A Study of State Library Agencies' Information Technology Standards Policies and Practices

Final Report

Conducted by

William E. Moen, Ph.D.
Gloria C. Shobowa le, M.S.

School of Library and Information Sciences
University of North Texas
P.O. Box 311068
Denton, TX 76201-1068

Contact Information
Email: wemoen@unt.edu
Voice: 940-565-3563
Fax: 940-565-3101

August 15, 2000

Table of Contents

Preface

This study reflects the situation of state library agencies' standards policies and practices in the latter half of 1998. Few areas in library organizations change as rapidly as those affected by information technology. Therefore, it is important for the reader to keep in mind that the study's results reported here are based on data from 1998.

Many of the results and recommendations are not affected by the passage of time. For example, it is unlikely that there has been a fundamental change this study's respondents' familiarity with standards organization or their perceptions of the advantages to standards. New initiatives by state libraries, especially in the area of digitization in the past 18 months, however, might well change respondents' sense of what standards are important for their agencies to implement or the areas in which new technical standards may be needed.

This study identified the primary driver for standards activities by state library agencies as their mission to support resource sharing within their states. That fundamental mission is likely to change slowly, if at all, and thus, the choice of specific standards—whether for data interchange, digitization, information retrieval, or other applications—will continue to be shaped by the agencies' missions and mission-critical applications.

1. Introduction

State library agencies play a pivotal role in the promulgation and adoption of standards for information processing and handling in a state's library communities. As key institutions in all 50 states and the District of Columbia, state library agencies have the potential to affect standards use through a variety of mechanisms including rule-making and setting requirements to use specific standards as a condition to receive state or federal grant funds. State library agencies constitute a market for the National Information Standards Organization (NISO) as users of NISO standards. These agencies can be considered an essential NISO stakeholder community because of their position to influence the purchase and deployment of information technology and standards for information processing and handling.

The dynamic pace of technology change challenges all organizations to identify and select standards on which to base mission-critical programs and services. State library agencies face particular challenges because of the increasing demands that publicly supported libraries provide access to increasing quantities and varieties of networked, digital and paper-based information resources and services. State library agencies are in a unique position to influence the adoption and implementation of standards to support statewide library resource sharing.

Little is known, however, about state library agencies' policies for standards adoption and use. This study, undertaken in 1998, attempted to bridge the gap of information and understanding about the current situation of state library agencies' use, opportunities and issues related to technical standards. The goals of this study were to:

- Help NISO better understand the current use of standards and need for standards information at the state level
- Provide state library agencies with a compilation of state library agencies' policies, practices, and issues related to information technology standards.

The objectives of this study were to:

- Survey state library agencies to document existing standards policies and initiatives
- Document existing (or planned) processes and procedures for identifying, learning about, selecting, implementing, and reviewing standards
- Identify key issues and barriers to standards selection, adoption, and use
- Identify critical areas where standards are being used or are needed
- Develop a set of recommendations for NISO, the state library agencies, and their professional organization, the Chief Officers of State Library Agencies (COSLA).

The study's data collection occurred over a five-month period (July 1998-November 1998). Researchers collected a range of information to document state library agencies' standards policies and the extent of standards use, with special attention to state library agencies' responses

to the unfolding digital revolution in information processing, handling, access, and dissemination.

The organizational structure of state library agencies, their position within individual state's political structure, and their missions and responsibilities vary widely. These and other factors affect a state library agency's attitude, responsibility, and capability regarding standards policies. To accommodate this reality, the study used several data collection activities including a national survey, telephone interviews, and document analysis of existing policies. The researchers identified a number of questions that guided data collection including:

- Which state library agencies require or recommend statewide library technology standards, and to what libraries or types of libraries do they apply?
- For those states that require or recommend standards, what are the standards, how were they selected, how are they enforced, and what is the process for ongoing review and evaluation?
- For those states that do not mandate standards, are they considering adoption of standards, is there a perceived need for standards, and is there a mechanism for adoption and enforcement?
- What is the relationship between state library agencies and the broader state government's requirements regarding the promulgation of standards and administrative rule making?

NISO sponsored this study to gain a better understanding one of its target markets. As the national standards organization for the communities of libraries, information services, and publishers, NISO's goal for supporting this study was to understand state library agencies concerns related to information technology standards. The study provides NISO with detailed information about the current use of standards by state library agencies and a set of recommendations to better serve the standards needs of state library agencies.

COSLA endorsed the study since the data collected would assist its members in awareness of what each state library agency is doing with standards as well as the standards issues identified by the agencies. The study benefits COSLA by suggesting appropriate leadership opportunities for state library agencies in statewide standards policy development and deployment.
The study also benefits the agencies by providing a compilation of their standards policies and procedures, and identifying barriers and best practices related to information technology standards.

The structure of this report consists of a number of narrative sections and a set of appendixes with supporting information. Following this introduction, Section 2 reports on a review of the literature to provide some background to the current standards situation in state library agencies. The review indicated the need for this study, since there is little in the professional or scholarly literature that addresses state library agencies and their standards. Section 3 briefly discusses the research methodology of the study. Section 4 presents detailed findings from the survey questionnaire and a summary of the telephone interviews. The data from the questionnaire and the interviews informed a focused analysis and synthesis of the levels and drivers for standards

adoption. Section 6 explores the key issues emerging from the study, and Section 7 presents a set of recommendations that address a number of the key issues.

Although the state library agencies themselves will never be a major market for purchasing standards, their primary needs are informational. This may be a common characteristic of many of NISO's important constituencies. This report presents NISO with the data necessary and several recommendations to expand its standards services (rather than standards as products themselves). The state library agencies provide an opportunity for NISO to shape information products and services based on empirical evidence of need.

2. Background

The professional and scholarly literature is very sparse on the topics related to standards and their use in state library agencies. A comprehensive review of the literature found very little information about standards usage or promotion by state library agencies. However, two publications deserve attention since they do help to situate a discussion of state library agencies and their involvement in standards.

In 1988, Pat Molholt prepared a report on library networking while on temporary assignment to the U.S. Department of Education. The report provided a brief history of libraries' efforts toward interoperability. Two significant standards-based developments she discussed were the Machine-Readable Cataloging Record (MARC) format in 1968 and the Open Systems Interconnection (OSI) reference model in 1980. The Linked Systems Project (LSP) was an effort to apply OSI to library systems and Molholt called for the "wholesale adoption of OSI as the telecommunications protocol" which would enable libraries to exchange information (Moholt, 1988, p. 5). She also referenced the use of TCP/IP—the standards suite that underlay the Internet—by the National Science Foundation (NSF) and the Department of Defense (DoD).

Molholt recommended that federal and state funds be used to encourage local libraries to participate in larger, resource-sharing networks. Minimum requirements for receipt of federal funds would be cataloging using MARC format and use of OSI for interconnection of systems, thus making local records available statewide and nationally in a standard format. She charged the state library agencies with responsibility for distributing federal funds only to standards-compliant libraries and for maintaining a statewide database of holdings at local libraries throughout their state. In 1988, the focus was on telecommunications and the use of networking standards to enable exchange of information and sharing of resources. MARC was a prerequisite for a standard data interchange format and the OSI protocols would provide the technical infrastructure for linking systems.

The other pertinent publication was a special Library Hi Tech double issue in 1996 that presented reports from state library agencies on the status of "Statewide Library Automation, Connectivity, and Resource Sharing Initiatives." These status reports focused on telecommunications and networking, referencing such standards as X.25 packet-switched service and TCP/IP, with minimal reference to OSI. The primary influence of change between 1988 and these 1996 reports was the utilization of the TCP/IP-based Internet as the network infrastructure.

In their status reports, quite a few states expressed their commitment to standards. States such as Florida and Minnesota discussed having standards work groups. Other states mentioned moving from dedicated facilities to Internet/public networks. The reports revealed states at varying stages of sophistication related to automation and connectivity, and knowledge of or adherence to standards as a requirement for interoperability. There were few states that made no mention of standards. At one end of the spectrum, states that mentioned standards were at that time still

using X.25 or migrating to TCP/IP, while others mentioned MARC as the only standards requirement within their states. At the other end of the spectrum, several states by 1996 had already implemented Z39.50 and others had requirements for several other NISO and/or ISO standards.

Whereas Molholt's article mentioned issues related to appropriate use of the NSF- and DoD-funded networks, the commercialization, growth, and use of the Internet in the 1990s have forever changed the networking landscape for libraries. National Information Infrastructure (NII) initiatives in the mid-1990s helped to spur further development and progression of library connectivity. The 1996 Library Hi Tech reports frequently cited the NII and statewide networking for libraries, education, and healthcare—sectors that now are intertwined in their shared visions for the future networked environment.

In 1988, Molholt recommended using funding as an incentive for cooperation and development of statewide databases and national resource-sharing networks. In 1996, the Library Hi Tech status reports indicated that indeed funds have been used to encourage connectivity but they also show that states had come on the bandwagon in terms of having goals for statewide connectivity and development of the NII. In the eight years between the publication of these two documents, much has changed, and much has remained the same. The Internet is a given. Attitudes within states towards resource sharing have improved and the need for standards to support that sharing is well recognized.

Overall, the absence of published information in the professional and scholarly literature on state library agencies' standards policies and practices suggests that this study fills a gap in data and understanding.

3. Methodology

This study explored the existing situation related to standards use, especially library-related and information technology standards promulgated by NISO, within state library agencies during the latter half of 1998. It sought answers to the questions about what the state library agencies were doing related to standards, specifically: what is the level of standards use within various states; which standards are in use; how are standards implemented; and what are the factors impacting state library agencies' use or non-use of standards.

Because of the dearth of available information about standards activities within state library agencies, one goal of the study was to collect baseline information that would address the goals of this study and provide a starting point for further research. This study provides empirical evidence, much of it in quantifiable format. However, it should be recognized that the primary focus was exploratory and descriptive, that is, to collect data and to describe the current environment related to standards rather than to test hypothesis or generalize from a sample to all state library agencies and other library communities.

Researchers initiated the study in the summer of 1998. The research design called for several phases: planning and goal setting; data collection; data analysis; and report writing. The unit of analysis was the individual state library agency.

The primary data collection tool was a questionnaire distributed to state libraries in all fifty states and the District of Columbia. The questionnaire solicited information about each state library agency's familiarity with national and international standards organizations, background information about the state library agency and its standards activities, its use and implementation of standards, and perceptions about roles for NISO and state library agencies in standards activities. Survey questions supported the study's goals by asking what standards are required or recommended, how standards are promoted, is compliance with standards monitored and what are the consequences for non-compliance, what formal policies and procedures are in place, and what impacts the adoption rate. Appendix A contains the complete survey questionnaire. The Chief Officers of State Library Agencies (COSLA) organization provided support for the study by endorsing the study and linking to the study's website and online version of the questionnaire from the COSLA website. Distribution methods included mail and electronic posting of the questionnaire in word processing, text, and HTML formats.

As questionnaires were returned, an inventory of responses was maintained. This tracked each respondent's name, the date received, whether the response was in paper or electronic format, and whether or not additional documents were returned with the questionnaire. The inventory helped in follow-up requests to ensure as many states as possible responded. Thirty-eight of the possible 51 agencies completed the questionnaire, a response rate of 75%. See Appendix B for the list of survey respondents.

