DOCUMENT RESUME

ED 211 124 IR 010 086

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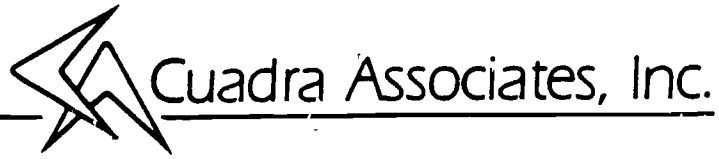
TITLE A Library and Information Science Research Agenda for the 1980s: Summary Report.
INSTITUTION Cuadra Associates, Inc., Santa Monica, Calif.
SPONS AGENCY Office of Libraries and Learning Technologies (ED), Washington, D.C.
PUB DATE Feb 82
CONTRACT 300-81-0022
NOTE 54p.

EDRS PRICE MF01/PC03 Plus postage.
DESCRIPTORS *Information Science; Information Services; *Library Research; *Library Science; Library Services; Needs Assessment; *Research Needs; *Research Opportunities
IDENTIFIERS *Agendas; Agenda Setting

ABSTRACT

This report summarizes the results of a project undertaken to assist the Department of Education, Office of Libraries and Learning Technologies (OLLT), and the wider community it serves, to identify research priorities in the field of library and information science. The background of the project is briefly described and the project design is reviewed, with emphasis upon the function of the 3-day Research Agenda Meeting which was the center-piece of the project. An outline of the Research Agenda and a classification of Research Agenda projects by research area are followed by comments on the interpretation and use of the Research Agenda. Appended to the report are descriptive summaries of the 20 projects which comprise the agenda and a set of brief summaries of non-agenda projects. (JL)






# A LIBRARY AND INFORMATION SCIENCE RESEARCH AGENDA FOR THE 1980s:

# SUMMARY REPORT

**February, 1982**

**Prepared by**

**Cuadra Associates, Inc.**

This project was conducted under contract (Number 300-81-0022), to the Department of Education, Office of Libraries and Learning Technologies. The views and opinions expressed herein do not necessarily reflect those of the U.S. Government.





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## PREFACE

This project was conducted for the Department of Education, Office of Libraries and Learning Technologies (OLLT), under Contract Number 300-81-0022. Dr. Carlos A. Cuadra, President of Cuadra Associates, Inc. (CA), was Project Director, and Judith Wanger, Vice President of CA, was the Associate Project Director. Other project team members were Mary C. Berger, David M. Abels, and Joseph W. Haaf.

The purpose of this summary report is to help disseminate the "Library and Information Science Research Agenda for the 1980s" widely throughout the library and information science community and to other interested organizations and agencies, as well. The 20 projects that comprise the Research Agenda and the issues that have been raised in the course of our work can, we hope, stimulate productive discussion and debate about the type of research that can have the greatest impact on future library and information services. This report can also be used by library and information science organizations to convey to potential sources of research funding a sense of the exciting potential of future library and information services and the ways in which research can contribute to that future.

In the text that follows, we first present some background material on the project, to indicate how the final product--the Research Agenda--was developed. A display of titles of the Research Agenda projects is presented in Exhibit 1, and one-page summaries are contained in Appendix A. To place the Research Agenda in context of the "universe" of projects that were initially considered for inclusion in this statement of research priorities, a classification of all projects reviewed and evaluated in the process of selecting the Research Agenda projects is presented in Exhibit 2. Brief summaries of the other projects that were considered are presented in Appendix B. Those readers who are interested in additional information may wish to read the full report, A Library and Information Science Research Agenda for the 1980s: Final Report.

ACKNOWLEDGEMENTS

The project team wishes to express appreciation, on behalf of the library and information science community, to the Office of Libraries and Learning Technologies for developing and supporting this study and for giving the project participants and project staff the freedom to express their views and priorities without restriction, expressed or implied. This type of project is extremely important to our discipline's growth and vitality.

We would also like to acknowledge the support and contributions of many of our colleagues in the field, who shared with us their views on library and information science research needs, who volunteered their support, made suggestions for areas of inquiry to be be considered by the project participants, and offered guidance and counsel on the organization and dissemination of the project findings. In this report, as in the conduct of the project, we have attempted to represent and take into account the many views and perspectives that were shared with us.

A special acknowledgement should be made to a number of representatives of library and information science associations and organizations who participated in an OLLT-sponsored Colloquium and provided valuable feedback on our draft report and the implications of the Research Agenda for their constituents. Their views helped to shape this summary report, as well as the full report, A Library and Information Science Research Agenda for the 1980s: Final Report.

Extensive assistance in helping the authors prepare the final manuscripts for these reports was provided by Marie E. Callaway, an intern from UCLA, Graduate School of Library and Information Science, and by Jane V. Bodjanac and Gloria N. Cuadra, members of the CA support staff.

The largest debt of gratitude goes to the 26 researchers and practitioners from our field who agreed to be our "project participants" and who are the chief architects of the Research Agenda. These individuals were carefully selected by OLLT and the project team to represent the leadership in our field and to give the project the benefit of a broad array of perspectives and expertise. The 15 project participants who served as researchers prepared a total of 88 draft project descriptions, to be used as the basic stimulus material for an intensive, three-day meeting held in a retreat environment. These participants, along with 11 practitioners, served in this meeting as reviewers and evaluators, on behalf of the library and information services community, and not as advocates for the projects that they had developed. They more than fullfilled our expectations in their contributions to the project. Although they, as well as the Colloquium attendees and members of the OLLT staff, have reviewed draft material for this report, responsibility for the presentation that follows necessarily remains with the CA project staff.

The project participants are listed below. In cases where individuals have changed their institutional affiliations since the time of their selection as participants in this project, we provide both present and past affiliations. Following each name and affiliation is an indication of whether the individual served on the project as a "Researcher" or "Practitioner." In keeping with their desire for the Research Agenda to stimuluate discussion and debate about research priorities throughout the library and information science community, the authors are not identified with individual projects. We hope that the "group authorship" for the Research Agenda will help to generate a similar sense of ownership throughout the profession for many of the ideas and needs that have been articulated in the course of developing the Research Agenda. The participants were:

Shirley Aaron, Associate Professor, School of Library Science, The Florida State University, Tallahassee, Florida. *[Researcher]*

D. Philip Baker, Coordinator of Library Media Programs, Stamford Public Schools, Stamford, Connecticut. *[Practitioner]*

Marcia J. Bates, Associate Professor, Graduate School of Library and Information Science, University of California, Los Angeles, California (FORMERLY: Associate Professor, School of Librarianship, University of Washington, Seattle, Washington). *[Researcher]*

Ching-chih Chen, Professor and Associate Dean, Graduate School of Library and Information Science, Simmons College, Boston, Massachusetts. *[Researcher]*

Robert L. Clark, Director, The Oklahoma Department of Libraries, Oklahoma City, Oklahoma. *[Practitioner]*

Pauline Atherton Cochrane, Professor, School of Information Studies, Syracuse University, Syracuse, New York. *[Researcher]*

Michael D. Cooper, Associate Professor, School of Library and Information Studies, University of California, Berkeley, California. *[Researcher; not a meeting participant]*

Evelyn H. Daniel, Dean, School of Information Studies, Syracuse University, Syracuse, New York. *[Researcher]*

Keith Doms, Director, Free Library of Philadelphia, Philadelphia, Pennsylvania. *[Practitioner]*

Kenneth E. Dowlin, Director, Pikes Peak Library District, Colorado Springs, Colorado. *[Practitioner]*

Miriam Drake, Assistant Director, Library Support Services, Purdue University Libraries, West Lafayette, Indiana. *[Practitioner]*

Douglas Ferguson, Manager, Research Libraries Group, Inc., Stanford, California. *[Practitioner]*

Marilyn Gell Mason, Metrics Research Corporation, Atlanta, Georgia (FORMERLY: President, Gell & Associates, Inc., Washington, D.C.). *[Researcher]*

Robert M. Hayes, Dean, Graduate School of Library and Information Science, University of California, Los Angeles, California. *[Researcher]*

F. Wilfrid Lancaster, Professor, Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign, Urbana, Illinois. *[Researcher]*

Barbara Lawrence, Head, Information Services Unit, Medicine and Environmental Health Department, Exxon Corporation, East Millstone, New Jersey. *[Practitioner]*

Jay K. Lucker, Director of Libraries, Massachusetts Institute of Technology, Cambridge, Massachusetts. *[Practitioner]*

Mary Jo Lynch, Director, Office for Research, American Library Association, Chicago, Illinois. *[Practitioner]*

Barbara Evans Markuson, Executive Director, Indiana Cooperative Library Services Authority (INCOLSA), Indianapolis, Indiana. *[Practitioner]*

William Paisley, Professor, Institute for Communication Research, Stanford University, Stanford, California. *[Researcher]*

Vernon E. (Gene) Palmour, Senior Vice President, King Research, Inc., Rockville, Maryland. *[Researcher]*

W. David Penniman, Director, Development Division, OCLC Online Computer Library Center, Inc., Dublin, Ohio. *[Researcher]*

Jane Robbins-Carter, Director, Library School, University of Wisconsin-Madison (FORMERLY: Dean, Graduate School of Library Science, Louisiana State University, Baton Rouge, Louisiana). *[Researcher]*

Peter B. Schipma, Scientific Advisor and Adjunct Associate Professor of Science Information, IIT Research Institute, Chicago, Illinois. *[Researcher]*

Loene Trubkin, President, Data Courier, Inc., Louisville, Kentucky. *[Practitioner]*

Herbert S. White, Dean, School of Library and Information Science, Indiana University, Bloomington, Indiana. *[Researcher]*

## SUMMARY REPORT

This report presents the results of a project sponsored by the Department of Education, Office of Libraries and Learning Technologies (OLLT), and carried out by Cuadra Associates, Inc. The purpose of the project was to assist the Department and the wider community that it serves in identifying research priorities in the field of library and information science.

### Introduction and Background

Although there has been considerable variation over the past decade in the pattern of research funding for library and information science, one can foresee a period of austerity in federal funding, over the next five to ten years. It is important, therefore, that public investment in research have the highest payoff possible. This means that we will need better planning, to ensure that available research funds are directed to research areas where they will have the greatest potential impact, and better coordination, to avoid duplication of effort. In addition, steps must be taken to revitalize the commitment to research and to develop a broader base of support for its sponsorship. These changes will not occur solely from the publication of the research agenda produced through this project, but critical examination and review of this report can help us to move toward those goals with greater assurance and speed.

The original title of this project included the term "national," to help convey the idea that the research to be proposed should address areas of broad concern and major potential impact. This idea was useful as part of the context for planning the project but, to avoid the implication that the research agenda to be described is federally proposed or federally endorsed, we will hereafter refer to it simply as the "Research Agenda."

As further context for this project, broad definitions of "library and information science" and of "research" were developed. Although there are strong differences embedded in the tradition of librarianship and library science, on one hand, and in information and information

science, on the other, there are also areas of strong common interest and concern. One fundamental shared concern is with facilitating the use of information in all forms, either directly, by providing library or information services, or indirectly, by studying ways to improve those services. The focus, in the present study, on library and information services was intended to encompass the entire spectrum of public and private settings in which such services are provided. In a similar vein, "research" was defined in terms that, while retaining the essential concept of "systematic investigation of a problem," encompass many different approaches, from experimental and quantitative studies and methods to conceptual and qualitative ones.

