essential that some of the legislation under consideration, as well as some of the budget proposals being drafted, address digitization.

Federal Investment in R&D

Which areas to be considered for research have the potential to contribute the most rapid development and orderly growth of digital libraries as part of the NII? What searching aids could be designed for the short term? for the long term? What basic architectural components of the digital library are in place? Which are missing? What issues must be resolved before the public will be willing to depend on the network in the same ways it trusts traditional libraries and the voice network? What are the models for preservation in the NII, both for material that only exists in digital form and material that exists in other forms that are endangered? Who will provide a testbed for digital repositories? What should be included in this testbed?

How should the federal government deploy its funding support to focus the necessary research efforts on the following areas:

- Schemes for classification and the building of lexicons and thesauruses are vital. Given the magnitude of data that will be searchable in the electronic environment, more efficient searching mechanisms must be built. Broader, more orderly, and more up-to-date classifications are one way to do this. Similarly, well-designed electronic lexicons and thesauruses can reduce the number of search query iterations and improve the precision of the response without excessive user intervention.

- The basic architecture to guide the implementation of library systems is needed. Many components are already in place: processing, storage, networking, authoring tools, and intellectual property law. Components missing from this architecture are: full technological interoperability; mechanisms to determine availability and ownership of items; a means to electronically receive permission for use.

- "Smarter" tools are needed. Currently, the amount of information retrieved from the network (directly and precisely related to the topic) is highly correlated with the expertise of the user searching the network.

- The issues of privacy and security must be resolved before the public will be willing to trust the network.

- Models for preservation, both for material that only exists in digital form and material that exists in other forms that are endangered, are currently lacking.

- Finally, testbeds for digital repositories must be established. Any testbed must provide: acceptance of digital items; authentication of the

[12] The Library's Americana holdings are much greater than the estimated 1 million items contained in these 200 collections. The Library's Americana holdings are estimated to be closer to 40,000,000. These 200 collections are those that have been identified as important to the culture of the United States and for which copyright protection either no longer exists because the materials are in the public domain or permission for use is a reasonable certainty.

item and its source; the ability to interface the item(s) with other systems as required (for example, copyright management); a means to authenticate and respond to requests to identify or provide access to stored items; the ability to provide a multimedia response; a means to impose conditions on the use of an item; and ongoing management of all stored items.

Coordination and Review of Standards

Better coordination of standards-setting groups should be initiated so that standards on internetworking, interoperability, and security are created and adopted in a more timely way. In a dynamic and quickly changing environment such as the Internet and the future NII, standards groups must consider streamlining the process for setting *de jure* standards and creating a process to adopt *de facto* standards when they are useful.

How can the federal government most effectively participate in the setting of appropriate standards for libraries?

Any national efforts to review standards-setting groups and methods should be undertaken with a clear sense that the network is already an international entity and that its international component is likely to grow as quickly (or quicker) than the national entity.

Conclusions

Libraries are central to the success of the NII. Librarians have already begun to explore the challenges presented by electronic materials and navigation tools. Enhanced skills, roles, and alliances in the electronic environment must be explored and developed before the vision of NII digital libraries becomes a reality. Libraries and librarians are anxious to assume their place in this electronic world, but basic issues must be addressed. These issues include copyright licensing schemes, collective rights administration and guidelines for fair use in an electronic environment, the availability of sufficient resources to ensure reliable connectivity and staff knowledge in network use, and databases of sufficient quality and quantity to be useful to those in need of reliable information. While the growth of the Internet has been impressive, the NII is a much more comprehensive, ambitious initiative which necessitates resolving significant issues and meeting critical objectives for Libraries as well as other application areas.

Finally, the network world is now international. Any national efforts, therefore, must consider the international context and implications.

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The Louisiana Libraries Network Project

Background/Description of the Project

Methods of access, storage, and delivery of information are changing rapidly and will continue to change dramatically as we move into the 21st century. National and international databases, keyword/Boolean searching, electronic journals, electronic document delivery, remote access, networking, and scholars' workstations are but a few of the developments in the technology of information delivery which require that academic libraries automate in order to meet instructional and research needs of faculty and students in every academic discipline in each college or university.