Researchers entered the detailed data returned by each state library agency into a spreadsheet application. The response to each question was entered into a separate field and multi-level responses were represented in multiple fields in order to capture as much detail as possible in the spreadsheet. Researchers also classified the responses to several open-ended questions into broad categories to make tabulation more meaningful. Where possible, numbers and percentages for responses were calculated. This helped to quantify the textual (as opposed to numeric) responses on the questionnaire. In addition to the tabulation of quantitative data, all responses were analyzed to determine common responses, differences among states, patterns, and trends. Subsequent sections of this report present the results of the data analysis. Based on questionnaire responses, the researchers also prepared summary profiles for each state library agency (see Appendix C for these profiles).

The second component of data collection consisted of follow-up telephone interviews with a subset of the state library agencies that had completed the questionnaire. Based on their responses to the questionnaire, researchers identified approximately 25% of the questionnaire respondents for the telephone interviews. Criteria for selection of this group included:

- Their familiarity with standards organizations
- Presence of written policies and procedures and/or training programs related to standards
- Extent to which various standards are required or recommended
- Formal adoption or legal responsibility for standards
- Unique or insightful responses to questions
- Number of positive responses on the questionnaire related to state library agencies' responsibilities for identification, evaluation, and implementation of standards and their roles in education about standards.

These criteria directed researchers towards a purposeful sample rather than random or stratified samples.

Eleven state library agencies were contacted about participation in the second data collection phase and ten agreed to participate. The researchers conducted telephone interviews with the following states:

- Georgia
- Indiana
- Massachusetts
- Minnesota
- Nebraska
- New York
- North Carolina
- Texas
- Wisconsin
- Wyoming.

Researchers designed a structured interview form. Common questions asked of each state addressed topics such as: what formal structures are in place for standards activities; how are standards identified and/or evaluated; what tools are used to educate libraries; and how could NISO help to ensure the successful implementation of a standard. In addition, each interview form contained specific questions for individual agencies to probe more deeply into the answers submitted on the questionnaire. Appendix D contains a sample telephone interview questionnaire.

The researchers conducted the telephone interviews, each of which lasted approximately 35 minutes. They took detailed notes during the telephone interviews and prepared a summary of the interview responses immediately upon completion of each interview. Analysis of the interview data focused on common responses, differences, patterns, and trends.

The third component of data collection and analysis focused on documentation identified by the questionnaire respondents (e.g., standards policies). Some respondents returned the documents with their questionnaire while others referenced website addresses where electronic documentation could be found. These documents provided supplemental information about selected state library agencies' standards activities.

The methodology and data collection strategies employed in the study resulted in reliable empirical evidence. Analysis procedures appropriate to the various types of data collection (e.g., descriptive statistics for numerical data, content analysis of documents) provide the basis for the findings reported in Section 4.

4. Results

This section presents results from the questionnaire and telephone interview data, and an analysis of the written documentation identified as standards related by the state agencies.

4.1. Survey Questionnaire

Thirty-eight state library agencies returned completed questionnaires for a 75% response rate. There were sporadic comments about the questionnaire being difficult to answer, lack of knowledge to complete certain questions, or that it was too long. Most respondents, however, completed the entire questionnaire and answered the questions fully. The following subsections report the findings in the order of the items on the questionnaire (see Appendix A for a copy of the questionnaire).

The Respondents
The state librarians or directors of the agency were the "respondents" for nearly half (45%) of the completed questionnaires. Other individuals completing the questionnaire represented areas of information technology, technical services, education/consulting, and development. Respondents identified their job responsibilities, and those included planning, policy development, leadership, coordination of statewide projects, consulting, automation/networking, oversight of grant programs, and compliance. Only 16% mentioned standards activities as part of their job responsibilities.

The Library Agency in the State's Organizational Structure
The respondents indicated the place of the library agency in its state's organizational structure. Frequently the state library is part of a state's Department of Education (26% of respondents). Some state library agencies report to the Secretary of State (11%) and others report to a Cultural Affairs department (8%). Five percent of the respondents say they are a commission reporting directly to the Governor. Five percent are in an Administration department and 32% report to some other type of department within the Executive Branch. Examples of the agencies within the Executive Branch to which state libraries report include the Department of Children, Families and Learning and the Department of Museums, Libraries and Arts. Eight percent of respondents said they report to the State Legislature, and one state library agency is an independent agency reporting to both the Governor and the State Legislature. Another agency reports to a State college.

Quite a few respondents (39%) noted that in their states government entities other than the state library are involved with standards, typically standards related to information technology.

The Library's Mission and Standards

Only a small percentage (13%) of the respondents indicated their agencies' mission statement addresses the use of standards, and only 26% stated that they have legal responsibility for standards activities. For those states without legal responsibility, respondents were asked to indicate appropriate roles related to standards. Responses included establishing standards or setting requirements (32%), making recommendations about standards (32%), education or training (32%), consulting or modeling best practices (29%), identifying or informing about standards (25%), ensuring the use of standards-compliant products (25%), promoting standards (18%), grant assistance (18%), coordination of statewide cooperative activities (14%), and actually developing standards when local needs require (11%). Eleven percent gave no response to this question.

Jurisdiction of State Library Agencies

State libraries indicated the types of libraries over which they have jurisdiction. The most frequently referenced library type was the public library. Table 1 summarizes the agencies' jurisdiction.

Table 1
Types of Libraries Under State Library Jurisdiction

Library Type	Yes	No	No Response
Public	84%	8%	8%
School	50%	42%	8%
Academic	50%	42%	8%
Government	45%	47%	8%
State	37%	55%	8%
County	26%	66%	8%
Municipal	26%	66%	8%
Special	39%	53%	8%
Archives	16%	76%	8%
Other	16%	76%	8%

Familiarity with Standards Organizations and Their Standards

When asked about their familiarity with various standards organizations, a surprising number of respondents stated they were unfamiliar with the organizations impacting libraries. While 87% of the state library agency respondents were at least somewhat familiar with NISO and ISO, and 84% are familiar with NISO standards, only half were at least somewhat familiar with Internet standards setting bodies (the Internet Engineering Task Force, the Internet Society and the World Wide Web Consortium). The percentages of respondents claiming they were *very familiar* with standards organizations were relatively low:

- 25% very familiar with NISO
- 11% very familiar with NISO standards
- 13% very familiar with ISO
- 13% very familiar with IETF or ISOC
- 11% very familiar with W3C.

Only one respondent indicated active involvement with a standards organization.

The survey asked about various technical standards from NISO or other organizations. Respondents were asked if they currently require or recommend a particular standard, if they may adopt it in the future or, if none of these, if they are aware of it or not aware of it.

In terms of NISO standards, the most commonly required standard was Z39.2: Information Interchange Format (or MARC). The second most required standard was Z39.50: Information Retrieval Protocol, and this was also the most frequently recommended standard. Sixty-six percent of the respondents stated their agency either required or recommended Z39.2, and 63% either required or recommended Z39.50. One third required or recommended Z39.9: International Standard Serial Numbering (ISSN) and Z39.44: Serials Holdings Statements. Nearly 25% required or recommended both Z39.21: Book Numbering (ISBN) and Z39.58: Common Command Language.

The top three NISO standards that agencies were considering for adoption were Z39.57: Holdings Statements for Non-Serial Items, Z39.58: Common Command Language, and Z39.63: Interlibrary Loan Data Elements. Many states were also looking at adopting ISO 16060/10161: Interlibrary Loan Protocol.

Standards with a high level of unfamiliarity among respondents were Z39.47: Extended Latin Alphabet Coded Character Set (ANSEL), Z39.69: Record Format for Patron Records, EDIFACT, UNICODE, X.400, and X.500. Table 2 lists the titles of NISO and other standards indicated by the respondents (this table is reproduced in Appendix E for quick reference). Table 3 summarizes the extent to which these standards are required, recommended, etc.

Other standards written in by respondents as being important for state library agencies to implement include digitization standards, metadata/Dublin Core, Internet protocols, telecommunications standards, and Electronic Manuscript Preparation and Markup (ISO 12083).

Table 2
Titles of Standards Indicated in Study

Standard Designation	Standard Name
Z39.2-1994	Information Interchange Format (MARC)
Z39.9-1992	International Standard Serial Numbering (ISSN)
Z39.21/ISO 2108	International Standard Book Numbering (ISBN)
Z39.44-1986	Serials Holdings Statements
Z39.47-1993	Extended Latin Alphabet Coded Character Set for Bibliographic Use (ANSEL)
Z39.50-1995	Information Retrieval
Z39.56-1996	Serial Item and Contribution Identifier (SICI)
Z39.57-1989	Holdings Statements for Non-Serial Items
Z39.58-1992	Common Command Language for Online Interactive Information Retrieval
Z39.63	Interlibrary Loan Data Elements
Z39.69	Patron Record Data Elements (Draft Standard)*
Z39.70	Exchange of Circulation Systems Data (Draft Standard)*
Z39.71-1998	Holdings Statements for Bibliographic Items (replacing Z39.44, Z39.57)
Z39.76-1996	Data Elements for Binding Library Materials
Z39.81	Data Dictionary for Circulation, Interlibrary Loan and User Records (Draft Standard)*
ISO 10160	Interlibrary Loan (ILL) Application Service Definition
ISO 10161	Interlibrary Loan (ILL) Application Protocol Specification
ISO 9000	Quality Standards
ASC X12	Electronic Data Interchange (EDI)
EDIFACT	Electronic Data Interchange (EDI)
UNICODE	Universal Character Set
X.400	Message Handling Standard
X.500	Directory Services Standard

* Standards activities now underway in developing a Circulation Information Protocol

Table 3
Status of Standards in State Libraries

Standards	Require	Recommend	May Adopt	Aware of	Not Aware	No Response
Z39.2	37%	29%	5%	18%	5%	5%
Z39.9	11%	21%	3%	53%	5%	8%
Z39.21	8%	18%	5%	55%	5%	8%
Z39.44	16%	18%	5%	37%	13%	11%
Z39.47	3%	8%	3%	32%	45%	11%
Z39.50	24%	39%	3%	24%	8%	3%
Z39.56	3%	8%	8%	37%	37%	8%
Z39.57	3%	11%	13%	37%	29%	8%
Z39.58	3%	18%	11%	39%	21%	8%
Z39.63	13%	5%	16%	39%	18%	8%
Z39.69	0%	3%	3%	32%	53%	11%
Z39.70	0%	5%	0%	3%	0%	92%
Z39.71	0%	3%	0%	0%	0%	97%
Z39.76	0%	3%	3%	32%	53%	11%
Z39.81	0%	3%	0%	3%	0%	94%
ISO 10160	3%	16%	18%	39%	13%	11%
ISO 10161	3%	16%	21%	34%	16%	11%
ISO 9000	0%	5%	3%	53%	29%	11%
ASC X12	3%	11%	5%	42%	29%	11%
EDIFACT	3%	0%	3%	32%	53%	11%
UNICODE	0%	0%	5%	34%	47%	13%
X.400	0%	5%	0%	37%	47%	11%
X.500	0%	5%	0%	37%	47%	11%

State Library Agencies' Standards Activities

The survey asked for specifics on state library agencies' standards activities. Most are responsible for identifying, recommending, and promoting standards. What is surprising is that, in spite of the high percentage recommending standards (74%), only 32% were involved in evaluating standards. This would point to states' reliance on others for information about the value of particular standards. The number of states involved with education and implementation was also lower than the number recommending or promoting standards. Again, this would appear to indicate that states rely on a third party to ensure recommended standards are actually put into place. Table 4 shows the percentages for each activity for which state libraries say they were responsible.