## Project Methodology

The centerpiece of the project design was a three-day meeting, the purpose of which was to have a group of highly respected library and information science professionals (hereafter referred to as project participants) evaluate and prioritize research projects--the "top 20" of which would comprise the Research Agenda.

Extensive research and communication with project participants preceded this meeting. A background document was prepared by the project staff to help shape the desired scope and coverage of the Research Agenda and to define several central concepts, including "research" and "library and information science." This document was based on an intensive literature review, an analysis of past funding data, and discussions held with about 20 "gatekeepers"--experts in a number of different areas of library and information science and related fields such as telecommunications, economics, and public policy.

Another major activity was the selection of the 15 researchers and 11 practitioners who served as the project participants. Initially, over 40 individuals were contacted to identify those who would be interested in participating and to determine their areas of expertise and specialization. We matched these areas with a preliminary set of research areas and

developed various matrices to help achieve the desired balances. With the advice and assistance of OLLT, a final selection was made.

During a two-month period, each of the researchers prepared draft descriptions of approximately six proposed research projects, in one or more assigned areas. The purpose of this work was to have available, at the Research Agenda meeting, stimulus material that would help the participants to focus their discussion and evaluation on specific, concrete ideas for dealing with important problem areas. The project descriptions were distributed to all participants, for their review and initial evaluation. Their evaluations became the starting point for the discussions and rating sessions held during the meeting.

## The Research Agenda Meeting

The Research Agenda meeting was held in July 1981, in a retreat environment in Virginia. The meeting plan, which included both small-group workshops and plenary sessions, was designed to facilitate discussion and evaluation of the research proposals and selection of the Research Agenda.

Since project participants had been selected, in part, on the basis of their diversity, there was no expectation for achieving complete agreement. Their diversity was reflected in the results of the pre-meeting ratings, in which the majority of proposed projects had attracted all five points on the rating scale that was used. At the meeting, emphasis was placed on communication among participants, to ensure that their different perspectives and value systems were shared, as the relative merits of individual projects projects and program areas were discussed. A number of criteria were applied in evaluating the projects, including their relevance to the field of library and information science, the plausibility and technical soundness of their methodology, their scope and size, and their potential impact. An important theme throughout the meeting was the need to achieve "balance" in the mix of projects that were to constitute the Research Agenda.

The initial ratings and discussions resulted in the selection of a preliminary set of 42 projects, out of a total of 101 candidates. This set included the top-rated projects in a number of areas; projects that were combined during the meeting to help represent multifaceted program areas; a few new projects developed at the meeting; and projects that were not top-rated but which, on further review by the group, were "upgraded" for consideration in the final ratings. A final set of ratings completed by each participant was tabulated and then reviewed by the entire group, to identify 20 Research Agenda projects. The rationale for establishing a target (of about 20 projects) was to ensure that, however difficult it was to make hard choices and specify priorities, it would be done.

## The Research Agenda

Exhibit 1 shows the final set of projects and combinations of projects selected for inclusion in the Research Agenda. No ranking is implied by the sequence of areas and projects. The project numbers, which were assigned sequentially to the project descriptions as they were received, are given to facilitate location of project summaries, provided in Appendix A. Full project descriptions are available in the Final Report.

Exhibit 2 shows the scope of the Research Agenda, within the total universe of projects and areas considered at the Research Agenda meeting. The display shows the Research Agenda projects (indicated with circled project numbers) in relation to the candidate projects in each category. A number of projects--both Agenda and non-Agenda--could be classified in more than one category but, for purposes of this display, they are represented only once. Brief summaries of the projects that are not included in the Research Agenda are provided in Appendix B.

Exhibit 1. Research Agenda Projects, by Number and Title (Part 1)

INFORMATION GENERATION AND PROVISION OF LIBRARY AND INFORMATION SERVICES

Electronic Generation, Storage, and Delivery of Information

03. Exploiting the True Capabilities of Electronic Publication

100. The Role of Libraries in Creating and Providing Viewtext Information Services (combining projects 79 and 80)

79. Role of the Community Library as Viewtext Information Provider

80. Impact of Viewtext Systems on Traditional Reference Functions of the Community Library

Use of Automation in "Reference-Desk" Services

04. An Online Network to Support Question Answering in Libraries

54. Information Transfer at an Online Reference Desk in a Public Library Setting--Design Considerations for Staff and Patron

INFORMATION USERS AND USES

Information Needs

09. Techniques for Marketing Library and Information Services

37. Consumer Behavior Research Applied to Libraries

64. From Childhood to Adolescence; Changing Information Needs

Information-Seeking Behaviors

55. Direct and Quick Information Retrieval Service in a School Setting

58. Information Seeking in High and Low Scatter Fields

Information Access and Use

18. Development of a Conceptual Framework for Observation of User Behavior with Online Information/Data Systems

19. The Influence of Selected Information Search Mechanisms on User Behavior

21. Evaluation of the Changing Needs of Online Search System Users as Influenced by Search Systems Experience

78. Impact of the "New Literacy" on the "Knowledge Gap" Between Demographic Groups

Exhibit 1. Research Agenda Projects, by Number and Title (Part 2)

ECONOMICS OF INFORMATION AND OF LIBRARY AND INFORMATION SERVICES

Costs of Library and Information Services

94. Costs and Cost Analysis of Library and Information Services (combining aspects of projects 17, 82, and 36)

    17. Elements of Cost in the Production and Dissemination of Information

    82. Cost-Accounting Standards

    36. Development of Cost and Performance Models for Evaluating Library Automation Programs

Funding of Publicly Suppported Library and Information Services

11. Alternative Funding Possibilities for Publicly Supported Library and Information Services

The Economic Value of Information and of Library and Information Services

31. Impact of Information on Industrial Productivity

32. Impact of Public Libraries on Community Productivity

84. Economic Value of Investment in Information

EDUCATION AND PROFESSIONAL ISSUES

97. Dissemination and Diffusion of Library and Information Science Research and Practice (combining projects 98, 42, 26, and 23)

    98. Analysis of Effective Researcher-Practitioner Linkages in the Library/Information Field

    42. Diffusion of Innovation in Librarianship

    26. "Pathfinders": The Diffusion of an Information Innovation

    23. Diffusion of Social/Behavioral Sciences Research Methods into Information System/Use Studies

47. A Study of Selected Organized Groups Which Actively Promote Censorship of Materials in Public Libraries and Schools

Exhibit 2. A Classification of Proposed and "Research Agenda" Projects* (Part 1)

| RESEARCH AREAS | PROJECT NUMBERS |
|---|---|
| **INFORMATION GENERATION AND PROVISION OF LIBRARY AND INFORMATION SERVICES** | |
| Electronic Generation, Storage, and Delivery of Information | (03), 05, 70, 71, 74, 76, 77, 83, 99, (100), (79+80), 101 |
| Automated Reference Services | (04), (54) |
| Information Dissemination--Research to Practice | 01 |
| Expansion of Community-Related Library and Information Services | 12, 35, 81 |
| **INFORMATION USERS AND USES** | |
| Information Needs | 07, 08, (09), 13, (37), (64) |
| Information-Seeking Behaviors | 24, (55), (58), 59, 92 |
| Information Access and Use | (18), (19), 20, (21), 41, 52, 53, 56, 57, 60, 62, 63, 69, 72, (78), 90, 91, 93 |
| **PLANNING AND EVALUATION OF LIBRARY AND INFORMATION SERVICES/SYSTEMS** | |
| Planning and Evaluation | 39, 50, 62, 66, 68 |
| Evaluation of Library and Information Service Effectiveness | 14, 15, 16, 25, 40, 45 |
| Collection Development and Preservation | 38, 75 |
| Library's Role in Government-Sponsored Dissemination | 96 |
| System Performance Measurements | 85 |
| Networks | 46 |
| Futures | 06, 43, 44, 73 |

*Research Agenda pr[illegible]bers are presented in circles.

**Exhibit 2.** A Classification of Proposed and "Research Agenda" Projects (Part 2)

| RESEARCH AREAS | PROJECT NUMBERS |
|---|---|
| ECONOMICS OF INFORMATION AND OF LIBRARY AND INFORMATION SERVICES | |
| Costs of Library and Information Services | (94) (17+82+36) |
| Funding of Publicly Supported Library and Information Services | (11), 33, 51, 95 |
| The Economic Value of Information and of Library and Information Services | (31), (32), (84) |
| Impact of Electronic Distribution on Conventional Library and Information Sources | 02 |
| Information Economy Theory | 10, 30, 49 |
| EDUCATION AND PROFESSIONAL ISSUES | |
| Dissemination and Diffusion of Library and Information Science Research and Practice | 34, (97) (98+42+26+23) |
| Education and Training | 28, 48, 88, 89 |
| Library and Information Science Research | 22, 27, 87 |
| Library and Information Science | 86 |
| Standards | 65 |
| Technology Utilization by Professional Groups | 67 |
| INTELLECTUAL FREEDOM | (47) |

Interpretation and Use of the Research Agenda

Although the Research Agenda does not represent "ready-to-fund" projects or a prescription that should be followed without further development or exercise of judgment, it does represent one carefully considered statement of proposed research priorities for the library and information science field, at this point in time. As such, it can properly be used to guide and support the allocation and targeting of present and prospective research funds.

The Research Agenda can serve a number of other useful purposes for OLLT and for the profession as a whole. One vitally important way in which it can be used is to stimulate further conceptualization of research needs and priorities in various areas of specialization such as those represented by various professional and trade associations concerned with library and information science. A highly desirable followup activity would be for groups of expert researchers and practitioners in those areas of specialization to review the Research Agenda projects, in light of their own priorities, and to develop in-depth statements about the research needs in their program area, using the Research Agenda projects (and, as well, those of potential merit that were not included in the Research Agenda) as illustrations of or inspiration for the types of project efforts that can meet those needs. Used in this way, the Research Agenda can help to provide immediate guidance to those institutions and agencies in the field that need and want such guidance in developing their own research agenda.

The special-interest reviews recommended above can also help to identify areas that may not be adequately represented in this Research Agenda. In using the Research Agenda in this way, it is important that the focus remain solidly on research. It is not enough to dwell on the importance and seriousness of a problem; we must translate our concerns into questions and/or hypotheses that can be addressed through research. This does not necessarily mean that the ideal study approaches can or must always be specified in advance. On particularly difficult issues,

preliminary work may be needed to develop appropriate theories and methodologies, if we are to break new ground in research.

One possible outcome from the dissemination and discussion of this Research Agenda could be the development and endorsement by the library and information science community of statements of national-level research priorities. It is not clear, however, from either a theoretical or practical standpoint, whether the various elements in the community can combine forces to define the most productive investments in research, to benefit all institutions and organizations concerned with the principles, theories, and effective practices in library and information services.

The Research Agenda project has drawn sharp attention to a compelling need to improve the dissemination of research results and to improve communication among researchers and between researchers and practitioners. There is also a need to draw the attention of potential research sponsors--both within and outside the library and information science community--to the need for research, to the likely payoff from well-targeted research, and to specific research needs such as those outlined in the Research Agenda. This document (and the Final Report) can be useful to various groups in communicating with potential sources of funding about research needs.