When the Louisiana Libraries Network project commenced, only five public academic libraries in Louisiana had an integrated automation system. Rather than the remaining academic libraries automating by purchasing separate, stand-alone systems, all libraries agreed to join in a network of library automation that would insure database compatibility and remote access to library holdings and the sharing of resources. The proposal which was developed was designed to build on the computing and library automation infrastructure at LSU and the fiber optic statewide network which was being developed by the Louisiana Office of Telecommunications Management. Five universities—Louisiana Tech University, the University of New Orleans, Nicholls State University, Southeastern Louisiana University, and Northeast Louisiana University—are currently "on-line". The remaining public academic libraries that are working to become "network ready" are scheduled to be on-line by July 1995. When this phase of the project is completed, not only will all public academic libraries in Louisiana be automated, but there will be a database of over three million records, which together with remote access from each of the network libraries, will enhance instruction and research in every discipline.

Because of the success of the academic library network project, LSU and the State Library of Louisiana submitted a proposal to the U.S. Department of Education in the spring 1993 to further enhance the electronic resources which would be available through the network and to extend all of the resources in the network to the 64 parish libraries and a group of 12 to 18 elementary/secondary schools. The Louisiana proposal was the top-ranked (out of 21) proposal, and Louisiana will receive $2.48 million beginning January 1, 1994, to implement it.

The network design for the Louisiana Libraries Network Project incorporates a tiered architecture. The Internet forms the foundation of the network structure and Internet connectivity will be available to all library sites. LaNet, the statewide fiber optic network, forms the second tier and will connect the State Library and parish libraries to LSU and to the other colleges, universities, and state agencies throughout Louisiana. LaNet is currently in operation with over 25 universities and state agencies already

connected. The use of the existing fiber optic statewide backbone network, LaNet, capitalizes on the existing investment in networking technology and expertise throughout the state. Seven parish libraries in the state will be identified as "regional" libraries and will connect directly to LaNet and will act as "information hubs" for the more remote parish libraries. Each of the "regional" libraries will be equipped with a T1 connection to LaNet; each of the "remote" libraries will connect to the "regional" library via a 56Kbps circuit terminated with a multi-port DSU.

Long-Run Goals

Funds available in the grant from the U.S. Department of Education permit the implementation of the plan described above. Our major concern, however, is how to maintain and enhance this resource for the long-run benefit of all Louisiana citizens. Specifically, we wish to ensure that:

- the library and information resources available in the network continue to be available to the 64 parish libraries at an affordable price after the "pilot" year;
- all private universities that wish to join the network are able to do so;
- the network resources will be available to all elementary/secondary schools in Louisiana as soon as feasible; and
- the resources that are available to all users in the network are continually enhanced as additional information, including government database records, becomes available in electronic format.

Additional Actions Required to Reach Our Goals

Incremental funds required to reach our goals will depend in large part upon the costs of circuits provided either by telephone or cable companies. Hence, a critically important first step is for the telephone companies to provide significant educational discounts for the long-distance circuits that are deployed for the benefit of libraries, K-12 schools, universities, and other educational agencies.

Once circuit costs are known, it would then be relatively easy to determine the annual costs of network connections, network management, and network enhancements. In addition to telecommunication costs, the continuing operation of the statewide system will require staffing for a network office, computing services support, and the payment of software and database licensing fees. The pilot statewide networking project and the experience with the academic library network (LOUIS) will provide data relating to the costs of operating a Louisiana information network. At that point, it would seem reasonable to request direct funding from the Louisiana legislature.

This project has been very cost effective, building upon a significant investment by LSU, the other colleges and universities in Louisiana, the investment of the Louisiana Office of Telecommunications Management in a statewide fiber optic network, and over

$3.5 million in grants from the Louisiana Board of Regents and the U.S. Department of Education. But more important, it will provide statewide access to information that is not otherwise available by traditional means or that is tool expensive for academic, parish, or school libraries if accessed individually through commercial sources.

Source: Carolyn H. Hargrave, Louisiana State University, December 8, 1993

Blacksburg Electronic Village

1. Project Description

1.1 Goals

The Blacksburg Electronic Village Project is a joint project of Virginia Polytechnic Institute and State University, the Town of Blacksburg, and C&P Telephone/Bell Atlantic Company. The primary goals are:

- to bring high-speed data connections to homes, schools, and businesses in the Town of Blacksburg;
- to bring access to Internet to the people of the community;
- to develop a prototype for "cable information"—bringing interactive library resources to the community, plus such services as E-mail, listserv capability, home banking, home shopping, K-12 applications, FreeNet access, and telemetry. This prototype should be transportable to other communities;
- to evaluate the impact of these types of information services on the lives of individuals in the Town of Blacksburg; and
- to determine which services have the greatest value to users and to understand pricing , billing, and delivery issues for the project.