Table 4
State Libraries' Standards Responsibilities

Activity	Yes	No	No Response
Recommend standards	74%	21%	5%
Promote standards	71%	24%	5%
Identify standards	68%	27%	5%
Educate about standards	55%	40%	5%
Require standards	45%	50%	5%
Implement standards	39%	56%	5%
Evaluate standards	32%	63%	5%
Adopt standards	29%	66%	5%
Other	3%	92%	5%

Standards Promotion
The respondents indicated how their agencies promote standards. Of the 38 survey respondents, 27 provided information about mechanisms used to promote standards that included:

- Written communication such as publications or mail (33%)
- Newsletters (26%)
- An electronic medium such as email or a listserv (22%)
- Personal contact or meetings (22%)
- Web site (15%)
- Training via presentations or workshops (15%)
- A technology plan (11%)
- Participation agreements (7%)
- Actual regulations (7%).

Eleven percent indicated they might recommend standards when consulting on a specific issue and eleven percent promote standards through Request for Information (RFI) or Request for Proposal (RFP).

Written Standards Policies and Procedures
Few agencies have written policies and procedures about standards (26%). Of those that do, most written documentation is for such things as automation or information technology standards. A number of respondents returned pertinent documentation with references to standards. These included a list of required standards for libraries to receive state and federal funds, guidelines for library automation standards, MARC record input guidelines, Z39.50 evaluation, digital library, virtual catalog and interlibrary loan information, information technology enterprise architecture standards, and strategic plans. Appendix F is a compilation of standards-related policies and processes for the states that identified the documents.

Perceived Advantages of Standards
The survey asked a series of questions related to perceived advantages provided by standards. Advantages to state libraries included networking and sharing of information (mentioned by 56% of those who responded to this question), cooperative buying (22%), a basis for vendor selection

(19%) and improved service (19%). Other responses included compatibility (15%), help in carrying out responsibilities (15%), avoidance of duplication (15%), readiness for new technology (7%), interlibrary loan (7%), and benchmarking (7%).

Advantages given for individual libraries within the state included compatibility, access to information, ability to migrate to new systems, and long-term cost savings. The most commonly stated advantage for local libraries was resource sharing (74%, or 23 of 31 that responded to this question).

Perceived Barriers to Standards Adoption
Though state library agencies for the most part see the benefits of using standards, there are barriers that prevent the adoption of standards. Cost was a major factor cited by 93% of the respondents. Lack of knowledge or expertise was given as a barrier by 60% of the respondents. Thirty percent mentioned factors related to geographical or political boundaries. Twenty percent of the respondents referenced vendor delays or availability of standards-compliant applications. Other factors limiting the adoption rate included lack of planning, lack of leadership, and problems with achieving consensus (17%). The applicability of standards was questioned by 13% of the respondents.

Strategies for Increasing Standards Adoption
The strategy for increasing the adoption rate was most often the use of funding as an incentive. Forty-four percent of the respondents to this question indicated that their agencies' link the receipt of grant funds to the use of standards. Only one state library has regulatory authority to actually require standards. Other methods used to increase the adoption rate included access to statewide network (25%), education (13%), and use of a formal technology plan that sets requirements (13%). Thirty-five percent stated they either have no strategy regarding increased adoption of standards or it is just not a priority. Thirteen percent will recommend a standard when appropriate to meet a specific need. Only nine percent indicated that they follow the work of standards organizations or professional associations.

Standards Compliance
Many state libraries (27%) do not monitor compliance by libraries with regard to the use of required or recommended standards. Those that monitor compliance do so by evaluating grant recipients (29%), conducting surveys or reviewing reports (21%), certifying technology plans or contracts (18%), or through on-site visits (6%). Fifty percent have consequences for non-compliance. These consequences include loss of funds (53%), inability to participate in statewide networks or union catalog projects (32%), inability to share information (5%), or loss of technical support (11%).

Perceived and Desired Roles for NISO and State Library Agencies
The survey asked questions related to perceived and desired roles for NISO and state library agencies. Respondents perceived NISO first and foremost as working with vendors to establish standards. Following this key role, the second most frequent response was that NISO provides general awareness and information about standards. Respondents also perceived NISO as being involved in prioritization, building consensus, education, and advocacy. One respondent

indicated awareness that NISO monitors international standards. On the other hand, 13% indicated that they do not know what NISO's role is or indicated "n/a" on the questionnaire. In addition to these activities, respondents indicated NISO *should* be involved with education about the implications, benefits or consequences of standards (57%), disseminating or publicizing information (33%), soliciting input from others on the design of standards (27%), and explaining things in plain English (20%). There were suggestions given for NISO to have a higher profile, to communicate more with state agencies, to push information out to interested parties, and to have a more direct liaison role with associations such as COSLA and ALA, particularly with standards subcommittees. NISO should also provide more timely updates on standards under development and provide more online and/or "free" information.

State libraries perceived their roles related to standards include training (66%), awareness about standards (47%), promoting the use of standards (38%), overall leadership in standards activities (25%), giving technical advice and assistance (25%), providing incentives for adoption of standards (22%), and formally adopting standards (13%).

Interestingly, 26% of the respondents did not think state libraries should be involved with the development of standards. However, 74% indicated they should be involved and, of these, 29% indicated appropriate involvement included serving on committees. Other involvement could take the form of providing input on proposed standards (21%), providing feedback about the local impact of proposed standards (4%), or facilitating the communication process between libraries within the state (4%). Seven percent of the respondents suggested representation through an organization such as COSLA, and others indicated state libraries should become NISO voting members either directly or through COSLA or ALA (18%). Seven percent stated generally that the standards process should be supported. Several respondents mentioned a lack of technical expertise that prevents some states from participation in the standards development process.

When asked about future roles, a common response was that agencies must have current knowledge of technology. There will be an increasing need for state library agencies to develop staff that has the required expertise, according to one-third of the respondents to this question. There will be heavier promotion of standards, and increased investment in systems infrastructure was recognized as a future requirement. Respondents indicated that state library agencies should take a leadership role in development of infrastructure, resolution of issues, and ensuring libraries understand the importance of standards.

Where New Standards Are Needed
The final survey question asked for input on where new standards are needed. There was an array of answers but more than one respondent mentioned electronic publishing, digitization, and a more specific Z39.50 standard and retrieval. Respondents indicated a variety of applications for which new standards are needed, including:

- Resource sharing
- Circulation statistics/patron record information
- Electronic statistics
- Electronic ILL

- Search engines/searching technology
- Smart library cards
- Materials for the handicapped
- Video
- Common data standards for government information
- Patron authentication
- Archiving of electronic serials and metadata.

This section presented the findings from the questionnaire. Based on the findings, the researchers developed brief summary profiles for the individual states (see Appendix C). These findings formed the basis for the telephone interviews with ten state library agencies through which the researchers collected data to understand more clearly and provide additional context for the findings from the questionnaire.

4.2. Documentation

An objective of the study was to get an indication of the standards documentation state library agencies have developed. However, most states do not have formal, written policies and procedures related to standards. Fourteen of the thirty-eight respondents either returned standards-related documentation with their questionnaires or referenced a web site address (in the form of a uniform resource locator, URL) for pertinent documents. Several states have written policies for library automation while others have guidelines for systems hardware, software, and telecommunications. Appendix F contains a list of the standards-related documents identified by the state library agencies.

The most frequently mentioned standards in the documentation are Z39.2 and Z39.50. Other standards covered include multiple NISO standards, interlibrary loan protocols, cataloging rules (e.g., Anglo-American Cataloguing Rules), and more. Table 5 shows which standards are referenced in the documentation. More detailed information may also be found in the state profiles in Appendix C.

Table 5
Standards Referenced in State Libraries' Documentation

State	Library Automation	Hardware/ Software	Z39.2/ MARC	Z39.50	Other
Indiana	✓	✓	✓	✓	Z39.44, Z39.58
Iowa			✓	✓	ILL, AACR2
Wyoming		✓			ILL, Video
Delaware					Digital Library
Utah	✓		✓		AACR2, ISBN, ISSN, STRN, CCIT
Texas	✓		✓	✓	AACR2, ISBN, ISSN, STRN, IEEE 802, Z39.47, Z39.58, ANSI IT9.1, ISO 9660, AIIM MS44, SGML, CCITT
Massachusetts			✓	✓	TCP/IP, ISO 10160/61, ISBN, ISSN, HTML, SIP2, Z39.81
Colorado			✓		AACR2
Kentucky		✓			Video
Minnesota	✓		✓	✓	X3, X12, X.25, X.75, X.400, X.500, CCITT, FDDI, ISDN, ISO 2709, ISO 8879, ISO 10162/63, VT 100, Codabar and Code 39, ISBN, STRN, AACR2, ISSN, Z39.9, Z39.44, Z39.45, Z39.47, Z39.49, Z39.55, Z39.56, Z39.57, Z39.58, Z39.63, Z39.64, Z39.69, Z39.70, Z39.71, Z39.80, EDIFACT, ILL, UNICODE
New York			✓	✓	ISO 10160/61
North Carolina	✓	✓	✓	✓	AACR2, LCSH, Z39.44, ISBN, ISSN, STRN, Codabar or Code 39, Z39.58, telnet, HTTP, IEEE 801, Z39.47, UNICODE
Wisconsin				✓	
Connecticut			✓		ILL
Florida			✓	✓	TCP/IP

4.3. The Telephone Interviews

The study's design included semi-structured telephone interviews that provided the opportunity for more in-depth data gathering. The interviews offered the researchers richer, site-specific information from a purposeful sample of state library agencies actively promoting and using standards (see the selection criteria described in Section 3, Methodology). The interviews explored data from the survey questionnaire and allowed the agency respondents to identify and discuss standards topics of interest to them.

Several focal themes emerged across the interviews:

- Roles and responsibilities of state library agencies
- Impact of automated systems and the digital revolution
- Resource sharing responsibilities drive standards policies and activities
- Standards information in the appropriate form and at the right time
- Roles and relationships of NISO, COSLA, and state library agencies

These deserve attention and are explored below.

Roles and Responsibilities of State Library Agencies
A minority of agencies has missions that specifically address the use standards (13%) or have legal responsibilities for setting standards (26%). However, data from the questionnaire indicated that there is a number of important roles agencies can assume related to standards:

- Establishing standards or setting requirements
- Making recommendations about standards
- Promoting standards
- Education or training
- Consulting or modeling best practices
- Identifying or informing about standards
- Ensuring the use of standards-compliant products
- Coordination of statewide cooperative activities
- Grant assistance
- Actually developing standards when local needs require.

Respondents in the telephone interviews expanded on a number of these roles, and the constraints on agencies in addressing these.

- **Leadership:** Local libraries and systems look to the state library agency for information and leadership on standards. State library agencies have a statewide perspective for library services and services. Respondents noted that agencies could act as a filter for local libraries by identifying and evaluating potentially useful standards and making that information available. This recognizes the likely lack of staff and resources at the local library level to accomplish such identification and evaluation of standards. The state library agency can highlight critical standards within the context of statewide directions

and goals. Another benefit of this form of leadership is that state recommendations on standards often carry substantial weight with local funding authorities of local libraries.