Finally, the process and results of the Research Agenda project may draw attention to the need in our profession to improve our capacity to conduct research and our capacity to interpret and use research findings. If we do not work to develop those capacities, the research ideas expressed in the Research Agenda are not likely to be executed well, and the results of research will not be translated into more effective library and information services. Critical discussion and debate now on these and other challenges highlighted in this report can help to stimulate a revitalized and healthy climate for research in our field for years to come.

## DESCRIPTIONS OF RESEARCH PROJECTS

Each of the 15 researchers among the 26 project participants prepared, in draft form, descriptions of approximately six proposed research projects, for review in advance of the Research Agenda meeting. Each of the 88 project descriptions was approximately five pages in length and included a background statement on the problem area being addressed, with references to relevant ongoing or prior research; purpose and objectives, including the research questions and hypotheses to be studied; the study approach (e.g., an experiment or survey); and estimated costs, in terms of professional person-years and any extraordinary expenses.

Descriptions of another 13 projects, covering new topics and/or program areas (represented by combinations of projects among the original set) were developed and evaluated at the meeting.

Appendix A contains one-page summaries of the Research Agenda projects. Appendix B contains brief summaries of the other proposed projects that were considered at the Research Agenda meeting.

## APPENDIX A

## SUMMARIES OF RESEARCH AGENDA PROJECTS

PROJECT 03: EXPLOITING THE TRUE CAPABILITIES OF ELECTRONIC PUBLICATION

Background: The application of computers to any activity usually proceeds through two major stages:

(1) Performing electronically some task that was previously performed manually. The capability may be enhanced, the efficiency improved, or the costs reduced, but the activity remains essentially the same.

(2) Applying electronics to do things not possible in the manual mode of operation.

In the application of electronics to publishing, we still seem to be in the first of these stages. An electronic publication today is little more than printed pages displayable on a screen.

Purpose and Objectives: At the present stage of development, it is very difficult to demonstrate the real potential value of electronic publication and to show that a properly conceived electronic publication could be an order of magnitude more effective than one printed on paper.

The purpose of the proposed study is to demonstrate what a publication designed specifically for electronic access would look like. At the same time, the study would experiment with alternative methods of information presentation and would measure user response to these alternatives.

Methodology: Demonstration, experimentation, and user reaction studies are proposed. Capabilities offered by the electronic medium that are not available in print media include: flexible, re-organizable text (i.e., a form of "hypertext"); dynamic analog models of operations and activities; sound output; inclusion of access to programs, where such programs have been used in a research project, and raw data, allowing the user of the publication to derive new results by plugging in alternative variables.

Since the project is a research--rather than an implementation--project, it will involve experimentation with a number of methods of presenting information. One could visualize a textbook in which the sequence can be re-organized to suit each reader, the contents can be indexed by each reader, reader and instructor notes (including to each other) can be incorporated, and so on.

Many of these capabilities already exist within systems of computer-aided instruction (e.g., PLATO), so this type of system would provide a hospitable environment for such a project. The whole project may best be performed within an academic community in which three different faculty teams would work independently on three (publication-related) subprojects. For each prototype publication, it would be necessary to establish a suitable audience willing to use the publication, evaluate alternative methods for presenting information, and provide reaction.

Cost: Proposed cost is difficult to estimate because of many imponderables, e.g.: Would all contributors require payment? How many articles would be needed to form a useful nucleus? How much text is needed?. The cost, over three years, might well be $1.5M.

PROJECT 04: AN ONLINE NETWORK TO SUPPORT QUESTION ANSWERING IN LIBRARIES

Background: While online systems have had a profound effect on the literature-searching activities of libraries, they have so far had a negligible impact on the other major component of reference service, namely the answering of factual-type questions. There seems to be little doubt that an online cooperative network that could substantially raise the level of question-answering services in libraries could now be implemented.

Purpose and Objectives: The purpose of the proposed study is simply to demonstrate that an online cooperative network to support question-answering is viable, including economically viable, and that it has the potential to improve substantially the quality of reference services in libraries of all types. The beneficiaries will be the libraries and their users.

Methodology: A demonstration and market research project is proposed. The first step would be to build a nucleus database to get the project moving. A suitable approach would be to build this nucleus from existing card files maintained by one or more large public libraries (e.g. in Chicago) or regional reference libraries. A single record might consist of the text of the question posed, the answer supplied, source of the answer (bibliographic or other), date of the record, and symbol for the contributing library. The file would not be indexed but would be searchable on keywords in questions and in answers. A KWIC-type display would probably be useful.

Once the initial file is created, it would be made widely accessible to potential user libraries. This might be done through an existing network, such as OCLC, or through one or more of the commercial services, such as BRS, Lockheed, or SDC.

For the feasibility study, a relatively small number of libraries would be invited to participate. Large public libraries would be obvious candidates. In the long run, however, the strength of the enterprise would depend on wholesale involvement of libraries of all types.

Participation in the project would involve: use of the file as a prime source for question-answering, adding new records to the file as new questions arise in cooperating libraries, and evaluating the use of the file and maintaining time/cost figures.

In the long term, such a file would be self-supporting, since libraries would be subscribers. Presumably, the libraries adding records would receive some financial credit. This file could eventually become the single most important source for question-answering in libraries of all types. It could reduce the size of reference collections in print-on-paper form and greatly improve the overall quality of reference service, especially in small libraries.

Cost: Cost would depend on the size of the initial file, the number of participating libraries and many other variables and considerations, e.g., whether the full costs of the project would be borne by the project or shared with the participants, perhaps through access fees. A two-year demonstration/experimentation/market research project, including cost of file file editing and conversion, might be supported for about $500,000.

PROJECT 09: TECHNIQUES FOR MARKETING LIBRARY AND INFORMATION SERVICES

Background: Library management should take a lesson from private business and view the information-seeking public as potential consumers who are to be drawn actively to the library through more attractive services and more extensive marketing strategies. Current efforts in library marketing are insufficient and ineffective. Libraries must be aware of, and must possess the competency to use, relevant business-oriented competitive marketing techniques, with or without modifications.

The proposed project will attempt to bring together a body of literature to support and defend the need to use modern marketing techniques in promoting library information services. It is recognized that the first step in modernization must take place in the area of attitudes, inclinations, and perceptions of library information professionals.

Marketing is not seen to be a cure-all. It can achieve maximum effectiveness only in conjunction with an actual program of innovation and development in available library services, just as any advertising is most persuasive when the product itself is worth buying.

Purpose and Objectives: This project has multiple purposes. The ultimate one is to make safe the expansion and development of libraries, in the face of a fiscally uncertain, foreboding future. It would attempt this through the advocacy of a more prominent role for libraries in serving the basic needs of the community, since, if the libraries must in some places compete with essential services such as fire and police departments, the willingness of the taxpayers to support these institutions is directly proportional to their perceived benefit from that institution.

The immediate objectives of such a project include: identification of viable marketing research techniques; determination of those that can be used "as-is" by non-profit organizations such as libraries, those that should be employed with modifications, and those that are of no real relevance to libraries; formulation of library marketing strategies in coping with competition; and heightening of the librarians' awareness of the importance of modern marketing techniques.

Methodology. Phase I will synthesize information available through formal and informal sources, including experts in fields such as business administration and management. It will also include a thorough literature search on library marketing practices. Emphasis will be placed on strategies for competitive marketing, since libraries face abundant competition.

Phase II will be exploratory research involving case studies of libraries that have employed aggressive marketing strategies in selling and promoting their services and in examination of the impact of those strategies. On-site interview techniques will probably be an appropriate methodology.

Cost: Because of the interdisciplinary, cooperative nature of the project, it is expected that no meaningful results could be accomplished without funding of at least two professional person-years.

PROJECT 11: ALTERNATIVE FUNDING POSSIBILITIES FOR PUBLICLY SUPPORTED LIBRARY AND INFORMATION SERVICES

Background: American libraries face a grim fiscal situation. Made vulnerable by long-term dependence on local tax sources, libraries are reeling from successive budget cuts. Perhaps the only solution that truly cuts to the heart of the problem is developing sources of revenue outside the taxpaying cycle. One alternative that has been largely ignored is charging some kind of fee to certain segments of the library's clientele for the use of some services. Doing so could at least offer some security, while allowing libraries to expand their services more than ever before.

If fee libraries are, at least partially, a viable alternative for fiscally pressured institutions, it is clearly essential that studies be conducted as soon as possible to assess the relevance of different modes of the fee approach and other alternative funding approaches to different situations.

Purpose and Objectives: One of the first objectives of this proposed project is to conduct empirical research that will open the eyes of library managers to the great potential of this form of alternative funding. The survey would attempt to show that a fiscally-vital library offering more extensive and responsive services would be of more value to the whole community than a financially-crippled one.

The project would explore the viability of a battery of alternative funding options currently open to library managers in the United States. If a cogent and well-designed reorganization were initiated, including fee library programs, this would lead to a vastly increased level of library responsiveness to community needs, to a greater interchange of empathy, perceptions, and feedback between the library and information consumers, and to enhanced involvement of the library in community affairs, which would, in turn, make taxpayers more willing to help support the library.

The survey will seek to answer the body of questions surrounding the issue of alternative funding:

- What exists?
- What is best for my situation?
- What is the feasibility of several of the options?
- If libraries are to charge, who should be charged and for what?

Methodology: The proposed project could usefully take any of several forms. It could either be a survey or a more evaluative study--one that would examine, analyze, and assess the effect of fee-charging on all aspects of library functioning, including relations with the community and government, possible effects upon managerial structures, and the potential impact upon services and organization. Survey methodologies using mail questionnaires would probably be most appropriate for this investigation.

Cost. This is a rather involved research project. To be able to conduct a meaningful project with a reasonable sample size, costs involving at least three professional-person years must be expected.

PROJECT 18: DEVELOPMENT OF A CONCEPTUAL FRAMEWORK FOR OBSERVATION OF USER BEHAVIOR WITH ONLINE INFORMATION/DATA SYSTEMS (a revision)

Background. Within the past few years, techniques that have been suggested to improve user-information system interaction draw upon data collected on the actual behavior of users confronted with real retrieval systems. However, the absence of any consistent measurement approach makes correlations across systems and studies impractical.

A project at the National Bureau of Standards identified over fifty variables involving time, length, and rates of interaction. This suggests a framework for general data that can be used in studying the user interface across many types of interactive systems and that is based on a stimulus-acknowledgement-response model of human-computer interaction.

The proposed project should result in an expanded conceptual framework or model that is (1) based upon a behavioral-science view of the communication process and (2) focused on providing a consistent interpretation for user-system interaction variables.

Purpose and Objectives. The objectives of this study are:

- to develop a behavioral-oriented model or conceptual framework that can be used for developing observational measures of user behavior vis-a-vis online information/data systems

- relate the components of the framework or model to specific areas of system design/operation in order to demonstrate the role of observational data in improving system performance

Methodology.

Phase 1 (3 months) involves Data Collection and Evaluation and will produce a comprehensive review of existing research and data on online user behavior.

Phase 2 (5 months) involves Conceptual Framework Development. A conceptual framework will be developed for analysis and presentation of user behavior data. This framework will include identification and interpretation of significant variables, as well as guidelines for their consistent capture and analysis. The framework or model to be developed will be communication-process-oriented and will encompass variables reflecting user and system conditions and interactions.