The project relies on this underlying assumption: when a critical mass of the residents of a community has easy access to telecommunications and interactive home library information, the fundamental nature of their lives will be changed. A corollary assumption is that the nature of current library services also will inevitably be changed.

The demonstration project will cover a minimum of three years. If successful, it will be self-sustaining after the initial three-year period and will be transportable to similar communities and some sectors of larger metropolitan communities. This project is not technology driven but is an applications development project for understanding, testing, and developing a suite of services that will bring economic and social value to a broad spectrum of society. The project will create a model for the national information infrastructure when deployed at the local level.

1.2 Project Background and Planning

This project was conceived in fall 1991 as a means of extending campus network and library services to off-campus students. In such a design, these students will have equal access to data and informational services as on-campus students. Consequently, faculty members will be able to integrate the use of the network into their pedagogy.

The concept and range of the project quickly evolved into a community-based project and became a test bed for services beyond those normally offered on a university campus. C&P Telephone approached the University with the offer of a feasibility study that would evaluate the economic and technical possibilities of extending the campus network. A formal announcement of this feasibility study was made in January 1992. In March 1992, a full-time engineer from C&P Telephone joined University personnel in the feasibility study. The University has already enlisted the services of the Vice President for Information Systems Emeritus on the project to develop the concept and promote it with in the community and corporate agencies. In addition, the manager of Advanced Systems was assigned full-time basis to concentrate on the information industry and granting agencies. A full-time communication engineer from C&P Telephone was also added to the project team.

The feasibility study proceeded from March until July 1992. During this time, C&P Telephone examined the existing telecommunications infrastructure within the Town of Blacksburg and developed cost estimates for upgrading to high-speed data communication. Also during this time, all grade levels in the public schools were consulted and numerous community groups were contacted concerning the plan to gather input and build enthusiasm for the project. Concurrently, the University began integrating client software that would allow ordinary citizens easy access to the Internet and other computer services. The feasibility study was completed at the end of summer 1992 by C&P Telephone with positive results. Since that time, high-level management of C&P Telephone and Bell Atlantic has been determining options for funding the project. However, an immediate decision was made to install an ISDN digital switch in Blacksburg in December 1992 at the cost of $4.5 million to make possible 64 kb speed access to data.

In addition, University personnel have made numerous contacts with granting agencies, hardware manufacturers, publishers, and information providers to develop broad-based support for the project. Weekly meetings were held with the Town manager, C&P personnel, and the University Project Team. In fall 1992, client software was released for beta testing to approximately 40 individuals within the faculty, students, and town.

In January 1993, C&P Telephone/Bell Atlantic Company made a formal commitment to fund the installation of a high-speed telecommunications infrastructure in Blacksburg using ISDN for selected segments of the community and ethernet for high-density apartment complexes. The University also made a commitment to offer modem access to all in the community and to improve access for on-campus students by providing ethernet in the dormitories.

Why Blacksburg? The Blacksburg Electronic Village Project will bring a 21st century telecommunications infrastructure to a rural university community of about 12,000 households so that the project can serve as a test-bed for a national information infrastructure that can be deployed throughout the Nation over the next several decades.

The Town of Blacksburg already has one of the highest concentrations of ownership of personal computers anywhere in the world. Currently, there are over 15,000 personal computers on the University campus. The College of Engineering requires all students to have access to a personal computer, as does several other departments. The survey of school children in grades K–12 revealed that ownership of personal computers in the homes is about 50 percent. Ownership may be as high as 80 percent in high–density apartment complexes where students live. Blacksburg is also a physically compact community and already has existing fiber runs to all major segments of the town. In addition, almost all homes are within the 18,000 foot loop required for ISDN technology. Because of its compactness and rural isolation, most residents use local services so that, as the community adopts the use of electronic services, the full impact can be realized and studied. If the same study were conducted in a portion of a larger metropolitan community, individuals would probably travel beyond the perimeter of the test–bed to obtain services.