A number of respondents indicated that other state agencies promulgate standards related to networking, telecommunications, and computing, but often those agencies lack the knowledge of standards related to library applications. Another role for the state library agency is to ensure that the standards needs and opportunities of the state's library communities are visible to the appropriate standards-setting agency in the state government. One respondent described how the state library works with another state agency that sets standards related to "cables and wires" to makes it aware that there are other standards needed for organizing and accessing information. "Connectivity is not

These comments complement the responses on the questionnaire regarding perceived roles and responsibilities that include consulting, recommending standards, and informing the state's libraries. However, providing standards information to the state's libraries means that the agency must be aware of standards, be able to access information about standards, and be ready to address questions and problems related to standards. Serving the state's libraries with standards information is one of the key motivations for the agencies' desire for better information in appropriate packaging at the right time as discussed below.

- **Using Grants to Achieve Standards Use:** A number of respondents indicated their agreement with the statement "money is the hook, not standards." While "moral suasion" is a valuable approach, state library agencies put standards use as a requirement for access to funds for statewide initiatives as well as for Federal funds, such as Library Services and Technology Act (LSTA) and E-Rate funds. In some states, libraries must supply technology plans as a condition for receiving grant funds. The agencies leverage the funds to achieve standards compliance because they believe standards-based approaches will be more cost-effective and will enable local libraries to participate in statewide resource sharing initiatives.

- **Training and Education:** In the area of training and education, most of the respondents' agencies do not do the actual training, but often provide grant assistance to local libraries or systems for training on standards. This reflects the limitations of staff available at the agency to do the training. Yet the agencies can and do provide incentives and resources to local libraries and systems through available grants for standards training. If agencies are involved with training, it often takes the form of training the trainers, who then take the training to the field.

State library agencies, as leaders for one or more library communities, have opportunities to demonstrate leadership in the standards arena.

The Impact of Automated Systems and the Digital Revolution
A number of the respondents indicated that the networked environment that has emerged in the past ten years is putting the need for standards in sharp relief. Compatibility, interconnectivity, and interoperability among systems require the use of standards.

There are several levels at which state library agencies perceive standards as critical. For a single library the migration from one system to another is more easily accomplished if the original system was standards-based. For example, having a MARC-compliant system makes it easier to protect the investment in the bibliographic records when migrating to a new system. And in anecdotal reports on the cost of non-compliance to standards, several respondents mentioned the problems and costs for local libraries if they had chosen a non-MARC or developed a "home-grown system" when it came time to migrate to a new system.

For multiple systems (e.g., regional systems, consortia, and statewide projects), standards such as Z39.2 (MARC) and Z39.50 (Information Retrieval) provide opportunities for building physical and/or virtual union catalogs. Respondents indicated that standards are necessary for the various digitization projects in which they or their state's libraries are engaged. The primary context is the ability of the libraries to share resources effectively in the networked environment, and respondents perceived standards as vital for sharing resources. One respondent discussed how standards define or provide assurance of "minimal readiness levels" for new technologies and projects. Standards provide technical infrastructure components that then enable the library to do other things, such as "share records, communicate across library catalogs and other resources, and provide home delivery of information."

Respondents also recognized that the networked environment presents a more complex standards arena in that many standards are necessary to achieve the interconnectivity and interoperability desired. (For an example of this, see Table 5 and the entry for Minnesota.) In addition to application level standards such as Z39.50 or data interchange standards such as Z39.2, there are a range of networking standards, computer standards, and others that are needed. Respondents said they needed to know more about NISO standards and how they could be used to support their mission, but they also want assistance in identifying and understanding non-NISO standards they are encountering. Several respondents asked whether NISO was an appropriate organization to provide information on the whole range of standards useful to libraries, whether or not they were NISO or ISO standards.

Resource Sharing Responsibilities Drive Standards Policies and Activities
Respondents explained that while state library agencies see standards as vital, it is the context of their mission and goals to support statewide resource sharing that drives their recommendations for and use of technical standards. The standards being referenced in written policies or as requirements to receive state grant funds often enable a state's libraries to share resources. Standards are evaluated for their utility in serving resource-sharing goals or other cooperative projects. This translates into their need for standards information that explains the utility of a standard, its costs, and the problems of resource sharing it can solve. State library agencies will promote a standard that serves its mission and goals.

This also translates into efforts by NISO to target the state library agency community with information about standards that complement the resource sharing mandate rather than simply trying to inform them about all standards. In making a case for standards adoption, a number of respondents suggested that focusing on the outcomes of using standards-based information technology is critical. When purchasing technology, the outcomes are primary concern and not the fact that they are standards-based, especially in being accountable to their funding organizations.

Standards Information in the Appropriate Form and at the Right Time
In general, state library agencies do not have staff dedicated to standards identification and evaluation or other standards responsibilities. Respondents identified their own strategies for maintaining awareness of what other states are doing and what standards might be useful to them. Corroborating the questionnaire data, a number of respondents stated that they need information about standards in more accessible language (i.e., "plain English") than the technical language of a particular standard. Specifically, they want "Readers Digest" versions of the standards that would describe the:

- Utility of the standard
- Benefits using the standard would bring
- Costs of implementing (and not implementing) a standard
- Details on what a library must do to implement a standard.

Respondents stated that appropriate standards information is vital for them when they need to make the case for or recommend standards that are costly and may be complex to implement, especially for smaller libraries.

State library agencies have jurisdiction over a range of state libraries (see Table 1). Neither the state library agencies nor the states' libraries comprise a homogeneous and monolithic community of standards users. As discussed below in Section 5, state library agencies vary widely in their levels of standards adoption, promotion of standards, and capabilities in identifying and evaluating standards. The libraries under the agencies' jurisdiction vary widely in their needs, abilities, and available resources. Several respondents suggested that standards are enablers for other activities (e.g., participation in statewide resource sharing initiatives, union catalog development, etc.) and useful standards information needs would address how a particular standard or suite of standards can enable libraries to develop services and programs and participate in statewide cooperative projects.

While most of the respondents indicated an interest in learning more about NISO and its standard development process, their critical requirement is access to appropriate information about specific standards, packaged for use in making the case to their states' libraries, and available in a just-in-time context.

The Roles and Relationships of NISO, COSLA, and State Library Agencies
The telephone interviews identified various roles and responsibilities as well as relationships between NISO, COSLA, and the state library agencies. There was general agreement among the respondents that NISO plays an important role in developing standards and working with the

vendor community. However, the respondents highlighted the need for good information packaged appropriately. Their suggestions for what NISO can do fall generally into the category of "providing standards information services;" for example, they suggested specifically that NISO could provide better information, offer training and education possibly through video conferences, and do current awareness sessions at COSLA meetings.

Respondents were less clear about their agencies' participation in actual standards development, yet they indicated a desire to review draft standards, provide input into the process, and generally keep up with what NISO was doing. A number of respondents mentioned that they do not have the staff to commit to standards committee participation. Yet, several suggested that state library agencies should participate in voting on draft standards, and that COSLA should become a NISO member with voting privileges. To carry this out, however, they recognized that COSLA would need to put in place mechanisms to have state library agencies review draft standards, compile the comments, and then submit their vote. There was also the suggestion that NISO consider having COSLA represented on its Board of Directors.

Since many state library agencies have staff that deal with standards (either explicitly as part of their job description or implicitly in their consulting and interaction with a state's libraries), respondents expressed a desire for a way to set up a network of state library agency staff who work with standards. One respondent suggested NISO look at the existing model of the Federal State Cooperative System (FSCS) of data coordinators for the collection of public library statistics. In this model there is a designated person responsible for statistics collection, and the entire group meets annually. Both COSLA and NISO would play important roles in jumpstarting such a network. COSLA could make available on their website the opportunity to participate in such a network by establishing a listserv and identifying points of contact in each state library agency; the suggestion was for a staff person, not the Chief Officer level. NISO could use this network for getting targeted information (e.g., draft standards, standards updates, new action items, etc.) out to the state agencies. It could host an annual one-day meeting for current awareness and standards updates. But most importantly, the respondents suggesting this network of standards "junkies" see it as a valuable tool to help each state know what others were doing, sharing information, and assisting one another.

In conclusion, the telephone interviews provided a close look at the various arrangements, attitudes, and practices across a selected group of state library agencies. Even within this selected group, the heterogeneity was remarkable. Yet, common concerns emerged and certainly the respondents had consensus that a key role for NISO for state library agencies is as a provider of standards information.

5. Levels and Drivers of Standards Adoption

This section delves further into the data from the questionnaire, the state library agencies' documentation, and the telephone interviews to provide a more detailed perspective on the levels of standards adoption and the drivers for adoption by the agencies.

An analysis of the data indicates that these two topics are closely related. This section addresses the following questions:

- Is it true that many state libraries do not use or promote the use of standards? If so, why? If not true, how do they promote them and to what extent are they used?
- Who are the states that do not promote standards? What are their characteristics?
- What are the characteristics of high adopters?
- Does statutory responsibility result in a higher level of standards adoption?
- Have libraries been slow to adopt standards because of the cost, or is there some other reason?
- If cost is a barrier, does this directly impact the adoption rate?
- Is there a chain of events that leads to a high adoption rate?

Following the analysis on standards adoption is a discussion on the motivation for state library agencies to use standards. The discussion suggests a perspective for understanding why certain standards have a high adoption rate among the agencies.

5.1. An Analysis of Levels of Standards Adoption

Based on the questionnaire data, the 38 states library agencies can be classified as high-, mid- or low-level adopters of standards. The level with which states require or recommend the various standards listed in the questionnaire was used as the criterion to make this determination. High-level adopters are those requiring or recommending five or more standards, mid-level adopters are those requiring or recommending two to four standards, and low-level adopters are those requiring or recommending fewer than two standards. Tables 6 to 8 summarize the levels of standards adoption.

Table 6
Level of Standards Adoption: High-level Adopters

States	NISO standards	Other	Total
Nebraska	11	4	15
Texas	8	6	14
South Dakota	8	4	12
Delaware	7	2	9
Washington	6	3	9
Wyoming	6	3	9
Minnesota	6	0	6
Illinois	6	0	6
Iowa	6	0	6
Wisconsin	4	2	6
North Carolina	5	0	5
Oregon	5	0	5
Idaho	3	2	5

Table 7
Level of Standards Adoption: Mid-level Adopters

States	NISO standards	Other	Total
Indiana	4	0	4
Michigan	4	0	4
Georgia	4	0	4
Florida	3	0	3
Massachusetts	2	0	2
Missouri	2	0	2
Colorado	2	0	2
New Jersey	2	0	2
New York	2	0	2
Kansas	2	0	2

Table 8
Level of Standards Adoption: Low-level Adopters

States	NISO standards	Other	Total
Connecticut	1	0	1
Kentucky	1	0	1
Rhode Island	1	0	1
Nevada	1	0	1
Pennsylvania	1	0	1
Maine	1	0	1
Utah	1	0	1
South Carolina	0	0	0
Maryland	0	0	0
Montana	0	0	0
Arizona	0	0	0
Virginia	0	0	0
Alabama	0	0	0
Louisiana	0	0	0
Ohio	0	0	0

The median number of NISO standards required or recommended is 2 and the mean is 3.1.
Table 9 summarizes the frequency with which specific NISO standards are required or
recommended and Table 10 summarizes the frequency with which certain other standards are
required or recommended (see Appendix E for titles of standards).