Phase 3 (3 months) involves Incorporation of Sample Data Within Framework. Examples of observational data will be incorporated into the framework, drawing from published works as well as available raw data. By incorporating samples of existing data into the developed framework, the usefulness of the framework in comparing results across studies will be demonstrated.

Cost. The estimated requirements to conduct the study are: information scientists (1.5 FTE over 12 months, in Phases 1,2,3); reference librarian (1 FTE over 3 months, in Phase 1); secretary (.25 FTE over 12 months, in Phases 1,2,3); graduate research assistant (1.5 FTE over 12 months, in Phases 1,2,3); and additional expenses: $ 5,000.

PROJECT 19: THE INFLUENCE OF SELECTED INFORMATION SEARCH MECHANISMS ON USER BEHAVIOR (a revision)

Background: While a number of different search mechanisms are being designed for information search and retrieval, very little is known about how the different mechanisms influence the underlying patterns of human information-seeking behavior.

As systems proliferate, it is possible that users retain a "core-concept" of information-seeking methods and use each system on the basis of this approach. If this is the case, then system designers need to understand what this "core-concept" is. Furthermore, the existence of common search behavior patterns across significantly different system designs could be of major importance to system designers.

Purpose and Objectives. Two questions are posed in this study:

(1) How does the fundamental design of the search mechanism influence user behavior vis-a-vis online interaction?

(2) What invariants and/or commonalities in user/system interaction patterns exist across distinctly different search mechanisms?

The objective of this study is to answer these two questions in terms that can be of use to system designers, search trainers, and end users.

Methodology. The scope of the proposed study, to be carried out in four phases, is limited to four search mechanisms: menu-oriented retrieval, command-oriented keyword with controlled vocabulary, command-oriented full-text keyword, and natural language. The data should be analyzed on the basis of user interaction variables that could be applied across additional systems in the future. Fundamental variables include: session length, interactions per session, interactions per minute, and proportion of each session spent doing various classes of activities.

In Phase 1 (4 months) the four proposed interfaces (based on existing interfaces from other systems with no new interface design) will be selected and simulated.

In Phase 2 (2 months) searchers will be selected for the experiment and trained to search across all four systems. At the same time, a set of queries will be designed to be used in the experiment.

In Phase 3 (2 months) a set of searches will be conducted across all four system types by each of the trained searchers. The searches will be ordered for each searcher to test for order effects.

In Phase 4 (4 months) analysis and presentation of the data will occur.

Cost. The estimated requirements to conduct this study are: information scientist (1 FTE over 12 months, in Phases 1,2,3,4); computer programmer (1 FTE over 4 months, in Phase 1); statistical analyst (.5 FTE over 6 months, in Phases 2,4); graduate research assistant (2 FTE over 12 months, in Phases 1,2,3,4); and additional expenses (e.g. computer time, searcher compensation): $ 7,300.

PROJECT 21: EVALUATION OF THE CHANGING NEEDS OF ONLINE SEARCH SYSTEM USERS AS INFLUENCED BY SEARCH SYSTEMS EXPERIENCE

Background. System designers are becoming more and more concerned with the "naive" or "casual" user, i.e., user types who are unlikely to have the knowledge of, or take the time to learn, sophisticated system procedures. At some points, it is conjectured, many users may wish to change their approach to information system use and begin to exercise more sophisticated system options. This "maturation" process can vary across users and systems and may require that systems have at least two modes of operation or a continuum of complexity and sophistication, in order to serve both naive and casual users, as well as sophisticated users.

Purpose and Objectives. Two research questions are posed in this study: (1) How does user behavior change with respect to online system use, as a function of experience gained with the system? and (2) What implications does any change in behavior have on system design?

Methodology. A sample of users will be selected who are just being trained on a particular system. This group of subjects will be tracked over a fixed period of time (possibly 9 to 12 months) and their search behavior will be recorded. In addition, their attitudes towards the selected system and any other training or other system experience will be documented by means of a series of questionnaires administered over the test period. The results will be analyzed through time series analysis, and significant variables contributing to any observed change in search behavior or measured change in attitude will be sought.

The critical factors to be resolved in the study design are system selection, number of subjects in sample, and attitudinal measures.

The major phases of this project are:

Phase 1 (6 mos.): System/sample selection and instrument design.

Phase 2 (2 mos.): Sample subject measurement and training.

Phase 3 (12 mos.): Measurement of system use and attitudinal change over time.

Phase 4 (4 mos.): Data analysis and evaluation.

The results of this study will be analyzed to provide system designers with insight into the changing needs/perceptions of users with respect to system features and the user interface.

Cost. The estimated requirements to conduct this study are: information scientist (1 FTE over 24 months, in Phases 1,2,3,4); behavioral scientist (.5 FTE over 19 months, in Phases 1,4); graduate assistant (2 FTE over 24 months, in Phases 1,2,3,4); secretary (.25 FTE over 24 months, in Phases 1,2,3,4); and additional expenses (e.g. communications, travel): $ 4,000.

PROJECT 31: IMPACT OF INFORMATION ON INDUSTRIAL PRODUCTIVITY

Background: Since 1972 the productivity growth rate of U.S. industries has dropped to only 1 percent per year, down from 3.2 percent per year in the period betwen 1948 and 1965. At the same time, our competitors in the world market have enjoyed increasing productivity growth rates. This shift is causing serious concern among U.S. economists and policy makers, since it affects our international balance of trade and the real value of goods and services produced and consumed domestically.

One part of the market, the information sector, is doing well. A recent Harvard study showed that 25 percent of the total productivity growth in American industry is a result of the growth of information industries.

A great deal of effort has gone into measuring the size and impact of the primary information industries (those that sell information goods and services to other firms, individuals, governments, etc.); yet very little has been done to measure the impact of information as an element of production. While many feel that there is a positive correlation between an investment in information goods and services and productivity growth, there are also data that suggest that, in some industries, the use of information technology may in fact contribute to productivity loss.

Purpose and Objectives: The objectives of this research are:

- A comparison of growth rates of productivity in selected key industries with corresponding rates of investments and expenditures in information goods and services within those industries.

- A comparison of these data with matching industries in other selected industrial countries.

- An analysis of data on expenditures and productivity, to provide a cross-industrial and international comparison of growth rates of information-related investments and productivity.

Methodology: This research will test the hypothesis that changes in investments and expenditures for information goods and services are related to changes in productivity, and that this relationship can be revealed by comparing these variables over time, across industries, and between countries.

The general approach is to collect data on productivity and investments in information goods and services by industry. This procedure will require a refinement of the definitions of productivity and information goods and services. In addition, industries must be selected with care and existing data examined to establish adequacy. Industries should be selected on the basis of several criteria: (1) availability of data; (2) impact on U. S. balance of trade; and (3) variety. In any event, one industry should be in the high-technology category, one should be a service industry, and one should be agricultural.

Cost: Approximately 3 person-years should be required to refine the project and collect and analyze the data.

PROJECT 32: IMPACT OF PUBLIC LIBRARIES ON COMMUNITY PRODUCTIVITY

Background. Productivity is usually defined as either output per unit of input or output per worker-hour. It is a measure of the efficiency of the production function and is commonly used by firms, industries, and nations as an indication of economic health.

Defining productivity for the public sector has proved to be quite difficult, across the board. There have been several studies that have dealt with the problem of measuring library effectiveness. By and large, these efforts have focused on the relationship between inputs (books, periodical subscriptions, staff, etc.) and outputs (circulation, reference questions answered, referrals, etc.). While this is a respected approach to the problem and enables us to compare libraries, it tells us little about the economic contribution that a library might make to a community.

In addition, the Urban Institute, in conjunction with the National Commission on Productivity, undertook a four-part study of local government productivity and arrived at the conclusion that output should be measured in terms of consequences.

Purpose and Objectives: The goal of this research is to develop and test a model for measuring the impact of the public library on community productivity. The objectives of this study are to:

- Identify all library outputs
- Identify all parts of the community effected by outputs
- Quantify impacts
- Compare the above with inputs to library
- Analyze and develop model

Methodology: Every effort should be made to take advantage of techniques that have been developed to measure the productivity of other local government agencies.

Stage 1, Refine Methodology, involves identification of all data collection points, which is critical to this research. While the usual service units mentioned above are obvious, libraries may also contribute in more passive ways.

Stage 2, Data Collection, will undoubtedly require a survey designed with great care and sensitivity. Telephone contact will not be overlooked and the community at large will be sampled to discover any economic impacts that may not be obvious from contact with users.

Stage 3, Analysis, involves the analysis of the survey data, and the assignment of value to various types of impacts. Comparisons will be made with level of support in general and by type of service.

Cost: If done properly, by a team of researchers with strong backgrounds in economics, library science, local government finance, and public policy analysis, this should be a 2- to 3- year project requiring about 3 professional person-years, plus appropriate clerical support.

PROJECT 37: CONSUMER BEHAVIOR RESEARCH APPLIED TO LIBRARIES

Background: The use of market research techniques by libraries to understand better the needs of users and potential users is regularly cited as having great potential payoff. Numerous user studies have been conducted, but the findings appear to contribute little to planned changes in services, resources, and management of the libraries conducting the surveys.

The concepts of marketing go far beyond the basic idea of describing the market, which is what most library surveys do. The modern marketing concept stresses identifying peoples' needs and offering products and services to satisfy those needs.

An area that offers promise to libraries is consumer behavior, defined by Engel, Blackwell, and Kollat in their book, Consumer Behavior, as the "acts of individuals directly involved in obtaining and using economic goods and services, including the decision processes that precede and determine these acts." This relatively new field in marketing emphasizes the understanding of customer motivation and behavior.

Purpose and Objectives: The purpose of this project is to review the field of consumer research, identify the most promising areas, and test applications in one community. Of particular interest is the prediction of library user behavior on the basis of psychographic variables such as life style, attitudes, and behavior patterns. Research questions include:

(1) What are the most promising consumer behavior models for studying library user behavior?
(2) What is the most meaningful way to segment the community, for library purposes?
(3) What is the likely effect of increased promotion of library services?
(4) What are the anticipated benefits from libraries' becoming more marketing-oriented?
(5) How will citizens react to the adoption of marketing techniques by libraries?
(6) What is the impact of marketing on library funding, organization, staffing?

Methodology: The study involves the following tasks:

(1) Review consumer behavior models.
(2) Adapt the most promising model to the library field.
(3) Prepare interim report discussing the review of consumer behavior models and the recommended model for library research.
(4) Test the model in a single library community
(5) Prepare report on the application of consumer-behavior models to library research.

For the study to succeed, the researchers must have previous experience in consumer behavior.

Cost: The proposed project will require 2 1/2 to 3 person-years of professional effort.

PROJECT 47: A STUDY OF SELECTED ORGANIZED GROUPS WHICH ACTIVELY PROMOTE CENSORSHIP OF MATERIALS IN PUBLIC LIBRARIES AND SCHOOLS

Background: Reported censorship incidents in libraries and schools have increased greatly in the last few years. The ALA Office of Intellectual Freedom reported a five-fold increase in censorship complaints after the November 1980 election. They further indicate that the number of censorship reports they receive involving public libraries have grown from 10 percent to 20-to-30 percent in the last three years.

Major factors influencing the increase in censorship incidents appear to be organizational ability and sophisticated techniques used by national, state and local groups who promote censorship of materials in libraries and schools.