1.3 Users and Applications

In many ways, the project subscribes to the "field of dreams" model"—If you build it, they will come". Placing the telecommunications infrastructure in Blacksburg where there is already a high degree of personal ownership and computer literacy should assure that a multitude of new applications will be developed and tested. The Blacksburg Electronic Village client software, already in beta testing, allows novice users access to the riches of the Internet via a keystroke. The client software allows users to perform such tasks as ftp, Gopher, Archie, WAIS, Veronica, and telnet sessions with a single key stroke. The software even updates itself by down–loading a new version from the server and deleting the version from the user's computer. During the duration of the project, the client software will continually be improved and updated as new applications are added. Providers, both commercial and non–commercial, will be invited to add new services. The project is in many ways patterned after the French miniTel system, which today hosts over 17,000 services. The major difference between the two systems is that the Blacksburg Electronic Village system will utilize intelligent devices and much higher communications speeds than the French system. A similar project was attempted in 1981 in Columbus, Ohio (named Channel 2000") between OCLC and Bank One Inc., and much was learned. However, today's technology is more advanced than the Channel 2000 project, and the environment of Blacksburg is a more concentrated laboratory in which to observe user behavior and to see the impact on an entire community instead of dispersed households.

In the Blacksburg Electronic Village Project, various user communities will be encouraged to work with specific faculty groups on campus to develop applications. For example, the College of Education will work with the K–12 school system to develop electronic parent–teacher conferencing. Homework assignments could be available via the net so that parents could check children's work habits. The schools will have Internet access, as well as access to commercial information providers. Church groups will be encouraged to develop electronic newsletters, and the medical

community will be connected electronically to its patients and pharmacies. Checkfree Corporation has agreed to offer its software for home banking to all members of the Blacksburg Electronic Village free of charge, and local bankers have been contacted to underwrite some or all of the remaining costs. A local grocery store is investigating electronic food ordering, which could be linked to a consumer products database so that customers could make better informed product choices to support good health. The local power company is considering installing "smart meters" in the homes in Blacksburg so that consumers could regulate the use of electric power based on cost per kilowatt hour as it varies during the day.

Most important, the information community has been invited to participate in the project. OCLC will be working through the Montgomery County Public Library to offer access to First Search via the electronic village—initially at no cost and later under creative pricing arrangements. Faxon Research Services is interested in experimenting with document ordering and delivery to the home. The Chronicle of Higher Education is considering offering free access to its tables of contents and linking itself to a document supply service. Underlying much of these information services is the possibility that billing for information services could be added to the local telephone bill so that individuals would be buying information units "by the drink". It is postulated that if information providers can spread the sunk cost of creating information among millions of individual users, the cost per access will drop dramatically—making electronic access to information accessible to a broad sector of the population.

No-cost, public access to the Blacksburg Electronic Village will be offered by the Montgomery County Public Library via terminals located in the library and in other public buildings in the community. C&P Telephone will underwrite the telecommunications costs for access via the schools and the library. The client software will be free to everyone; however, the cost of data access will rest with the user. Although rates have not been specified by C&P Telephone, access via modem through the University's modem pool will be $60.00 per year. It is envisioned that, like cable television, cable information will offer basic services, such as E-mail, and Internet access for a single monthly fee, and there will also be premium pay-per-use information services that users will subscribe to or elect to use.

2. Plan of Operation

As stated in the "Project Description", a considerable amount of planning and effort has already been expended in the Blacksburg Electronic Village Project. The university personnel have already invested over two person-years of effort; this is in addition to the personnel that C&P Telephone devoted to the project during the feasibility study. (The Feasibility Study is a confidential document of C&P Telephone.) To date, (1) the costs of the telecommunications infrastructure have been determined, (2) a beta version of the client software is being tested, and (3) contacts with a broad spectrum of hardware vendors, telecommunications industry representatives, and information

industry representatives have been made, and significant in-kind contributions have been committed to the project.

2.1 Telecommunications Infrastructure Deployment

An ISDN digital switch was installed on December 5, 1992, to allow ISDN access (64 KBS) to the Electronic Village, although pricing and Customer Premise Equipment (CPE) have not been determined. "Seeding" of ISDN connections will begin by fall 1993 to select agencies such as the public library and the K-12 schools. Access via the University's modem pool (datalock) is available now at speeds up to 14.2 KBS. Deployment of ethernet access for apartment complexes to the Electronic Village will begin during summer 1993, and additional new units will be added throughout the project duration. Up-grading of the campus network to ethernet in the dormitories will begin in fall 1993 and will be complete in 1996.