Table 9
Frequency of NISO Standards Required/Recommended

NISO Standard	Total	Required	Recommended
Z39.2	66%	37%	29%
Z39.50	63%	24%	39%
Z39.44	34%	16%	18%
Z39.9	32%	11%	21%
Z39.21	26%	8%	18%
Z39.58	21%	3%	18%
Z39.71	18%	13%	5%
Z39.57	13%	3%	11%
Z39.47	11%	3%	8%
Z39.56	11%	3%	8%
Z39.81	5%	0%	5%
Z39.76	3%	0%	3%
Z39.63	3%	0%	3%

Table 10
Frequency of Other Standards Required/Recommended

Standard	Total	Required	Recommended
ISO 10160	19%	3%	16%
ISO 10161	19%	3%	16%
ASC X12	14%	3%	11%
ISO 9000	5%	0%	5%
X.400	5%	0%	5%
X.500	5%	0%	5%
EDIFACT	3%	3%	0%
UNICODE	0%	0%	0%

Is there a relationship between the level of standards adoption and the states that promote standards? The questionnaire data indicate that 71% of the states include the promotion of standards as one of the activities for which they are responsible. When asked if they promote the **use** of standards, this percentage drops to 61%. However, based on these results and the variety of promotion methods described by respondents, we can safely say that most states view standards promotion as one of their roles. The most common method of promotion is written communication. More than 37% use access to federal or state funds as an incentive for libraries to adopt standards. However, fewer than 25% of the states promote standards using face-to-face communication.

Of those states that do not promote standards, there is overall a lower rate of adoption when compared to states that do promote standards. Table 11 presents information about the states that do not promote standards along with the number of standards that they require or recommend.

Table 11
States That Do Not Promote Standards

States	Number of Standards Required or Recommended
Maryland	0
Montana	0
Utah	1
Kansas	2
Arizona	0
Ohio	0
Washington	9
Virginia	0
Illinois	6
Louisiana	0
Maine	1
Connecticut	1
South Carolina	0
Florida	3

Among these states the total number of standards required or recommended is 23. The median is .5 and the mean is 1.6. These results appear at variance from the overall numbers of standards required or recommended by all respondents. The median number among states that do not promote standards is .5, whereas the median for all states is 2. The average is 1.6 among states that do not promote standards, whereas the average for all states is 3.1. Among those states that do promote standards, the median number of required or recommended standards is 4 and the mean is 3.9. Of the states that do not promote standards, 11 of 14 or 79% fall into the lower third of states by level of adoption. Only one-third of the states defined as low adopters indicate they promote standards. However, 80% of the mid-level adopters indicate they promote standards and 85% of the states defined as high-level adopters say they promote standards.

Though most states do not have written documentation related to standards, five of the thirteen high-level adopters have formal policies and procedures and an additional two reference related documentation on their web sites. This means over 50% of the high-level adopters have formal documentation to support their standards activities. Among all other respondents, six additional states say they have written policies and procedures. Two-thirds of these are mid-level adopters. Of the high-level adopters, more than half have a formal structure in place to support standards activities. These include standards committees, workshops, training or presentations. From these numbers it is appears that the presence of formal processes to support standards activities has a direct impact on the rate with which standards are adopted.

A few of the high-level adopters indicate they have no strategy for increasing the adoption rate of standards. Yet over 50% of the high-level adopters link the availability of grants or funding to standards adoption. Other methods to increase the adoption rate include use of a committee to review or recommend standards, general awareness or following the activities of standards groups, and monitoring vendor compliance.

Another characteristic of the high-level adopters is their belief that state library agencies should be involved in the standards development process. All but one of thirteen states (or 92%) say state library agencies should be involved.

One assumption at the outset of this study was that states with statutory responsibility for standards would have a higher adoption rate. The data collected did not confirm this assumption. Nebraska, Indiana, Delaware, Kansas, Pennsylvania, Virginia, New York, Wisconsin, Rhode Island and Florida have legal responsibility for standards (10 of 38 or 26%). Only three of these are categorized as high-level adopters, four are mid-level adopters and three are classified as low-level adopters.

Another assumption of the study was that cost has a direct impact on the adoption rate of standards. As previously stated, nearly all (90%) of those responding to this question indicated cost is a factor. However, the data reveal no variation in responses based on whether a state is a high-level adopter versus low-level adopter. Of those states responding to this question, 88% of low-level adopters say cost was a factor, 89% of mid-level adopters say cost was a factor and 92% of high-level adopters say cost was a factor. Table 12 shows the responses by adoption level (only those responding to this question are reported).

Table 12
Cost As a Barrier To Standards Adoption

	Low-adopters	Mid-adopters	High-adopters
Yes	7 (88%)	8 (89%)	12 (92%)
No	1 (12%)	1 (11%)	1 (8%)
Total Responding	8	9	13

Based on an analysis of the data collected, researchers attempted to determine the sequence of events that appears to lead to a high standards adoption rate. To do this, the researchers reviewed the specific standards required or recommended at various levels. The data to support this sequence of events are presented in the boxes below.

**States with 0 required or recommended standards
are considering adopting which standards?**

South Carolina: none   Virginia: none
Maryland: none   Alabama: none
Montana: Z39.2   Louisiana: none
Arizona: none   Ohio: none

Only one standard is being considered for adoption and that is Z39.2.

**States that require or recommend only 1 standard
are considering adopting which other standards?**

	Require/Recommend	May adopt
Connecticut	Z39.2	None
Kentucky	Z39.50	Z39.2, Z39.9, Z39.21, Z39.44, Z39.47, Z39.56, Z39.57, Z39.58, Z39.71, Z39.76
Rhode Island	Z39.2	None
Nevada	Z39.50	None
Pennsylvania	Z39.50	None
Maine	Z39.2	Z39.50
Utah	Z39.2	None

Four states required or recommend Z39.2.
Three require or recommend Z39.50.

<div style="border: 1px solid black; padding: 10px;">

States that require or recommend 2 standards
are considering adopting which other standards?

	Require/Recommend	May Adopt
Massachusetts	Z39.2, Z39.50	Z39.57, Z39.71
Missouri	Z39.2, Z39.50	None
Colorado	Z39.2, Z39.50	None
New Jersey	Z39.50, Z39.57	Z39.58
New York	Z39.2, Z39.50	Z39.44, Z39.56, Z39.57, Z39.58, Z39.71
Kansas	Z39.2, Z39.50	None

All require or recommend Z39.50.
83% require or recommend Z39.2.
Z39.57 is required or recommended by one state.

Z39.57 may be adopted by 2 states.
Z39.58 may be adopted by 2 states.
Z39.71 may be adopted by 2 states.
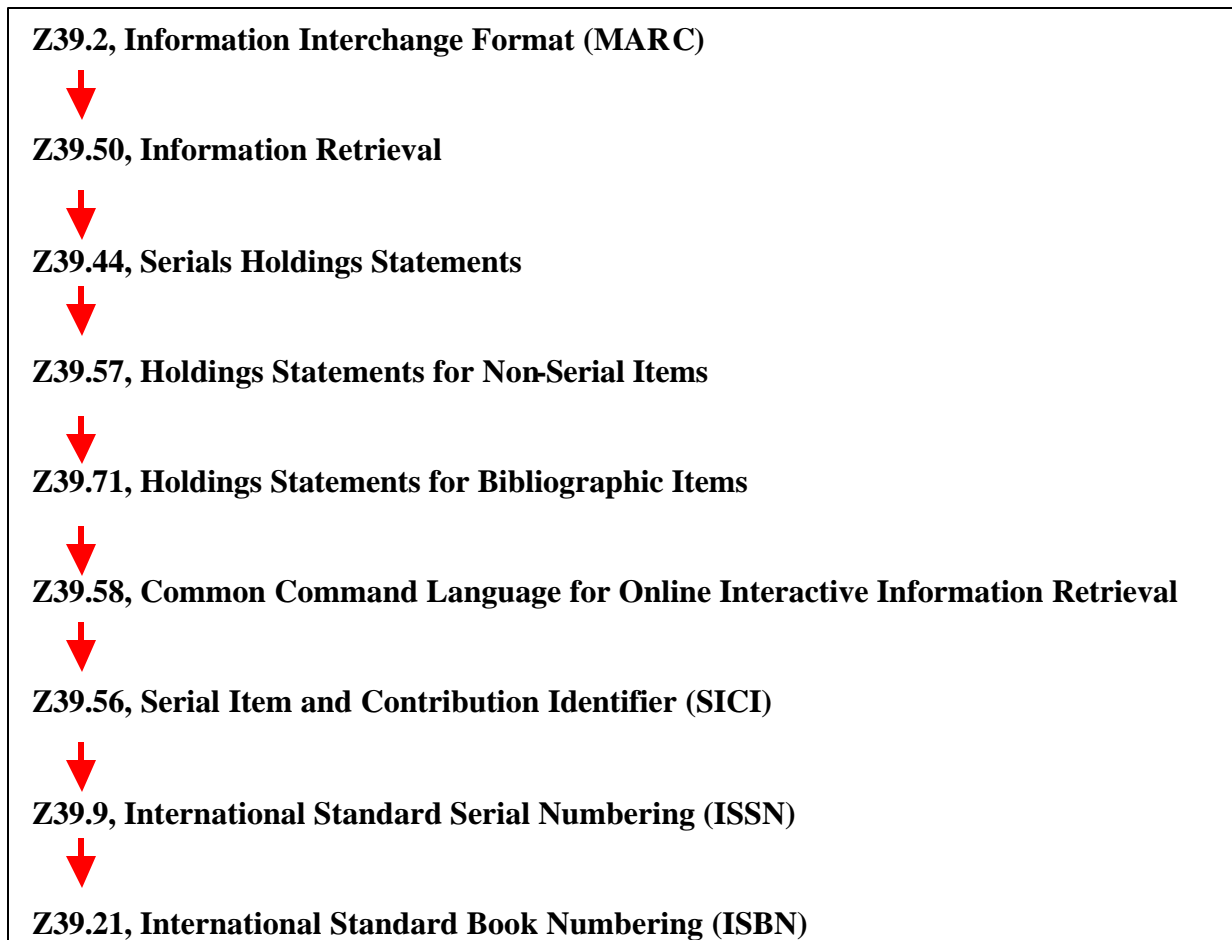Z39.44 may be adopted by 1 state.
Z39.56 may be adopted by 1 state.

</div>

<div style="border: 1px solid black; padding: 10px;">

Other mid-level adopters

	Require/Recommend	May adopt
Florida	Z39.2, Z39.44, Z39.57	Z39.71
Indiana	Z39.2, Z39.44, Z39.50, Z39.58	Z39.57, Z39.71
Michigan	Z39.2, Z39.9, Z39.21, Z39.50	None
Georgia	Z39.2, Z39.9, Z39.44, Z39.59	Z39.21, Z39.56, Z39.57, Z39.58, Z39.71

100% require or recommend Z39.2.
75% require or recommend Z39.50.
75% require or recommend Z39.44.
50% require or recommend Z39.9.
25% require or recommend Z39.21.
25% require or recommend Z39.57.
25% require or recommend Z39.58.