Those who would prepare before the censor comes, as he/she/they surely will, in this conservative climate, must be aware of how the censor operates and who he/she is, in order to plan an effective strategy to counteract this insidious influence and promote intellectual freedom for everyone in a community. This study attempts to help librarians to gain the information necessary to develop more effective strategies.

Purpose and Objectives: The objectives of this research study are (1) to gather information about the characteristics, purposes, perceived tangible effects, and strategies of selected major organized pro-censorship groups that have attempted to censor materials in public libraries and/or schools; (2) to assess selected demographic, social-psychological, political, and participatory characteristics of the leaders of this movement and to compare them with the same characteristics of leaders in anti-censorship organizations, to determine differences and similarities; (3) to identify the methods used to combat pro-censorship forces in particular localities; and (4) to ascertain whether censorship campaigns move through predictable stages.

Methodology: This research study utilizes three basic field research techniques (document search, informal and unstructured interviews, and formal and structured interviews) to investigate selected pro-censorship organizations, their tactics and strategies, methods that have been used to combat these efforts, and differences and similarities between censors and non-censors.

Organizational documents, newspaper accounts, and other items will be used to collect basic data to answer the research questions posed in this study. Unstructured and structured interviews with organization leaders and other major participants in censorship incidents will also be used to obtain needed information. The structured interview items will be composed of informational inquiries and items assessing social-psychological characteristics drawn from various validated scales dealing with topics such as political intolerance and attitude toward censorship. The unstructured interviews will focus on eliciting information not obtained from other sources.

Cost: This study will require one and one-half person years. Additional direct expenses will be incurred for interviews and document analysis.

PROJECT 54: INFORMATION TRANSFER AT AN ONLINE REFERENCE DESK IN A PUBLIC LIBRARY SETTING--DESIGN CONSIDERATIONS FOR STAFF AND PATRON

Background: Questions have been raised about the ways in which reference work in a library will change, now that we have fee-based literature searching, online interlibrary loan, online circulation, and online catalogs. Some people have tried to analyze existing service and show all of these changes as a mere extension of existing service, while others have said that they will make a qualitative and substantive difference.

Purpose and Objectives: For census purposes, it seems necessary to itemize and categorize typical reference service activities in public libraries, to itemize and assess possible machine-aided tools for these activities, and to suggest some means of developing a machine-based reference-service environment, complete with merged databases of more than bibliographic reference tools, possibly incorporating dictionaries, handbooks, and encyclopedias for ready online access and question-searching.

The objective of this research is to understand what does and might exist at a public library reference desk, if the full capability of the information industry were integrated and placed at the disposal of the reference staff and the patron.

Methodology:

(1) By review of the literature on reference service in public libraries, compilation of statistics of these activities, and case studies, develop a categorized census of the reference works most often cited and the user questions most often asked of reference staffs.

(2) Check the availability of these items in machine-readable form and the economics of generating a combined database of these tools with retrieval capability superior to Channel 2000, New York Times Information Bank, NEXIS, and Paper Chase.

(3) Develop a prototype system that could exemplify the type of service possible at a reference desk by such an augmented reference collection. Tie this to an existing circulation, catalog, and interlibrary lending system.

(4) Working with software specialists, human factors engineers, systems analysts, and librarians, develop the design specifications for a system that could handle 25 to 40 percent of the activity around a typical reference desk, including telephone inquiries.

(5) Have these design specifications reviewed by librarians and other information specialists from non-participating libraries who would be representative of the public library community that could be affected by these developments.

Cost: Steps 1 to 3 will require at least three years of effort by the Principal Investigator. Steps 3 and 4 will require consultants (2 years FTE) and clientele participation. Two to six months are required to do step 5.

PROJECT 55: DIRECT AND QUICK INFORMATION RETRIEVAL SERVICE IN A SCHOOL SETTING

Background: Years ago a group at MIT experimented with a "knowledgeable information system" and a group of teen-age boys. They presented these boys with a typewriter console and microphone and told them that they could ask any questions they liked. The information system (really a room of top-grade physicists and engineers in the next room) recorded their questions and tried to respond on the typewriter console. By this means the information system designers hoped to learn how people really want to ask questions and what we might have to do to answer them.

The proposed research could open up that interaction one more time, in a set of representative schools across the country, and the findings might tell us if the present menu-driven computer systems or new systems need to be designed for direct and quick question-answering systems for the general public, for children, for the next generation of Americans.

Purpose and Objectives: This study would provide valuable insight into the way young people ask questions, the topics in which they are interested, and how information services might be re-designed with the aid of computer-based information systems technology that could be piped into the home, the school, the library, etc. The limitations of the existing developments could be noted and some reflection and recommendations could suggest new avenues of research.

This study would be useful to system designers, librarians, information entrepreneurs and, eventually, even the information seeker.

Methodology:

(1) Review and revise the experimental design of the original MIT study, taking into account existing capabilities and technologies.

(2) Prepare the identical research environment in several locations: metropolitan, suburban, rural, elementary and secondary levels.

(3) Gather data on these interactions and codify the similarities and necessary equipment for successful responses.

(4) Do failure analysis and user acceptance of the service.

(5) Develop a "wants" list for system development of a quick and direct user information service for the population aged 10 to 16. Incorporate in this any database developments that might be needed.

(6) Publicize the findings.

Cost: Includes a two-year effort for the Principal Investigator; the equivalent of two years FTE for consultants who form the "invisible" information system; related costs for teams or transporting of research environment for at least four different locations; some computer costs; support staff for literature review, report writing, etc.

PROJECT 58: INFORMATION SEEKING IN HIGH AND LOW SCATTER FIELDS

Background: Mote defines low-scatter fields as those in which "the underlying principles are well developed, the literature is well organized, and the width of the subject area is fairly well defined." In high-scatter fields the number of different subjects is great and the organization of the literature is almost non-existent. The medium group falls in between, in degree of structure.

Mote's and other studies suggest that degree of scatter may be a very important variable in determining researchers' information-seeking behavior. It may, for example, account for far more variance in search behavior than subject discipline.

Purpose and Objectives: Two studies are proposed:

(1) A study of how people in low- and high-scatter fields do search

(2) A study comparatively testing methods of optimizing information-gathering when the field is high- or low-scatter, i.e., testing how people should search.

The objectives of these studies are (1) to increase our scientific knowledge about this potentially important (i.e., influential) factor in information-seeking behavior, and (2) to determine, where possible, optimal seeking strategies for researchers in high- and low-scatter fields.

Methodology: The first study would address the question: Do people in high-scatter fields exhibit different information-seeking behavior from people in low-scatter fields? This can be done by studying the information-seeking behavior of scientists in closely related fields. It would be desirable to use two pairs of fields, in case the chosen pair has unknown idiosyncrasies.

A modest sample of researchers--say about 20--could be studied in each of the four fields. Researchers should also be drawn from more than one institution, to eliminate biases due to pecularities of the institutions or their personnel policies. The study should be at least modestly longitudinal-- perhaps three months--using diary or periodic interview techniques, to get a sense of both the variety and amount of information-seeking done.

Since a previous study dealt with current awareness, it would be interesting to focus the second study on retrospective information needs. Real information needs of people in high- and low-scatter fields should be used in the testing. The basic approach in this study is to take two sets of real retrospective information needs, one set from people in high-scatter fields and one from people in low-scatter fields, and have experienced searchers search questions involved, by several methods.

Cost: The project requires: 1 Ph.D. (Principal Investigator) 40 percent time during the academic year and full time in summer, 15 months overall; 2 M.L.S. full time over 11 months each; 1 to 2 Research Assistants, 40 percent time each; 100 hours of online database search time @ $100 per hour ($10,000); and 20,000 citations printed offline @ $.10 each ($2,000).

PROJECT 64: FROM CHILDHOOD TO ADOLESCENCE; CHANGING INFORMATION NEEDS

Background: School and children's librarians frequently comment on the sharp drop-off in reading activities and use of the library, as children enter puberty, around the seventh or eighth grade. Because of the possibilities and uncertainties in their environment at this time, it is a period when information-seeking activity may be potentially as high as it ever will be. There are numerous studies of information-seeking behavior in adults but only a very few studies that focus on children and on adolescents, in particular. These are often confined to reading and library use.

Purpose and Objectives: The objectives of the proposed research are to test empirically some of the assumptions about information needs in early adolescence and, in particular, to determine whether formal instruction on information-gathering makes a difference in strategies for obtaining information.

Methodology. *Dervin suggests that information needs should be studied by focusing on the individual and the situations that confront the individual. She suggests that information is not a constant but, rather, a flexible term defined by the individual for him/herself. In this respect, Dervin makes a distinction between objective information, which describes external reality, and subjective information, which describes the meanings imputed to reality by people. She also uses situation analysis as a means for determining real information needs.

For the proposed project, a modification of Dervin's questionnaire would be used, in particular, that aspect that deals with the analysis of situations. Information-seeking behavior will be assessed by eliciting responses to five questions for each case where the individual tried to find out something, or learn, or come to understand.

(1) How hard was the information to find?
(2) How did you go about finding it?
(3) Did you succeed in finding it?
(4) Did finding it help?
(5) How did it help? Why didn't it help?

The questionnaire would probably best be administered in personal interviews. A large sample, approximately 300 to 500 students, from a variety of settings, would be useful for a first attempt.

Cost: Two and one-half professional person-years, with appropriate clerical and technical support, plus two to three interviewers for six-month stints, should be sufficient. Significant amounts of computer time for data analysis would also be required.

*Dervin, Brenda, et al. The Development of Strategies for Dealing with the Information Needs of Urban Residents: Phase I - Citizen Survey. Final Report on Project #L0035JA, Grant #OEG-0-74-7308 to U.S. Dept. of Health, Education and Welfare, Office of Education, April 1976.

PROJECT 78: IMPACT OF THE "NEW LITERACY" ON THE "KNOWLEDGE GAP" BETWEEN DEMOGRAPHIC GROUPS

Background: Some researchers have written about the "knowledge gap" between demographic groups in American and other societies where exposure to information media (although not entertainment media) is highly correlated with education and socioeconomic status. Some social researchers predict that the knowledge gap will be narrowed by the introduction of information media that require less processing skill than books, magazines, and newspapers. Other social researchers point to the fact that use of all information media is intercorrelated: the most active users of each new information medium are the active users of previous information media. Most empirical evidence supports the second point of view.

The "second generation" electronic media of viewtext systems (see definition in Project 100) seem to offer little hope for narrowing the knowledge gap. These systems require not only literacy but a "new literacy" that combines reading skill with some understanding of computer-stored information files.

Purpose and Objectives: Public-service stakeholders should be concerned about the equity implications of viewtext systems. If public funds are spent on projects such as converting community library files for viewtext distribution, will this only add to the riches of the information "haves," while not offering the information "have nots" more than a hypothetical benefit? Can viewtext services narrow the knowledge gap? If so, under what circumstances?

Methodology: Field research on the use and non-use of viewtext services is proposed. Samples, instruments, and analyses must help to answer three related questions. First, does the decision to acquire viewtext home information services have demographic correlates? Second, do viewtext adopters make more use of other information media than viewtext non-adopters? Third, controlling statistically for other demographic and media-use variables, is there an increasing or decreasing knowledge gap (variance of knowledge means by demographic group) in communities where viewtext services have been extensively adopted for a period of a year or longer?