2.2 Software

Beta testing of the client software will continue until summer 1993. New functions will be added to the client software throughout the project as new services are developed and added, and continued refinement of the useability of the software will continue throughout the project. Special emphasis will be given to the collection of user behavioral data in both the client and server software beginning in summer 1993. In spring 1994, C&P Telephone/Bell Atlantic Company will proceed with software development that will allow information vendors to use their billing system for "pay-per-use" premium information products.

2.3 Hardware Deployment

The design of the client software allows users of the Blacksburg Electronic Village to use distributed hardware on the net and to change easily from server to server. The following servers will be installed in fall 1993 at the University in support of the project: a server to maintain the "Electronic Village Gopher" (the gopher is already under construction), a server to store USEnet feeds, a mail server to maintain electronic mail for participants, an Archie server to act as an Internet search tool, a ftp server to store specific Electronic Village information, and a real-time communications server. The Town of Blacksburg will also be purchasing a FreeNet server in fall 1993 to allow FreeNet type activities in the Electronic Village. Public access hardware to be placed in the public library, town hall, community center, and retirement center will be installed in fall 1993. As usage increases, additional disk storage, modems, and slip servers will be needed. CPE hardware to be placed in homes using ISDN will be installed as new users join the Village. Users may number 200 in 1993 and grow to around 2,500 by 1996. However, the rate of growth is unknown at this time, and this factor is one of the key data elements to be discovered by the project.

Growth of the system should be accommodated from revenue generated by the project so that the project will be self-supporting.

2.4 Personnel Deployment

Currently the University is supporting three full-time individuals on the project—a project leader, a manager of advanced systems for software design, and a communications engineer. The Director of Network Development and Design and the Interim Vice President for Information Systems are each contributing a portion of the their time to the project. In fall 1993, two individuals should be added to the project—a 1.5 fte systems engineers to maintain hardware and a full-time librarian to update the growing information resources in the Village and to supervise the 8.5 fte end-user consultants. As growth of the Village increases, additional end-user consultants may be needed. Other personnel will be used throughout the project on a consultant basis, especially in the areas of evaluation, data collection, and analysis.

2.5 Evaluation

Evaluation is an integral part of a research and development project (detailed evaluation techniques are discussed elsewhere in this proposal). Beginning in summer 1993, client and server software will be developed to gather use and behavioral data. Evaluation consultants will be used on the project beginning in fall 1993 to design basic demographic data gathering instruments and to gather bench-mark data. As the project proceeds, the evaluation consultants will be used again on the project to conduct focus group sessions, to do case studies of specific services, and to monitor the project. In spring 1996, these evaluation consultants will begin preparing the final report and findings of the project.

3. Budget and Cost-Effectiveness

The budget for this project is derived from a combination of funding from the private sector, the University, the Town of Blacksburg, and granting agencies. The funding model of this project follows a model suggested by the Clinton Administration to form research partnerships between education, industry, and the federal government.

The budget request for the Blacksburg Electronic Village Project is $1,500,000 in salaries, wages, and benefits over three years for some of the project personnel. These individuals, combined with the services of other personnel assigned to the project from the University, will be adequate to complete the project. Resources from other sources for the telecommunications infrastructure, hardware, consultants' fees, software design, travel, evaluation, and dissemination of the findings far outweigh this budget request to the Department of Education. The project is of great significance to libraries, to education in general, and to the national priority of remaining competitive in world markets by creating a national information infrastructure. In relation to the stated objective of the project, the project budget request is reasonable and cost-effective.

4. Adequacy of Resources

The requested funding under Title IIA for salaries will be adequate to carry out the project. Additional personnel will be adequate to carry out the project. Additional personnel will be assigned to the project by the University. The Montgomery County library will be contributing personnel to the project for user support and training in the community. C&P Telephone personnel will install the telecommunications infrastructure within the town, and the University will upgrade the telecommunications infrastructure in the dormitories. Hardware for the project will be supplied by IBM and the University. ANS has granted access to the Internet to individuals in the community. It is expected that as deployment of the system and usage increases, access fees will make the project self-supporting by 1996. Free access to those who cannot afford to join the Electronic Village will be offered through the public and University library and underwritten by a surcharge on the overall access fees and usage charges. The Town of Blacksburg will supply the hardware for the FreeNet component of the Electronic Village and will also support printing and mailing of information and surveys to the residents of Blacksburg as part of the evaluation phase. The Council on Library Resources supports the project and has requested a proposal that will support the costs of evaluation and dissemination.