</div>

Based on the above evidence, progression from one NISO standard to others would appear to follow the pattern presented in Figure 1.

Figure 1
Sequence of NISO Standards Adoption

Z39.2, Information Interchange Format (MARC)

↓

Z39.50, Information Retrieval

↓

Z39.44, Serials Holdings Statements

↓

Z39.57, Holdings Statements for Non-Serial Items

↓

Z39.71, Holdings Statements for Bibliographic Items

↓

Z39.58, Common Command Language for Online Interactive Information Retrieval

↓

Z39.56, Serial Item and Contribution Identifier (SICI)

↓

Z39.9, International Standard Serial Numbering (ISSN)

↓

Z39.21, International Standard Book Numbering (ISBN)

Using this analysis, it may be possible to determine a particular state's standards stage by looking not only at the number of standards that have been adopted, but also by looking at the specific standards adopted for use. There appears to be a natural progression or evolution related to the adoption of standards as state library agencies become increasingly networked.

To test this analysis, the high-level adopters from the study should be the states that have adopted some of the newer NISO standards. Z39.71 is a new standard that is replacing Z39.44 and Z39.57. A review of the survey results shows that Nebraska, Wyoming, Delaware, Illinois and South Dakota require Z39.71 and Washington and Texas recommend it. All these states are high-level adopters. States that use the predecessors to Z39.71 are shown in the box below.

Z39.44		Z39.57	
State	**Status**	**State**	**Status**
Delaware	Required	Delaware	Required
Florida	Recommended	Florida	Recommended
Georgia	Recommended		
Illinois	Required		
Indiana	Required		
Iowa	Recommended		
Minnesota	Recommended		
Nebraska	Recommended	Nebraska	Recommended
		New Jersey	Recommended
North Carolina	Required		
Oregon	Recommended		
South Dakota	Required		
Texas	Recommended	Texas	Recommended
Wyoming	Required		

Of the states shown above, Georgia, Florida and New Jersey are mid-level adopters. The rest are high-level adopters of standards.

Looking at Z39.50 adoption, most states are mid- or high-level adopters as shown in Table 13.

Table 13
Who Requires or Recommends Z39.50?

Low-adopters	**Mid-adopters**	**High-adopters**
3 of 15 (20%)	9 of 10 (90%) (All but Florida)	12 of 13 (92%) (All but Iowa)

The Library Hi Tech reports from 1996 appear to indicate that if a state emphasized standards, by 1998 they were further along than others in the adoption of standards. In those reports Minnesota, Illinois and Iowa made frequent reference to standards. Texas, Wyoming, Wisconsin and North Carolina also made reference to standards. Recognition of the importance of standards seems to be a first step toward improving the adoption rate.

Lack of planning and lack of expertise were both identified as barriers to standards adoption. However, certain states farther along than most have implemented formal processes to support standards activities. Written policies and procedures send a message that standards are important. The presence of a committee or work group structure allows planning to take place and provides a forum for discussion of standards. States with formal training programs may

have more success with implementation of standards. At least one state has a joint working group with a regional network to develop standards recommendations and procedures. This appears to be highly effective.

Several states have a technology plan to better define goals and pathways to achieving objectives. Requiring local libraries to submit an annual report of progress toward goals also appears to support standards adoption and implementation.

Formal policies and procedures, a technology plan, and formal structures to support the standards process can be considered best practices in general terms. But even having these things in place does not guarantee a high standards adoption rate. With formal policies and procedures, a statewide library technical plan and even state regulations to back them up, New York is classified as a low-level adopter with only two standards required or recommended.

5.2. Identifying Drivers of Standards Adoption

A review of the data presented above raises an important question. What motivates state library agencies in their adoption of standards and which specific standards? This section uses data from the questionnaire and the telephone interviews to suggest answers to the question. Items on the questionnaire solicited responses regarding the advantages standards provide to the state library agency and the libraries in the state. For example, respondents indicated the advantages of standards for their agencies:

- Networking and sharing of information
- Cooperative buying
- Basis for vendor selection
- Improved service
- Compatibility
- Help in carrying out responsibilities
- Readiness for new technology.

The respondents indicated the advantages of standards for the libraries in their state:

- Compatibility
- Access to information
- Ability to migrate to new systems
- Long-term cost savings.

The most commonly stated advantage for local libraries was resource sharing.

The telephone interviews provided additional details on the motivation and drivers for standards adoption. Many of the respondents tied their use of standards to the mission and goals of the state library agency, with the primary goal being the improvement of resource sharing among libraries in their state.

As one reviews the inventory of NISO and other standards required or recommended (see Table 9) within the context of the primary goal of resource sharing, the highest utilized NISO standards can be seen as infrastructure standards that underlie a state's abilities to improve resource sharing. Z39.2 (MARC) provides a standard format for interchanging cataloging and other database records. Z39.50 (Information Retrieval) enables the linking and interworking of separate systems. The NISO standard related to holdings information provides mechanisms for librarians and patrons to identify locations of libraries that hold specific copies of needed materials.

State library agencies recognize that their environments are becoming increasingly complex as more and more libraries become automated and integrated into the networked environment. Respondents in the telephone interviews noted that standards become increasingly important as the need for access to electronic resources grows, as states become increasingly networked, and as statewide resource sharing projects become required.

The analysis presented in this section provides a perspective on the levels of standards adoption and the drivers for the adoption. Of the many standards NISO has developed, only two (Z39.2 and Z39.50) are required or recommended by more than 50% of the state library agencies. Smaller percentages of the agencies require or recommend a number of other NISO standards. A key issue for NISO in considering state library agencies—as a market for its products and services—is to understand the drivers for specific standards. Section 6 discusses this and other key issues emerging from this study.

6. Key Issues and Questions

One motivation for this study was to gather baseline information about state library agencies' standards policies and procedures. Previous sections in this report provided detailed looks at the data collected to present a picture of current practices and standards use. Another primary motivation for conducting this study was to discuss implications from the data and suggest recommendations for NISO, the state library agencies, and COSLA. This section addresses these aspects of the study by identifying key issues and challenges. Section 7 builds on the analysis of issues and provides a set of recommendations for action by NISO and the state library agencies.

From the questionnaire data, the documents examined from the state library agencies, and the follow-up telephone interviews, a number of key issues emerged:

- Information and education about standards needed
- Integrating the use of many standards
- NISO as perceived by state library agencies
- Heterogeneity of state library agencies and their roles and responsibilities for statewide standards adoption
- How to increase the levels of standards adoption
- Vendor implementation of standards
- Role of state library agencies in national standards development

The following sections discuss these issues.

The Need for Information and Education about Standards
Anecdotes from respondents to the telephone interviews provide an initial context for a discussion of the information needs of state library agencies. Several respondents indicated that while completing the questionnaire, they realized they did not know enough about technical standards and NISO to adequately answer the questions. From the data summarized in Table 14 about familiarity with NISO and its standards, it would be inappropriate to assume there is either broad or deep knowledge about technical standards that are integral to the mission and goals of the state library agencies. Respondents' level of familiarity with other standards organizations and their standards that impact libraries was even much lower.

Table 14
Familiarity with NISO and Its Standards

Very familiar with NISO	9 (24%)
Somewhat familiar with NISO	24 (65%)
Not at all familiar with NISO	4 (11%)
(37 respondents)	
Very familiar with NISO standards	4 (11%)
Somewhat familiar with NISO standards	28 (74%)
Not at all familiar with NISO standards	6 (16%)
(38 respondents)	

The data from the questionnaire indicate that the respondents have some specific information needs related to standards and suggest that NISO should be doing a number of things to assist them, including:

- Providing information about the implications, benefits, or consequences of standards (57%)
- Disseminating or publicizing standards information (33%)
- Explaining specific standards and their utility in plan English (20%).

The first and third bullet points were common discussion topics in the telephone interviews. Respondents in the interviews suggested that they need timely, specific, and understandable information about standards and their uses. Given the overriding mission of the state library agencies to support statewide resource sharing, respondents are interested in knowing about the standards that will assist them in carrying out mission-critical programs and services. The implication here is for targeted marketing of specific standards to the state library agencies rather than providing them information about all NISO standards. State library agencies want to be more knowledgeable but believe they must rely on others for information or for help in implementing standards.

Respondents also indicated need for current awareness information about what NISO is doing, updates on standards, and information about new standards initiatives. There is compelling evidence in the data to support this need. In a number of cases, documents from the agencies or responses on the questionnaire reference standards that have been withdrawn (e.g., the standards Z39.44-1986 and Z39.57-1989 are being replaced by Z39.71-1999: Holdings Statements for Bibliographic Items). State library agencies need to be aware that standards development is dynamic. While NISO has an excellent vehicle for disseminating current standards information in *Information Standards Quarterly*, the challenge is getting the information to the correct people in the state library agencies.

Given the importance of the need for information, NISO is faced with the question of how best to meet state library agencies' standards information needs.

Integrating the Use of Many Standards
Another facet to the need for standards information relates to non-NISO standards. The networked environment provides the potential for global access to information, but implied in such access is the integration of many standards to bring about the appropriate levels of interconnectivity and information interchange needed by the states. To the extent that state library agencies are familiar with NISO, they perceived NISO as developing and promoting library standards. Yet, their standards needs for the digital environment go beyond the standards that NISO develops. Internet standards, web standards, ISO standards, and others are being utilized by the states. Taking Minnesota as an example, the list of referenced standards is impressive:

> X3, X12, X.25, X.75, X.400, X.500, CCITT, FDDI, ISDN, ISO 2709, ISO 8879, ISO 10162/63, VT 100, Codabar and Code 39, ISBN, STRN, AACR2, ISSN, Z39.9, Z39.44, Z39.45, Z39.47, Z39.49, Z39.55, Z39.56, Z39.57, Z39.58, Z39.63, Z39.64, Z39.69, Z39.70, Z39.71, Z39.80, EDIFACT, ILL, UNICODE.

The data indicated, however, little familiarity with some of the key standards organizations producing standards of importance to libraries (e.g., W3C, IETF). In addition, state library agencies indicated need for new standards related to digitization, an area for standards likely not to be addressed by NISO. The question is whether NISO can assume a role as a source of standards information for such a range of standards and provide the environmental scanning service to identify for the state library agencies (and other national library communities) potentially critical standards coming from other organizations.

NISO as Perceived by State Library Agencies
NISO has some work to do in order to resolve differences between current or perceived roles and what state library agencies would like NISO's role to be. Respondents perceived NISO as:

- Working with vendors to establish standards
- Providing general awareness and information about standards
- Prioritizing what standards should be developed
- Building consensus on standards
- Educating about standards
- Advocating the use of standards
- Monitoring international standards.

The desired roles for NISO focus almost entirely on communication and information. Respondents gave specific suggestions for the type of information services NISO should offer and activities it should take on:

- Education about the implications, benefits or consequences of standards
- Disseminating or publicizing information, explaining things in plain English
- More timely updates on standards under development
- Soliciting input from others on the design of standards
- More direct communication with state agencies
- More direct liaison role with associations such as COSLA and ALA.

It is important to note, however, that with their low level of familiarity with NISO, respondents may not be aware of ongoing NISO activities (e.g., liaison with organizations) nor the information resources available from NISO and NISO Press. Yet there is the question: how can NISO bridge the perceived gap between what respondents think it should be doing and the variety of activities NISO is involved with and the resources it already makes available?