Survey data could be collected to answer the first two questions at this time. However, the preconditions of the third question will not be met until 1982, when several viewtext systems pass their first birthday.

Once viewtext adoption reaches the level of 5 to 10 percent of all households, which may take another five years, broadly representative data bearing on the third question can be collected by placing one or two pages of questions on a national-sample "omnibus" survey.

Cost: Preliminary analyses of viewtext adoption, based on completed or ongoing studies will cost about $25,000 (a good doctoral dissertation project). Generating new survey data capable of addressing all three questions will cost about $150,000. The professional person-year requirements are 0.5 and 1.0 years, respectively. Total cost: $265,000.

PROJECT 84: ECONOMIC VALUE OF INVESTMENT IN INFORMATION

Background: Over the past couple of years, research has been conducted to examine the economic value of information, first by applying "production models" (the Cobb-Douglas model in particular) to libraries and, second, by applying similar analyses to the Marc Porat data and related data on the "information economy." The results from those studies are clear, consistent and robust. They unequivocably show that there is a positive return to productivity and to profit from an investment in information services. They also show that U.S. industry is under-utilizing the information resources available. That is, the use of information in U.S. industry is significantly less than optimum.

Purpose and Objectives: The purpose of the research is to establish a methodology for evaluation of the economic value of investment in information resources, products and services.

Methodology: The study approach is a continuation of the present methodology, in which the "input-output" statistics showing the purchases of each industry from every other industry are analyzed in the context of models for return to profit (or to "value-added" or to "contribution to gross national product"), to determine the effects of investment in different types of resources.

The data for specific categories of industry are available from national industry statistics, for the U.S. and for other countries. Those data would need to be acquired, placed on a consistent basis, and analyzed. The analysis at this stage is quite straightforward and replicable from the present study approach. Other methods of analysis, designed to test the robustness of the results, the effects of different categorization of industry, etc., would need to be carried out.

The project is multidisciplinary by its nature, requiring economists as well as information scientists.

Cost: A level of four person-years, over a two-year period, should yield results that will test the validity of current results and, if valid, show their applicabillity.

PROJECT 94: COSTS AND COST ANALYSIS OF LIBRARY AND INFORMATION SERVICES
(Combines aspects of Projects 17, 82 and 36)

Background: We need accurate, reliable, consistent cost data for internal management and inter-institutional comparison. We presently lack the accounting standards and practices for providing such data in libraries.

Purpose and Objectives: The purpose of this project is to establish standards for recording and reporting cost data in libraries.

Methodology: Phase I is to establish standard accounting practices (see Projects 82 and 17). Phase II is to use them to establish standard unit costs. Phase III is to apply them to a particular type of management decision--the automation decision (see Project 36).

Description of Component Projects

COMPONENT PROJECT 17: ELEMENTS OF COST IN THE PRODUCTION AND DISSEMINATION OF INFORMATION

Background: Techniques for the identification and measurement of unit costs are well developed throughout industry and society, and there is no reason to suppose that they will not fit at least some library functions.

Purpose and Objectives: The project seeks to identify a set of universally accepted procedures for collecting and projecting unit costs in libraries.

Methodology: It is suggested that a task force of selected librarians and cost analysts identify and tag all of the elements of cost in specific library operations.

Cost: The identification and acceptance of cost elements in certain library operations such as technical processing, circulation, and interlibrary loan will cost anywhere from $100,000 to $350,000.

COMPONENT PROJECT 82: COST-ACCOUNTING STANDARDS

Background: Currently, data on the costs of library operations are difficult to obtain, inconsistent among institutions and over various time periods, and not based on any standards for accounting practice.

Methodology: Three major steps are involved in carrying out this project. They each involve essentially "survey" (of present operations) and "review" (of the existing published material).

(1) Review of current industrial accounting practices and standards as they apply to these issues--either directly or analogously.

(2) Review of current accounting practices in libraries and other information activities, to establish present patterns and bench-mark cost data.

(3) Reconciliation of cost data as reported in the literature with the practices identified in (1) and (2).

Cost: The project will require 3 person-years.

COMPONENT PROJECT 36: DEVELOPMENT OF COST AND PERFORMANCE MODELS FOR EVALUATING LIBRARY AUTOMATION PROGRAMS

Background: Libraries of all types are faced with decisions about automating their operations. However, surprisingly little is known, from systematic study, about the impact of automation on library operations.

Purpose and Objectives: The purpose of the project is to develop a series of mathematical models that could be useful in decision-making on library automation for the following library functions: acquisition, serials control, cataloging, catalog maintenance, circulation, reference, and interlibrary loan.

Methodology: A review of the literature in the fields of library automation, business automation, and other computer-related areas should be conducted, concentrating on previously-developed models for evaluating automation programs. Tentative models will be developed and tested in several libraries that are considering automation.

Cost: The project will require 3 professional person-years for a team with experience in mathematical modeling, library operations, and library automation.

PROJECT 97: RESEARCH ON THE DIFFUSION OF LIBRARY/INFORMATION RESEARCH AND INNOVATION (a combined project that encompasses a new project, 98, and projects 42, 26, and 23.)

Introduction: Not much is known about the diffusion of libra /information research findings, models, and methods to other researchers, p icymakers, educators, library/information system managers, and the int ed public. Similarly, few studies have been conducted on the diff ... adoption of library/information service innovations.

Three kinds of research projects on these topics are proposed:

(1) Research on the diffusion of library/information innovations.

(2) Research on the diffusion of library/information research findings.

(3) Research on the diffusion of library/information research models and methods.

Description of Component Projects

COMPONENT PROJECT 98: ANALYSIS OF EFFECTIVE RESEARCHER-PRACTITIONER LINKAGES IN THE LIBRARY/INFORMATION FIELD

Background: It is imperative to study linkages between researchers and practitioners as a system in which communication events, supported by a communication infrastructure, take place. In addition to events in which research findings are passed on to practitioners, there are "feedforward" as well as "feedback" events in which practitioners take the initiative to advise future research and critique past research.

Purpose and Objectives: To conduct a "microcosm" study that would map and describe the linkages between researchers and practitioners that occur either within a geographical area or within a shared area of research and practice, such as library automation.

Methodology: More specifically, the structure of the researcher-practitioner relationships would be mapped via social network methods, with as much attention as possible being given to both longitudinal and cross-sectional characteristics of the reseacher-practitioner networks. The function of sets of linkages would be analyzed from interview responses according to a taxonomy of functions.

Cost: The project will require 1 professional person-year and data acquisition and analysis costs of $5,000 per area. Total: $75,000.

COMPONENT PROJECT 42: DIFFUSION OF INNOVATION IN LIBRARIANSHIP

Background: The major problem area that this project addresses is the lack of systematic planning and implementation strategies for bringing about the adoption of important innovations in librarianship.

Purpose and Objectives: A major purpose of this study is to ascertain the extent to which library professionals who receive LSCA Title I funds have identified and used in their projects systematic ways of bringing about changes.

Methodology: Literature related to the change process will be investigated to develop the necessary framework and instruments for evaluating LSCA projects and for obtaining needed information from LSCA project personnel. Interviews with key project personnel of a nationally representative sample of LSCA Title I projects for the current year and for projects submitted during fiscal year 1978 will be conducted to obtain additional information about their attitudes toward incorporating change mechanisms in library projects, their awareness of research findings in this area, and their perspectives on the methods that have been used to promote adoption of their innovation.

Cost: The project will require 2 professional person-years, with additional funds for visits to selected project sites and telephone interviews.

COMPONENT PROJECT 26: "PATHFINDERS": THE DIFFUSION OF AN INFORMATION INNOVATION

Background: In a field such as library science, which is undergoing rapid change, it is important to determine efficient and effective means of diffusing new technological and non-technological programs, techniques, and activities of presumed benefit to the field's clientele.

Purpose and Objectives: The purpose of this project is to determine the stages through which an innovation in library practice passes and to identify the communication channels used in the diffusion process to facilitate future planned innovation and change in the field.

Methodology: This will be both an historical study, using sociometric survey methods to trace the development and distribution of a particular innovation, and an active research study, to introduce the innovation into test sites and trace the diffusion from that point forward. The innovation chosen to be studied is the "Pathfinder," a step-by-step bibliographic tool that introduces its user to the variety of information sources available in a particular library on a particular subject.

Cost: The project will require an estimated 1.5 professional person-years, over 5 years.

COMPONENT PROJECT 23: DIFFUSION OF SOCIAL/BEHAVIORAL SCIENCES RESEARCH METHODS INTO INFORMATION SYSTEM/USE STUDIES

Background: Too often after a study is conducted the results are presented in report form and made available only through one of the document distribution centers. This is too passive a system for widespread dissemination of results, particularly when a change in behavior (i.e., use of new research

methods) is sought. Therefore, this study will focus on the active transfer of the research results of a companion project (see Project 22).

Purpose and Objectives: This study will evaluate a specially developed series of seminars as a means to transfer the research methods evaluated and presented in the companion study.

Methodology: The study will involve three phases and will draw upon the skills of technology transfer specialists. In Phase I (4 months), the "Research Methods Handbook" developed in the precursor study will be used as the core for development of a seminar series. The series will be promoted and presented in Phase II (6 months). Phase III (2 months) will involve evaluation of the seminar's effectiveness by means of appropriate follow-up techniques. The results of this evaluation will be used to develop recommendations to the sponsor for additional seminars and for enhancement to the "Research Methods Handbook."

Cost: The project will require 1.67 professional person-years, plus expenses for such items as: promotional material and seminar expenses ($5,000); mailing and communication ($1,[illegible], and travel ($2,500).

PROJECT 100: THE ROLE OF LIBRARIES IN CREATING AND PROVIDING VIEWTEXT INFORMATION SERVICES (a new project combining projects 79 and 80)

Introduction: A number of new electronic home information services have been introduced in the United States since 1975--the majority since 1980. Some of these services use teletext technology, defined as the transmission of text to television sets during the vertical blanking interval of the TV signal. Other services use videotex technology, defined as the transmission of user-selected pages via telephone, coaxial cable, fiberoptic cable, FM sub-carrier, etc. Unlike teletext, videotex pages do not enter the transmission stream until a user has selected them through the keypad or full-keyboard terminal; the pages are then sent to that user alone.

Viewtext, the term chosen for this paper, is intended to encompass the following technologies: 1) Teletext; 2) Videotex; 3) Bibliographic information retrieval, generally using telephone lines and full-keyboard terminals; 4) Cartridge-, cassette-, or disc-format text files that can be displayed on personal computers or videodisc players.

Description of Component Projects

COMPONENT PROJECT 79: ROLE OF THE COMMUNITY LIBRARY AS A VIEWTEXT INFORMATION PROVIDER

Background: Viewtext systems further reduce the small set of information resources that only libraries have been in a position to provide in most communities.

Purpose and Objectives: The proposed research will determine, for a sample of community libraries, the information resources they now hold--or could arrange to hold in the future--that would make a unique contribution to viewtext home information services in their communities.

Methodology: The first phase of the proposed research will consist of as many as ten case studies of the "viewtext potential" of information resources held by a stratified sample of community libraries. The second phase will consist of a mail questionnaire survey of a stratified sample of community libraries.