5. Evaluation Plan

The evaluation of the project will concentrate on two key areas: (1) marketing information and analysis; and (2) social and behavioral changes. Data for the marketing portion will be gathered from demographic data via the applications that each users will be required to complete in order to join the project. Data gathered at this stage will include such information as age, gender, education, status (i.e., student, business person, retired), type of hardware used, income categories, and user expectations.

Client and server software will also be written to log transactional data as the system is used. Commercial information and service providers will be encouraged to share use data, although it is understood that they may consider some data proprietary if they are to join the project. Every effort will be made, however, to gain their agreement for freely sharing the results of the acceptance of their products or services.

Focus group sessions will be held with selected individuals using specific services to understand user acceptance or behavior. The end-users consultants on the project will maintain logs of contacts, and data from these logs will be analyzed.

The portion of the project directed toward understanding user behavior and community impact will use some of the following methods of evaluation. Case studies that actually observe habits and reactions of users will be conducted in schools, businesses, and households that have either high, medium, or non-users.

Specific service areas, such as electronic publishing, multi-media, or home shopping, will also be selected, and specific instruments for evaluation purposes will be designed for each of these areas. The evaluation will be formative as well summative, so that, as the project proceeds, services and applications can be refined.

Special Program Criteria

1. Innovative Approach

In the early 1980s, the French telephone system, MiniTel, distributed terminals to households for their use in accessing a wide range of information services. Today, over 6 million terminals are installed and over 17 thousand information providers use the system. A limitation of the system is that it runs a 1200 baud on dumb terminals. MiniTel will soon upgrade the system to 4800 baud terminals; however, even this higher speed may not make many services available, such as multimedia, video, page images, or even the ability to access ftp large data files.

Also in the early 1980s, an experiment was undertaken in Columbus, Ohio, called "Channel 2000". Data and entertainment products were offered via cable television with the aid of a device hooked to the television which gave users some rudimentary interactivity. Several hundred users in the Columbus area were involved in the project. Significant data were obtained from the project about user behavior and preferences, but the project was short lived.

The Blacksburg Electronic Village Project builds on these two early models. However, the project uses today's intelligent personal computers and much higher telecommunication speeds and is in the forefront of extending network connectivity to all citizens. It first extends the campus network beyond the campus to off-campus students via high-speed data connections. This has never been done before. However, it goes beyond the simple extension of data networks because it also creates an environment in which library services can be delivered to an entire community. It extends the NREN to average citizens, and it makes access and use of the NREN easy. This environment also provides a means of exploring pricing information. Currently, the cost of information access is borne by a limited number of users, generally via libraries. When information can be delivered directly to millions of users, the cost per information unit will drop drastically per use and access will be less costly. The Blacksburg Electronic Village Project explores this postulate. The project uses technology in an innovative way to explore economics, users behavior, and social implications of the virtual library of tomorrow.

The Blacksburg Electronic Village goes beyond information delivery to the delivery of a wide range of data services, such as home banking, home shopping, medical applications, and K-12 applications. One assumption is that only when informational services are combined with other data services in a package will they be welcomed by

the general public. The innovation of this project is this combination of services into the prototype of "cable information".

2. Evidence of Desirability

Numerous presentations of the concept of the Blacksburg Electronic Village have been given during the last year to library, publishing, and telecommunications communities. Some of these groups have been CNI, ARL Workshop on Fee-Based Services, OCLC Users Council, NorthwestNet, the Washington Chapter of ASIS, CAPCON, Society for Scholarly Publishing Top Management Round Table, and Texas Educational Network. At each of these group presentations, audience response was overwhelmingly positive and supportive of the project. The project has also received coverage in the Washington Post, The Chronicle of Higher Education, Telemedia Monitor, The Futurist, and will be reported on in a 20-minute documentary on the "Voice of America".

3. Special National or Regional Needs

Since the introduction of the NREN legislation, the concern of the library community has been that the NREN be extended beyond the higher education community. In the 102 Congress, S.2937, the Information Infrastructure and Technology Act of 1992, was introduced into Congress "to help ensure the widest possible application of high-performance computing and high-speed networking". The target of this deployment was education, libraries, health care, manufacturing, and other appropriate fields. The Blacksburg Electronic Village directly addresses the essence of this act because it can be a test-bed by which higher education can play a critical role in a partnership with private industry and the federal government to demonstrate the "proof of concept" and to create a working model for broad deployment. One expectation is that a broad range of experts from many fields of social science will eventually become involved with the project to understand the impact of ubiquitous data and informational access to the general citizenry.