The Heterogeneity of State Library Agencies and Their Roles and Responsibilities for Statewide Standards Adoption
One assumption of this study was that state library agencies are in a position to affect standards adoption within a state's library communities. The data generally indicate that this assumption was warranted. However, the data also indicate that state library agencies vary widely in their size, structure, mission, and activities. This heterogeneity means that the state library agencies do not constitute a monolithic market for NISO. Instead, NISO will need to address the question: what are the common needs among state library agencies that would be the basis for NISO products and services. As discussed throughout this report, the information needs of the agencies provide a starting point for services.

Another commonality among many of the agencies is their leverage of grant funds to promote standards-based implementations in the library communities under their jurisdiction. With the appropriate standards information from NISO, the agencies could be more aggressive in their requirements for additional NISO and other standards as a condition for receiving funds.

Increasing the Levels of Standards Adoption
The data indicate a relatively low adoption rate of NISO standards. Section 5 discussed some reasons for this. Outcomes and money also play key roles in evaluating the utility of standards and recommending them for adoption. NISO needs to be wary of assuming that simply providing better information to state library agencies will increase adoption rates.

The data indicate clearly that state library agencies will promote, recommend, and require standards as they enable statewide initiatives and cooperative projects for resource sharing. This provides NISO with a clear opportunity to explain and market appropriate standards that can help state library agencies achieve their goals for statewide resource sharing. The challenge for NISO is to determine appropriate standards, explain their benefits clearly, and be able to demonstrate the utility of those standards in terms resonant with the needs of state library agencies.

Vendor Implementation of Standards
State library agencies overall do not "implement" standards. Instead, they are consumers (or recommend to other consumers) of standards-compliant technology products developed by others, particularly integrated library systems vendors. Respondents perceived NISO as working with vendors in the development of standards. They viewed NISO as in a unique position to have contact with vendors at the upper levels of management, and thereby NISO should have more influence on vendor compliance than individual libraries or state library agencies. Yet several respondents indicated time lags between the availability of a standard and its implementation in products. Others indicated that some vendor's implementation of standards did not produce the results desired to meet organizational objectives. What is NISO's role with the vendors beyond the development of a standard?

State library agencies can specify requirements for the technology products they need, and they assist local libraries in developing requirements and specifications for products. But a statement in an RFP, for example, that says "must conform to ANSI/NISO Z39.50-1995" is not sufficient. Disappointment with vendor products may result from a lack of detailed specification, especially in the use of particular standards. To what extent can NISO provide assistance to the state library agencies in explaining not only what a standard can do but also how it needs to be specified in an RFP?

The networked environment presents new challenges. No longer do vendor products stand alone, but must interwork with a variety of other systems. Standards are the glue that makes interconnectivity and interoperability possible. As noted above, a wide range of standards may come into play to achieve the interoperability between systems. What is the level of standards awareness by the vendors of the needs of the state library agencies and their states' local libraries?

The Role of State Library Agencies in National Standards Development
While a large number of respondents indicated that involvement in standards development is a role for state library agencies, they also indicated time and resource constraints on their ability directly participate in the standards development process. Some suggested that COSLA become a voting member of NISO as well as having a seat on the NISO Board of Directors. Yet, many indicated they would like the opportunity to comment on draft standards, and provide input on the benefits and burdens of implementing or using particular standards.

Again the lack of familiarity with NISO and its processes may be the problem here. NISO invites comments from everyone on its draft standards and offers free access online to the draft standards. The question for NISO is how to alert the state library agencies about the opportunities for input on the standards?

Readers of this report may identify other key issues that need to be articulated and addressed. But we offer these issues as primary ones that, if addressed, may assist NISO and the state library agencies.

7. Recommendations and Conclusion

Based on the questionnaire data, the in-depth interviews with selected agencies, and a review of agencies' standards-related documents, the researchers propose a series of recommendations for NISO, and for the state library agencies and the Chief Officers of State Library Agencies (COSLA). The recommendations that follow are categorized as recommendations for NISO and those for the agencies and COSLA.

Recommendations for NISO:

- Develop appropriate standards information services that address the needs of the state library agencies
- Increase communication and outreach to state library agencies to improve NISO visibility
- Recognize that libraries need standards information on NISO and non-NISO standards to address the challenges of the digital and networked revolution
- Provide a clearinghouse for national projects that utilize NISO standards and assist in coordinating a network of state library "standards junkies"
- Publicize membership options to state library agencies.

Recommendations for State Library Agencies and COSLA:

- Support standards implementation by the states' libraries
- Improve communication and information sharing among state library agencies
- Use state library agencies' websites more effectively to promote and share information about standards
- Support NISO through membership and participation in the standards development process.

The following sections discuss each of the recommendations and suggest specific actions.

7.1. NISO Recommendations

The following recommendations are based on the assumption that NISO sees the state library agencies as an important clientele to serve. Further, a number of these recommendations have broader utility for NISO activities; action on the recommendation can serve state library agencies but other NISO constituents as well. The researchers are cognizant of resource constraints of state library agencies. In addition, the reality that NISO is a membership organization means that there may be several levels of services and products at different price points for members and non-members. The economic impact of these recommendations are not addressed here, but the researchers assume that NISO may need to consider some activities as basic information

services provided at no cost while others are value-added standards information services and products that would provide a potential revenue stream to NISO.

<div align="center">

Recommendation

***Develop appropriate standards information services that
address the needs of the state library agencies.***

</div>

The results of the study are unequivocal regarding state library agencies' needs for standards information. NISO can help state library agencies by keeping them informed and providing enough information for them to stay abreast of changes related to standards. NISO can help them be more knowledgeable and that knowledge can assist the state library agencies in their work with local libraries. However, attention must be paid to the form and content; NISO must package the information appropriately to address those needs. Specific actions NISO could consider are:

- Identify the specific NISO standards that can be used by state library agencies to meet their mission and goals
- Explain standards in easy-to-understand language
- Develop packages of standards information for audiences with varying levels of interests and technical expertise (e.g., high-level overview of a standard with focus on importance and utility; "Reader's Digest" version summarizing the functionality, specifications, and implications; and detailed technical specifications implementation guidance)
- Explain the importance and benefits of specific standards
- Explain the implications and costs of not using the standards
- Consider an "Ask a Standards Expert" service.

Information kits could be packaged that address high priority state library agencies' initiatives. For example, kits could address: Standards for Establishing a Statewide Virtual Catalog; Standards for Digitization of Textual Documents. These kits could also include best practices and other helpful information.

<div align="center">

Recommendation

***Increase communication and outreach to state library agencies
to improve NISO visibility.***

</div>

NISO should target outreach efforts to the state library agencies and COSLA. This will increase NISO's visibility and improve two-way communication. Several specific actions can begin this process:

- Provide standards update at annual COSLA meeting
- Promote NISO's website more effectively so people know it is available and are aware of the types of information to be found there

- Prepare a one-time document targeted at and distributed directly to all state library agencies providing information about NISO, services and products offered, and opportunities for involvement in standards development (e.g., free access to draft standards for comment and review)
- Prepare a short paragraph on the importance of standards and work with COSLA to get state library agencies to include the statement on their websites.

Recommendation
Recognize that libraries need standards information on NISO and non-NISO standards to address the challenges of the digital and networked revolution.

Providing library services and supporting resource sharing in the networked environment means that a host of standards are required. Many of these standards will not be NISO standards. NISO has a number of critical standards that are being utilized by states for statewide resource sharing, but there are other critical non-NISO standards that the agencies need information about such as UNICODE, XML, etc. NISO can provide an extremely valuable service by serving as a portal and information source for the selected standards necessary to state library agencies in pursuing statewide networking initiatives. Standards information services offered by NISO would certainly improve NISO's visibility among the state library agencies and demonstrate that NISO is the library community's standards leader. Specifically, NISO can:

- Work with leading state library agencies to identify the standards they are using (much of that information is contained in this report)
- Create a web resource that lists these standards, with links to descriptions and projects using them.

Recommendation
Provide a clearinghouse for national projects that utilize NISO standards and assist in coordinating a network of state library "standards junkies."

Respondents indicated that they lack a systematic way to find out what other states are doing regarding standards. In part, this is beyond the control of NISO. However, in conjunction with COSLA and the state library agencies, NISO could:

- Provide space on its website that would serve as a clearinghouse for standards-based initiatives and projects
- Solicit descriptions and evaluations of projects that utilize NISO standards
- Develop and publish a list of key contacts for standards information in state library agencies (i.e., the "standards junkies")
- Create/host a listserv for use by the state library agencies' staff that have standards responsibility.

<u>Recommendation</u>
Publicize membership options to state library agencies.

Given that a number of respondents indicated involvement in standards development is an appropriate role for state library agencies, NISO should solicit their involvement. Currently, there are two levels of membership in NISO: 1) Voting Member and 2) Member of the Information Standards Forum. Because of the lack of familiarity with NISO, NISO should encourage membership in the Information Standards Forum. Many state library agencies are likely not aware of this membership option. Because of the unique position of state library agencies to influence the adoption of standards, special consideration for membership may be warranted. One option would be for a special membership class at a lower rate; the justification would be that state library agencies' use and promotion of NISO standards throughout the state could have a positive effect on NISO revenues from standards and standards information resulting from the secondary market of the states' individual libraries.

7.2. State Library Agency and COSLA Recommendations

Survey respondents indicated state library agencies would be increasingly involved with standards. In addition to the roles indicated in the findings, the agencies should be prepared for the following:

- There will be increasing pressure to show the benefits of statewide projects, which will increasingly rely on standards for complete and successful implementation
- There will be varying levels of technological expertise at individual libraries throughout the state causing greater reliance on the state library agency for support and guidance.

Access to appropriate standards information will be a great help to the agencies as they respond to these challenges. However, there are a number of things that the agencies and COSLA should consider.

<u>Recommendation</u>
Support standards implementation by the states' libraries.

Most state library agencies recognize the advantages that come with the deployment of standards-based information technology. That recognition has led them to promote and encourage standards implementation among their states' various library communities. This leadership role must continue. Supporting standards implementation is essential.

There are at least two ways agencies can demonstrate leadership in their support for standards implementation:

- Ensure their own information technology environment is standards-based and thus become a model for standards implementation
- Require adherence to standards for state agency and federal funds for information technology purchases.

The latter method is currently used by many of the agencies to encourage standards implementation by libraries. The recommendations that follow can assist in supporting standards implementation through provision of standards information by the agencies and COSLA.

<div align="center">

Recommendation

Improve communication and information sharing among state library agencies.

</div>

Based on the responses, there is a number of knowledgeable staff in various state library agencies. Yet some agencies face the challenge of dealing with standards without the technical expertise available from their staff. Specific actions appropriate for agencies and COSLA are:

- Assist and work with NISO to establish a network of standards experts, one in each state library agency
- Assist and work with NISO to establish a clearinghouse of standards-based projects and initiatives.

Specifically, COSLA could consider using its website to

- Provide a list of state library agency standards contacts
- Encourage the Chief Officers to have their staff participate in the network of standards experts and submit information the clearinghouse.

<div align="center">

Recommendation

Use state library agencies' websites more effectively
to promote and share information about standards.