Cost: The project will require .5 professional person-year of effort, over a one-year period. Data acquisition and analysis costs add $5,000 to the $30,000 personnel cost. Total: $35,000.

COMPONENT PROJECT 80: IMPACT OF VIEWTEXT SYSTEMS ON TRADITIONAL REFERENCE FUNCTIONS OF THE COMMUNITY LIBRARY

Background: In a few years it will be commonplace for reference librarians to turn to their terminals for fact retrieval of all kinds.

Purpose and Objectives: The proposed research project will help to identify the viewtext information files of greatest usefulness to reference librarians in community libraries, based on an analysis of reference questions.

Methodology: Quantitative content analyses will be conducted of reference questions answered in a sample of community libraries. Some current samples of reference questions should be collected in order to determine the range of topics that patrons are now bringing to the reference desk, but most of the data for the content analysis can be extracted from a number of previous studies in this area.

Cost: The project will require .25 professional person-year plus .5 person-year of clerical assistance, over a one-year period. Data acquisition and analysis costs are estimated at $2,500. Total: $15,000 + $10,000 + $2,500 = $27,500.

## APPENDIX B

## BRIEF SUMMARIES OF NON-AGENDA RESEARCH PROJECTS

Project 01. The Identification of "Bridge Papers." An empirical approach to identifying "bridge papers"--research papers that are eventually applicable to the solution of practical problems--is suggested. Early identification and distribution of such papers to practitioners would decrease the time lag between theoretical studies and the practical application of research.

Project 02. The Migration from Print to Electronics. The availability of electronic forms of publications has led to reduced use of paper publications, and it is expected that electronic forms will become even more popular in the future. Planning could be facilitated if we were to determine the rate at which paper publications are being phased out and identify the barriers to increased use of electronic publications. A survey is proposed.

Project 05. The Electronic Catalog. Current online catalogs are little different from the card catalogs that they replace, because they still depend on traditional cataloging. A controlled experiment in a small library is proposed, to determine the advantages, costs, and user acceptance of an online catalog that provides access through data from title and content pages.

Project 06. The Library Without Walls. As more information resources become available in electronic form, the "custodial" function of the librarian will decline in importance. We need to learn, through a demonstration project, to what extent the library as function can be detached from the library as place, and what demands will be placed on the technical skills of the librarian operating in a de-institutionalized mode.

Project 07. Information Seeking Patterns of the "Information Poor." The information needs of special population groups (ethnic minorities, handicapped persons, etc.) are not fully known and thus cannot be met. This study would identify their occupational and non-occupational information needs and their satisfaction with current providers of information. It would also develop a taxonomy of barriers to effective information access.

Project 08. Information Seeking Patterns of the "Students." Fiscal constraints are causing some public libraries to consider charging fees to their non-primary clientele, such as students. This study would identify the information needs of students and determine the extent to which their information needs are being met by various institutions. It would also develop a taxonomy of barriers to effective information seeking.

Project 10. Dynamic and Cyclic Model of Information Systems. Information flow is a complex cycle consisting of many substructures and subcycles. It would be highly desirable to have a model of the entire information system. A three-phase research plan is proposed, to include a structural study of the present system, a modeling analysis of this system, and an economic analysis of alternative systems.

Project 12. Expanding Library and Information Services: Feasibility and Potential Impact of Community-Related Services. Libraries must become more responsive to community needs. Libraries have been expanding their services but there is a need to develop, through a pilot project, a clearer view of the new services that they can reasonably provide and the techniques that will allow implementation of those services.

Project 13. Academicians and Their Preferred Information Approaches. User studies are generally structured in terms of existing services and reflect adaptation to the limitations of those services. A study is recommended that would analyze the work of academicians to determine what information sources they really need and how their information needs can best be met.

Project 14. Case Studies to Determine the Impact of Information Availability. The benefits received from library services are difficult to determine. Case studies are proposed of individuals in two groups—those who use informatio. sources and those who do not. The objective is to obtain impact data on how the use of information affects individuals' lives, work, and accomplishments.

Project 15. The Library As a Production Organization. Circulation figures are easily derived statistics that are frequently used as a measure of library "effectiveness." A variety of techniques, including a Delphi study, are suggested to identify other criteria that are suitable for evaluating library performance.

Project 16. Determining and Assuring the Quality of Information Services. Quality must be judged in terms of the services that users need and not necessarily the services that are asked for. This study would gather data concerning user needs for access to library materials and the ways in which the library meets those needs. Specific areas of study could include catalog-use patterns, the effect of classification systems on multi-disciplinary studies, and the extent and importance of browsing in various types of libraries.

Project 20. Adaptive Prompting - A Method for Intelligently Intervening in User-System Interaction. Online search systems provide little assistance to beginning users. Error messages seldom include suggestions for correction and do not address user actions that are inefficient, though correct. This empirical study would continue development of adaptive prompting, a context-sensitive approach in which patterns of user actions, as well as individual actions, are analyzed and appropriate diagnostic messages are generated by the online system.

Project 22. Development of a Handbook of Methods from the Social and Behavioral Sciences Appropriate to Information System/User Studies. It is suggested that a handbook of research methods be created, based on a review of the techniques for data collection and evaluation that are already well established in other disciplines and that are applicable to information science, particularly to the study of user/system interaction.

Project 24. Utility of the Unobtrusive Participant Observer Technique in the Study of Information-Seeking Behavior. Greater understanding of the variables associated with information-seeking behavior is needed. A pilot project is proposed, to evaluate one possible research technique: use of the unobtrusive participant, someone who observes and documents the information-seeking activities of a particular group (one department of a university, for example) while seeming to be a member of that group.

Project 25. Effect of Public Library Summer Reading Programs on Reading Level Retention of Upper Primary Grade Students. Summer reading programs are among the most popular public library programs for children, but there has been no evaluation of the effect of the programs on reading level retention. This study involves a national sample of public libraries, with randomly selected students from several classes in each library, and administration of a pre- and post-test program.

Project 27. Identification of Research Methodologies of Utility in Library and Information Science. A study is suggested to develop a monograph on basic research methods for library and information science. Research experts in various fields, including the social sciences and physical sciences, would be polled through the Delphi technique to determine what methods they would use to study a specified set of 15 research problems in the field of library and information science.

Project 28. Programs of Study for Library and Information Science Research Personnel. The quality of research depends largely upon the skills of the researchers. There are a number of problems associated with teaching research methodology, including a lack of appropriate instructional materials. The development of a sequence of model courses is proposed to improve instruction in library and information science schools on research design, methodology, and application.

Project 30. Development of a New Economic Theory. The impact of information as both a resource and a product has not been adequately understood by contemporary economists. A project that brings together creative thinkers from a variety of disciplines is proposed, to examine the role of information in our economy and, with an improved understanding of its role, to develop a new economic theory to be used as a planning and policy tool.

Project 33. Alternative Funding Possibilities for Publicly Supported Library and Information Services. Many public libraries are developing fee systems for selected services. The rationale for such fees and their impact on public support and funding are not yet clearly understood. Research is proposed to collect and analyze data from experts about current use of library fees, to identify types of information or services that might appropriately be fee-based, and to develop pricing models for selected services.

Project 34. Impact of New Information Technologies and Services on Public Libraries. As computer and communications technologies become more common, it becomes more important for public libraries to learn how to use the new technologies effectively. This project would develop and maintain a database containing all available information concerning computer and communications technologies and their uses.

Project 35. Development of Expanded Community Library and Information Centers through Use of New Technologies and Institutional Relationships. Public libraries face many challenges, including reduced funding and the proliferation of new technology-based competing services. A coherent approach to meeting these challenges is needed. This project would create several integrated community information utilities--libraries of the future--to serve as models and to help demonstrate the types of sophisticated library services that are possible.

Project 38. Explicate the Concept of Cooperative Collection Development in Library Networks. Before cooperative collection development can become an effective tool in library management, it must be understood better. A desk-type study is needed to define objectives, identify various means of access for different materials, specify evaluation criteria, assess the potential impact on publishers, and determine the costs and benefits for users.

Project 39. Evaluation and Impact of the Public Library Association's Planning Process. In 1980, the Public Library Association introduced a planning process that could be implemented by individual libraries. A study should be conducted to evaluate the impact of the adoption of this process, so that recommendations on future applications can be prepared.

Project 40. Research on the Impact of Public Library Use. Not enough is known about the impact of information use. One of the areas needing further study is public library use: what impact does the public library have on its users and how can the library design services to have greater impact? A conceptual model will be developed and tested in one community.

Project 41. The Role of Electronic Home Delivery Systems in Meeting Information Needs of Citizens. The electronic home-delivery systems now coming into use present a new area for research. Studies are needed to determine whether and how these systems meet information needs, by considering such issues as the uses to which the systems are put, the characteristics of the people using them, and how these systems compare to, and relate to, other information sources, including the public library. A survey methodology is proposed.

Project 43. Promoting Improved Futures for Libraries (Study I). This research project would seek to assist library professionals in exploring new visions of librarianship and developing innovative solutions to problems. It is hoped that, through examination of a number of scenarios describing alternative views of the U.S. between 1981 and 2001, a framework for planning can be created that places the library in a societal context.

Project 44. Promoting Improved Futures for Libraries (Study II). This study would seek to identify the range of possible solutions to the problems and issues that must be overcome in moving toward the "future" defined in the prior research. It would use the Delphi technique to assess the current thinking, perceptions, values, and biases of librarians who are in a position to have an impact on the future direction of library development.

Project 45. The School Library Media Specialist's Impact on Classroom Instruction. It is very difficult to show a direct relationship between pupil academic achievement and the services of the school media specialist, primarily because the media specialist does not have direct contact with students. Teachers are the primary, direct recipients of school media services. An experiment using several teachers operating with and without the help of a media specialist is proposed, to help determine the contribution of the media specialist to more effective teaching in the classroom.

Project 46. School Library Media Programs and Networking. A survey-based study should be conducted to determine the present status of school library media programs in library networks. Specific information desired includes the number of networks to which media programs belong and the extent to which they are involved in them.

Project 48. Study of Library School Graduates. Little is known about the motivations or career paths of library school graduates. Many graduates do not enter the information labor force and others leave the profession permanently. A long-term study of graduates could provide information useful in evaluating the structure and nature of information professional jobs.

Project 49. Restructuring the National Income Accounts. The National Income Accounts record the monies spent by various sectors of the economy, but the organization of the Accounts does not permit direct determination of the size of the information sector. A thorough examination of the Accounts and existing analyses could lead to suggestions for providing detailed information on the size of the information economy.

Project 50. Measuring the Productivity of Information Workers. Measures of productivity, regularly used in many industries, are not common in the information professions. A study is recommended to examine the measures used in other sectors and to develop measures of productivity appropriate for the information professions.

Project 51. Property Tax as an Equitable Means for Funding Public Libraries. Property taxes currently provide a large portion of public library funds. As libraries institute direct charges to users, the problem of equitably distributing funding burdens becomes more complicated. A study correlating library use with payment of property tax is recommended, to determine if this is an equitable means of funding public library service, and to compare this analysis with an analysis of alternative funding methods.