4. Consultation of Leading Experts

Experts from the private sector (for example, BellCore, Northern Telcom, IBM, Apple Computers, Bell Atlantic, and Cox Cable) have been involved in the project design. Members of EDUCOM, CNI, and OCLC have also reviewed the project, as well as experts in electronic publishing. Although it has been stressed that the project is no a technology project, its services are made possible by the latest technology. The project demonstrates the application of these powerful technologies to the delivery of library and other information services.

5. Dissemination of Results

The concept of this project has already received wide exposure in the media and the professional community. Presentations have already been scheduled for this spring and summer at meetings of PACNET, SSP, and LITA. As the project progresses, updates of the implementation and findings will be disseminated to library, telecommunications, and information communities. Data and findings from the evaluative phase of the project will be published in the professional literature and presented at professional meetings.

Summary of a Current Study of the Costs and Beneficial impacts of Library Functions

Project: Study of the Costs and Beneficial Impacts of Library Functions

Investigators: Paul Kantor and Tefko Saracevic, Alexandria Project Laboratory for the Study of Library Function at the School of Communication Information and Library Studies, Rutgers University

Libraries today must make planning allocation decisions concerning both new and old modes of access to information. These decisions require knowledge of the expected impacted and the expected cost of each course of action. Some of the factors that may influence decisions include timeliness, thoroughness, convenience, accuracy, and precision.

The goal of this project is to develop and apply tools and procedures for measuring costs, classifying benefits, and measuring benefits of diverse library functions by:

1) Adapting a functional cost analysis to all types of library functions and services;
2) Developing a taxonomy to classify library beneficial impacts; and
3) Developing a metrology (measurement science) for measuring benefits as described by the taxonomy.

Specifically, the investigators will develop and use a dictionary for classifying the impacts of libraries on individuals and organizations. They also plan to develop and use a manual, which will enable library administrators and staff to use the measurements that the investigators define or to define their own dictionaries and measurement scales as appropriate.

It is recognized that applying economics to the library area is a complex issue. To date, little has been done to classify, measure, and quantify the beneficial impacts of library functions. In a recent article in Library & Information Science Research that reviews previous research on impact assessment of university libraries, Ronald R. Powell, School of Library and Informational Sciences, University of Missouri–Columbia, concludes that "In an era in which academic libraries are more and more in competition for financial support with other important enterprises on their campuses, it is becoming increasingly important for them to be able to justify their costs, if not their existence. ...An inescapable conclusion seems to be that neither measures of input, nor even measures of output or performance, are up to the task of justifying the tremendous expenditures of university libraries. What does appear to be needed are valid, reliable measures of the actual impact libraries are having on their users."[1]

The Rutgers study will involve five research libraries located within a reasonable geographic area of the investigators. Confidentiality will be maintained for specific cost information from the institutions, but the data will be reported out in simulated form.

The first task will be to conduct a cost analysis at each institution by analyzing the flow of funds from all sources through each library's organizational structure and its expenditure categories. This method has been documents by Kantor in previous work.[2] The data will be collected in site visits and through structured interviews. The resulting information will be used to develop a manual that will enable replication of the process at other sites.

A taxonomy of beneficial impacts will be developed during the second project task. This taxonomy will be empirically derived, tested, and documented in a dictionary that will include: a) tasks undertaken by library users, b) related immediate beneficial gains, and c) related longer term beneficial impacts. Samples of library users will be studied through observation, questionnaires, and interviews as they perform a variety of library tasks of functions to resolve their information problems. The techniques to be employed include critical incidence, conjoint analysis, modified focus group, grounded theory building, and problem solving.

The project's third task is to develop measurement scales for assessing the value to users of the various library services. Investigators plan to use conjoint analysis as a tool to determine the perceived value of tradeoffs among services, and of quantity or quality of services versus speed of performance. A set of scales, conjoint analysis instruments, tabulated results of analyses, and an interpretive essay will be provided as deliverables for this component.

An evaluation plan has been developed for the project that includes quarterly reviews of the process by participants and external reviewer, reviews of the instruments and tools developed, and development of seminars for training in the utilization of the tools. Council staff or representatives will be included in all phases of the project.

The total budget for this project is $202,203 and Rutgers will provide $104,591 through cost-sharing and overhead reduction.

The principal investigators for this project have experience in research design, data collection, and publication. The final deliverables for the project will be publishable materials that can be disseminated to the broader library community.

Notes

[1] Ronald R. Powell. "Impact Assessment of University Libraries: A Consideration of Issues and Research Methodologies." Library & Information Science Research 14 (1992) 245-257.

[2] Paul B. Kantor. "Library Costs Analysis." In Problem Solving in Libraries, Library Trends. 38 (2) : 171-188, 1989.

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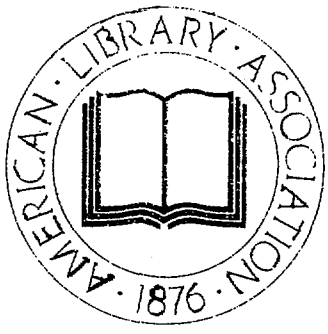

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Date: May 12, 1994

To: Participants in NCES/NCLIS/LP Forum on Library & Information Services Polity, May 16-17, 1994

From: Mary Jo Lynch, Director, ALA Office for Research and Statistics

Subject: Statistics about libraries and the NII

John Lorenz asked me to summarize briefly what statistics are currently collected by NCES from academic, public, and school libraries. This memo does that. I am making the assumption that our interest is in data on the use of telecommunications technologies.

1. **Academic Libraries** (i.e., in a college or university)

Background: Data are collected every two years from a universe of about 3,500 libraries as part of the Integrated Postsecondary Education Data System (IPEDS). The latest library survey was conducted in fall 1992. It is expected that results will be published in June 1994.

Items:

1992 Form: none

1994 Form

- Line 19 requests expenditures for computers, formerly lumped together with furniture and other equipment. Obviously computers are the *sine qua non* of electronic information.

- Line 20 requests expenditures for utilities, networks and consortium through which much electronic information is accessed.

- Lines 44 and 45 (Document Delivery/Interlibrary Loan) includes documents exchanged by "facsimile or other forms of electronic transmission" but those transactions are not separated from others.

1996 Form

Since 1990, the Advisory Committee to this survey has been trying to come up with better ways to capture the extent to which telecommunications technology is transforming academic libraries. Several suggested items have been rejected because we could not agree on a definition OR because librarians told us it was too hard to collect the data OR because a particular technology is still changing. As of now, we are considering the addition of a checklist based on one included in Martin Dillon's paper for the 1993 Forum (attached).

2. **Public Libraries**

Background: Data are collected annually from the universe of almost 9,000 public libraries by state library agencies and sent to NCES on disk through the Federal-State Cooperative System for Public Library Data (FSCS). NCES edits data and produces a report. The latest report (for 1992) will be published in a few weeks.

Items: none

3. **School Library Media Centers**

Background: The most recent statistics on school library media centers were collected in 1985-86 by Westat under contract to NCES. Since that time, NCES initiated a set of questionnaires, known as SASS (Schools and Staffing Survey), sent to a sample of administrators and teachers. For the fall 1993, iteration of this survey set, a questionnaire was added for the school library media center. The survey has been in process since November 1993. A brief report is expected in about a year at which time the file will be released.

Items:

The technology section asks if the library media center has 14 different types of equipment or services including:

- telephone
- fax machine
- computer with modem
- on-line database searching, such as BRS, Dialog, etc.
- connection to Internet
- cable television
- broadcast television
- closed circuit television
- satellite dish

Checklist

Electronic Services in Libraries		
Ability for patrons to	Currently offer	Plan to, next two years
Access our library's CD databases from stand-alone microcomputers or terminals in our library	63%	79%
Dial into library's online catalog from outside primary community	51%	81%
Access the online catalogs of other libraries through our library	46%	78%
Access reference databases that are mounted at remote sites	31%	59%
Access reference databases that are mounted onour library's local computer system	23%	55%
Order and receive electronic documents directly through document delivery services	21%	55%
Submit their own ILL requests electronically to our ILL department	18%	50%
Access our library's CD databases from computers linked through library or campus networks	15%	58%
Check out library materials electronically by dialing into our library's online catalog	4%	19%

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