Project 52. User Commands and Dialogue Protocols in Online Bibliographic Systems for the Public to Use in Homes, Information Centers, and Libraries. The proliferation of online systems poses severe problems for users and seems to call for some degree of standardization. A compendium of system features is needed, as the basis for discussion of basic system features. From this, standards could be recommended, to achieve consistency, clarity, flexibility, power, and simplicity in command and response languages.

Project 53. Display Formats and Output Considerations for Online Public Access Catalogs in Diverse Settings. There is wide variety in the amount and format of information displayed in online catalogs. However, it is not known which, if any, of the current systems meet the needs of users. An investigation using a heterogeneous user panel is suggested to determine, among other things, what bibliographic information is important to display online and how it should be displayed.

Project 56. Improved Indexing Capabilities Online. Online systems offer the user little information about the connective relationships between descriptors, particularly in free-text searches. A multifaceted research project is proposed. It includes a survey and evaluation of existing systems to identify linkages among online subject authority files, basic indexes for

free-text searches, and other related user aids. Experiments to test the impact on retrieval from use of various aids and search tactics would also be conducted.

Project 57. Description of Information Items for Improved Access Online. Although library card catalogs exhibit increased conformity, after many years of professional effort, the description of information items in online catalogs and bibliographic databases is not standardized. A study is recommended, to develop a typology of common bibliographic data elements and produce guidelines and models, for both full and brief display modes.

Project 59. Cognitive, Affective, and Sensory Differences among Media as Experienced by Information Seekers. Differences in ease of comprehension through various media (aural, visual) may partially determine information seekers' choice of media. This project would study the factors influencing the choice of medium, relative to several information and user characteristics, and develop a research paradigm for use in subsequent tests of the effects of media upon information transfer.

Project 60. Comparative Evaluation of Search Strategies. A search strategy is an approach to, or plan for, a whole search. One part of the proposed study would identify possible global strategies (e.g., choice of sources). A second part would involve comparative testing of these strategies, to discover which of them are efficient and effective in given situations.

Project 61. Discovery of Means to Optimize Browsing as an Information-Seeking Method. Browsing is recognized as an important means of encountering unknown or unsought useful information. However, this method of information-seeking is little understood. A two-phase project is proposed: an extensive literature search, followed by a controlled experiment to study information-seeking behavior among researchers in three types of "browseries," established as part of the project. The configurations of these browseries would be: materials central, peripheral, and entirely novel to the researchers' interests.

Project 62. The User's Understanding of the Library as a Reference Resource. Studies repeatedly show low levels of library use, but the reasons for this low use are not clear. It may stem from a poor image of the library, in which case a better understanding of the public's view of the library is needed, if changes are to be made. Personal interviews and surveys will be conducted with users at reference desks, to identify their assumptions about and expectations of the library and the librarian.

Project 63. Hierarchical Structuring of an Online Subject Catalog. Online catalogs can offer users hierarchical, subject menu structures, which would make them aware of new subject-term options and help them to select search terms. A project is proposed to develop hierarchies for one test discipline--converting the LC Subject Headings--after which a menu-driven online catalog for that field will be developed and tested in an operational environment, preferably with an already existing system.

Project 65. Field Testing of Proposed Revision of ANSI Standard for Library Statistics. The American National Standards Institute is developing a new standard for the reporting of library statistics. However, field testing of the proposed standard has not been adequate, and it is not known if the data will be practical to collect and available in a useful form. A carefully-controlled field test in a medium-sized state is therefore recommended.

Project 66. Estimation Measures for Product/Service Consumption in Large Information Systems. A study is proposed to measure the product/service unit of output from large distributed network information systems (such as ERIC and MEDLARS), at the local level, to provide estimation techniques for measuring the impact of large information systems. A multi-stage survey will be used to gather the necessary longitudinal usage data.

Project 67. Electronic Meetings as Replacement for Formal Board Meetings; Case Study of the American Association of Library Schools (AALS). AALS is planning to conduct its regular board meetings as teleconferences. A survey is proposed to examine the effects of teleconferencing on the interactions of the board members during meetings. The social/psychological variables, including member satisfaction, will be studied, and adaptions made to the computer conference format will be recorded.

Project 68. Effect of Level of Technology on Internal Organization Structure. It has been suggested that increased use of technology may change the ratio of non-professionals to professionals within the library. A study is proposed to gather data to determine whether, with the increased use of technology, there has been a significant change in organizational structure, including the size and autonomy of the professional staff. The project would entail visits to selected libraries and analyses of various records to identify trends.

Project 69. Relevance Judgments as a Function of Learning and Reconceptualization. Relevance is a primary dependent variable for measuring retrieval success; yet relevance judgments exhibit a high degree of variance from one judge to another and from a single judge over time. An experimental study of relevance judgments is proposed, to test the value of one information-processing model in measuring information-system effectiveness.

Project 70. Electronic Information Transfer. This project would determine the utility of television technology to alternative and new operational modes for the library. A study would be conducted of cable television, videotext systems, and interactive information transfer, to establish potential experimental scenarios and measurement parameters.

Project 71. Storage Technology and Information Delivery Impact. This project would explore the potential applications of videodisks in libraries and information centers. A prototype system would be designed to evaluate the use of videodisks and state-of-the-art computer technology for acquisition, organization, and circulation functions.

Project 72. The Electronic User. The impact of new technologies on users cannot be predicted, and studies are needed to explore user reactions to these technologies. One suggested study is an experiment to measure and evaluate the use of cable or closed-circuit television for book selection and ordering. System use would be monitored and attitudinal data would be obtained from users.

Project 73. To Have But Not To Hold. Technological developments present the possibility of a "transaction-based" society in which the transmission of information, rather than the item of information, is emphasized. A Delphi study is proposed for developing a set of scenarios that can help to explain the implications of a transaction-oriented information society on library/information center operations.

Project 74. Knowledge Delivery Systems. Some work in the field of artificial intelligence has direct implications for library and information science. Two areas of particular importance are natural-language processing and world-set definition. Some experimental projects in these areas are suggested, including a user-friendly, conversational card catalog.

Project 75. Preservation and Protection of Non-Print Media. There is a body of material (e.g., art works; film) in which only the original truly encompasses the information. This project recommends the development and trial use of videodisks for the long-term preservation of multichromatic film information. The study would identify the types of materials to be preserved, define the system specifications, generate samples, and provide accurate cost data.

Project 76. Structure-Function Relationship in Viewtext Information Services. The viewtext home information service technologies, including videotext, teletext, and other electronic information delivery systems, are extremely versatile, but each service has its own individual limitations. An analysis of existing and proposed viewtext technologies is recommended to clarify the capabilities of each system. The result of the analysis will be a directory of systems, cross-indexed by structural dimensions and functions.

Project 77. Formats for Viewtext Displays. Viewtext systems are quite limited in their display of printed information. However, they offer the possibility of dynamic display features that may more than offset these limitations. This project proposes to explore (through brainstorming) the most promising dynamic display features and to evaluate them through field trials.

Project 81. Consortium Arrangements for Community Library Involvement in Viewtext Information Services. The community library is constrained in participating in viewtext experiments by its charter and revenue base. The tradition of interlibrary consortia suggests one possibility for library involvement in viewtext consortia. A two-phase study of this possibility is proposed: a case-by-case analysis of a small sample of libraries, followed by a mail questionnaire survey of a much larger sample.

Project 83. Human Factors in System Design. Automated information systems are becoming increasingly common; yet little has been done to identify the relevant aspects of the physical and operational relationships between users and systems (e.g., display formats; image intensity; pace of system response). Experiments should be conducted to identify relevant human factors parameters and to establish benchmark values.

Project 85. The Effects of "Uncertainty" on System Performance. For years there has been a debate in information retrieval theory about the extent to which "precision" and "recall" are inverse functions. This issue should be answerable by mathematical analysis, and research is proposed using combinatorial methods to establish the relationship between "uncertainty" and retrieval performance. The predictions generated in this analysis could then be tested experimentally.

Project 86. Historical Relationship between Library and Information Science. It is hypothesized that the "library problem" (the library catalog as a problem, in particular) has had an effect upon the development of technology at various times in history, including recent decades. Research is proposed to establish links between people in libraries and people concerned with development of information technologies and information-handling concepts.

Project 87. Research Productivity by Faculty of Library and Information Science. A recent study of the rates of publication and citation for tenured-level faculty of schools of library and information science shows that the general level of research productivity is low. Further analyses are needed to identify the conditions that lead to high and low research productivity, to establish benchmark data for the evaluation of faculty, and to determine what can be done to raise the quantity and quality of research.

Project 88. Role of Specialization in Library Education. Library education is experiencing major changes. The goal of this project is to help establish criteria for evaluating the extent to which a library school provides for specialized work and the level at which it prepares its graduates for such work. A multi-stage study, including a literature review, analysis of aspects of specialization, and a Delphi study, is proposed.

Project 89. Utility, Feasibility, and Possible Structure of a Recommended National Program for Education of Library and Information Science Personnel (a new project that recasts Project 29 and supersedes it. This project seeks to identify the essential aspects of library and information science education and the changes that must be made in the present system to provide adequate training for library and information science professionals. A conference of professionals would be held, to discuss the utility and feasibility of a planned national structure of educational institutions.

Project 90. Full-Text Retrieval (a new project). Information professionals can help to evaluate the quality of retrieval and use of full-text information retrieval technologies developing in the workplace (e.g., word-processing). This study would evaluate information retrieval on large, unstructured, natural-language text files, through tests with one or more word-processing systems and several different populations, including business and scientific professionals.

Project 91. Improved Indexing Capabilities Online (a new project that provides an addendum to the purpose and objectives of Project 56 and incorporates Project 63). This project would identify available machine-readable subject indexes and authority files and test a prototype system that provides various combinations of these aids.

Project 92. Adolescent Information Behavior (a new project combining Projects 55 and 64). Two studies directed at gathering more information about adolescent search behavior and information use have been proposed. This project recommends inclusion of an analysis of the adolescent psychology and sociology literature to contribute to the data-gathering structure in each of those studies.

Project 93. Information-Seeking Behaviors of Children and Young Adults (a new project combining aspects of Projects 55, 8, and 64). More information is needed regarding the information-seeking behaviors of children and young adults, particularly with reference to non-print media. A study encompassing surveys, interviews, and experiments is proposed to gather these data and to develop, through situational analysis, means for determining how library media programs can best meet the information needs of children and young adults.

Project 95. Alternative Funding Possibilities for Publicly Supported Library and Information Services (a new project combining Projects 33, 11, and 51). This project proposes study of several approaches to analyzing alternative sources of library funding, particularly fees for services.

Project 96. Libraries as a Mechanism for Disseminating "Government Information" (a new project). Libraries currently participate in the dissemination of government information through the depository library program. Libraries could also function as Federal "information centers," so that new centers for the collection and dissemination of government information would not need to be created. A model of the operational requirements of existing information centers is required to determine if, or under what circumstances, libraries could take the place of such centers.

Project 99. Characteristics of Electronic Presentation and Delivery (a new project combining Projects 3, 73, 74, 76, and 77). This project combines a number of previously described investigations of electronic information transfer. The objective is to determine, as quickly as possible, what types of systems would be well-accepted by both information professionals and the public.

Project 101. Direct Delivery to Users (a new project combining Projects 70, 72, 41, and 78). This project combines several of the technology-oriented projects, to determine the utility of various direct-delivery technologies and to identify characteristics of users of such systems.