</div>

Most all state library agencies have some web presence. The use of these websites for providing standards information to state libraries is essential. Specific actions the agencies can take include:

- A well-organized standards section for their websites
- A link to the NISO website and other appropriate standards organizations websites
- A link to other states' standards documentation or a national clearinghouse

Specifically, COSLA could:

- Encourage its members to use their websites for publishing and sharing standards documentation, policies, and technology plans.

<u>Recommendation</u>
Support NISO through membership and
participation in the standards development process.

NISO is the library communities' standards developing and standards information organization. It relies on membership dues and revenues from its products and services for its existence. Many of the recommendations in Section 7.1 suggest new and value-added activities for NISO to better serve the state library agency community. The state library agencies and COSLA must be cognizant of their responsibilities in supporting NISO. A reciprocity is essential to safeguard NISO's role and to assure that the nation's library communities have the standards they need for delivery of services in the networked environment. Many respondents suggested that the state agencies should be involved in standards development. Yet only one respondent had membership affiliation with NISO through an organizational partner. Involvement with the standards development process and NISO support can take a number of forms, all which should be considered by COSLA and the state agencies:

- COSLA should become a voting member of NISO
- State library agencies should become members of the Information Standards Forum
- Agencies should provide input on draft standards (which are available freely online)
- Agencies should be prepared to expend resources (staff time and funds) to take advantage of NISO-sponsored training and workshops as well as purchasing value-added information services from NISO.

The recommendations presented here provide specific actions that NISO, state library agencies, and COSLA can take to improve communication, increase knowledge of standards, and support library services and programs.

7.3. Summary and Conclusion

This study described the extent to which standards, especially NISO standards, are utilized in an important library community. Although only one quarter of the respondents have written policies or legal responsibilities for standards setting for their state's libraries, the vast majority of the respondents acknowledged the vital importance of standards. Most respondents expect that the role of standards in the digital environment will become even more important, and likely more complex.

The results indicated, however, varying levels of standards adoption and use among state library agencies. This data can enable NISO to target already active state library agencies, or those that seem poised to move more strongly into promoting and using/mandating standards, with value-added standards information services and products. Two categories of agency standards adopters already recognize the importance of standards and are actively promoting, using, or requiring standards. Another category of agencies is the minimal adopters of standards, and these agencies' standards information needs are likely less sophisticated. The important point is that the state library agencies are not a homogeneous group and different marketing strategies to reach these agencies will be necessary.

A key consideration for NISO is to investigate appropriate packaging of standards information for the state library agencies. While there was some familiarity with NISO standards, the questionnaire and the telephone interviews suggested that this familiarity did not mean a deep understanding of the standards and their importance. This was the basis for the various recommendations relating to information sharing and packaging standards information appropriately. Since the state library agencies may see themselves in the roles of trainers, educators, and intermediaries to their states' libraries, they have a need for appropriate training materials on various standards. Further, for those agencies that are implementing standards or requiring standards when issuing grant funds, the information needs of the staff seem to be characterized as "just-in-time" rather "just-in-case." This suggests that potential standards services NISO might consider would include serving as a source for "just-in-time" standards information. One potential model to examine is the popular Internet-based "Ask a [specialist]" services. Any just-in-time service by necessity must be web-based.

Because the roles of the state library agencies are multi-faceted, their organizational structures are diverse, and their status as a arbitrator or setter of standards for an individual state's libraries are varied, it is difficult to see the agencies as a homogeneous customer base for NISO. Yet, many of these agencies play a pivotal role in the use of technology, and therefore standards, in their states. Further, the respondents indicated that the increasingly digital environment would increase the need for and importance of standards. The agencies, while possibly a small customer base in absolute numbers, can or do have positions of influence over a large number of potential NISO customers and customers of technology vendors who are NISO members and implementors of NISO standards.

The investigators conclude that the state library agency community will likely not be a major market base for NISO standards. They may constitute, however, a significant market for appropriate, value-added standards information services. Even more important, they may serve as a conduit for and/or promoter of standards to the states' individual libraries. By serving well the state library agencies' standards information needs, NISO may well develop a larger, secondary market of the states' libraries. The study's data,
words describing the benefits, importance, and utility of standards as well as their standards information needs, can be a basis for NISO to expand its standards information services to serve this community.

References

Moholt, Pat. (1988). Library networking: The interface of ideas and action. Washington, DC: U.S. Department of Education, Office of Library Programs.

Library Hi Tech. (1996). State of the state reports: Statewide library automation, connectivity, and resource access initiatives. Special Double Issue. *Library Hi Tech, 14*(2-3).

Appendix A
Survey Questionnaire

The National Information Standards Organization's Study of
State Library Agencies' Information Technology Standards Policies & Procedures

This questionnaire is part of a study sponsored by the National Information Standards Organization (NISO). This study will compile information about state library agencies' standards policies and procedures as they relate to the use of technical standards for information systems and services (e.g., library automation, digital libraries, networking, Internet/Web, and electronic publishing) by each state's library communities. The study will document the range and extent of state library agency standards policies and identify the concerns of State Librarians regarding technical standards used by libraries. NISO is interested in identifying how state library agencies address the formal technical standards needed state-wide by libraries and developing appropriate services to assist agencies in their standards activities.

Please provide complete answers to the following questions and return the copy by **July 15, 1998** in the self-addressed envelope provided. An electronic version of this questionnaire and instructions for completing and returning it are available at: <**http://www.unt.edu/wmoen/projects/NISO/questionnaire.htm**>.

Questions about this study should be directed to William E. Moen, Principal Investigator, at: <**untniso@unt.edu**>. Thank you for your participation and cooperation in this study.

A. Your Familiarity with National and International Standards Organizations

1. Please indicate your familiarity with the National Information Standards Organization (NISO).
_____ Actively support (e.g., member, participant in standards developing committees, etc.)
_____ Very familiar
_____ Somewhat familiar
_____ Not at all familiar

2. Please indicate your familiarity with NISO **standards**.
_____ Very familiar
_____ Somewhat familiar
_____ Not at all familiar

3. Please indicate your familiarity with the International Organization for Standardization (ISO).
_____ Actively support (e.g., participant in standards developing committees, etc.)
_____ Very familiar
_____ Somewhat familiar
_____ Not at all familiar

4. Please indicate your familiarity with the Internet Engineering Task Force (IETF) and Internet Society.
_____ Actively support (e.g., member, participant in standards developing committees, etc.)
_____ Very familiar
_____ Somewhat familiar
_____ Not at all familiar

5. Please indicate your familiarity with the World Wide Web Consortium (W3C).
_____ Actively support (e.g., member, participant in standards developing committees, etc.)
_____ Very familiar
_____ Somewhat familiar
_____ Not at all familiar

B. Information about You and Your Agency's Standards Activities

1. Your Name: _____

2. Your Title/Position: _____

3. Contact Address: _____

4. Contact Telephone Number: _____

5. Contact Fax Number: _____

6. Contact Email Address: _____

7. Please describe **your** responsibilities for, and/or involvement with, your agency's standards activities.

8. To which governmental unit does your state library agency report and where does your agency reside within your state government's organizational structure?

9. Does your agency's Mission, Goals, and Objectives discuss the agency's role/responsibilities for the use of national and international technical standards by libraries in your state?
_____ YES
_____ NO

10. Does your agency have legal or statutory responsibility for requiring/recommending national and international technical standards for libraries in your state?
_____ YES
_____ NO

11. If your answer to **Question 10** was **NO**, please describe what you perceive as appropriates roles for your agency regarding statewide library technical standards activities.

12. Does another state governmental unit(s) recommend/require technical standards that impact your choice of national and international technical standards for libraries in your state?
_____ YES
_____ NO

If yes, please identify the governmental unit(s) (i.e., name of governmental unit) and the areas of standards it recommends/requires (e.g., networking, platforms, operating systems, software, telecommunications, etc.).

13. Please mark all of the following that apply in describing your agency's activities and responsibilities related to national and international technical standards for libraries in your state:
_____ Identification of standards
_____ Evaluation of standards
_____ Recommendation of standards
_____ Requiring standards
_____ Adoption of standards
_____ Implementation of standards
_____ Promotion of standards
_____ Education and training about standards
_____ Other, please specify and describe

14. Which types of libraries are subject to your statewide technical standards policies/recommendations/requirements? (Mark all that apply)
_____ Academic
_____ Government _____State _____County _____Municipal
_____ Public
_____ School
_____ Special
_____ Archives
_____ Other, please specify

15. If your agency recommends/requires the use of national and international technical standards, identify the mechanisms your agency uses for communicating these required/recommended standards to affected libraries in your state.

C. Use and Implementation of Standards

1. Do you have written policies and procedures that address the use of national and international technical standards by libraries in your state?
_____ YES
_____ NO
If yes, please identify and briefly describe below. **Please send copies of standards -related documentation with your completed questionnaire in the self-addressed envelope provided. If available electronically, please provide URLs to the documents.**

2. Does your agency promote the use of national and international technical standards to libraries in your state?
_____ YES
_____ NO
If yes, please describe the ways that your agency promotes their use.

3. Identify the three key advantages that standards provide **your agency** (e.g., administrative rule -making? cooperative buying?).
a. _____

b. _____

c. _____

4. Identify the three key advantages that standards provide **the libraries in your state** (e.g., resource sharing? protecting investments?).
a. _____

b. _____

c. _____

5. What are three key factors that affect the adoption rate and use of technical standards by libraries in your state (e.g., costs? knowledge?)?
a. _____

b. _____

c. _____

6. Briefly discuss your strategy for increasing the adoption rate and use of technical standards by libra ries in your state?

7. How does your agency monitor compliance by libraries with recommended/required technical standards?

8. Are there consequences for libraries for non-compliance with recommended/required technical standards?
_____ Yes
_____ No
If yes, please describe the consequences.

9. Please indicate your policy on and/or awareness of the following NISO standards:

NISO Standards	Implementation
Z39.2-1994 Information Interchange Format (MARC)	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
Z39.9-1992 International Standard Serial Numbering (ISSN)	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
Z39.21/ISO 2108 International Standard Book Numbering (ISBN)	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
Z39.44-1986 Serials Holdings Statements	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
Z39.47-1993 Extended Latin Alphabet Coded Character Set for Bibliographic Use (ANSEL)	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
Z39.50-1995 Information Retrieval	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
Z39.56-1996 Serial Item and Contribution Identifier (SICI)	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
Z39.57-1989 Holdings Statements for Non-Serial Items	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
Z39.58-1992 Common Command Language for Online Interactive Information Retrieval	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
Z39.71-1998 Holdings Statements for Bibliographic Items	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
Z39.76-1996 Data Elements for Binding Library Materials	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
Other NISO Standards (please identify)	

10. Please indicate your policy on and/or awareness of the following technical standards:

Other Technical Standards	Implementation
ISO 10160 Interlibrary Loan (ILL) Application Service Definition	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
ISO 10161 Interlibrary Loan (ILL) Application Protocol Specification	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
ISO 9000 Quality Standards	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
ASC X12 Electronic Data Interchange (EDI)	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
EDIFACT	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
UNICODE	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
X.400 Message Handling Standard	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of
X.500 Directory Services Standard	____Currently require ____Recommended ____May adopt in future ____Aware of standard, but do not recommend/require ____Not aware of

11. Please identify other specific technical standards (e.g., standards related to library automation, digital libraries, networking, Internet/Web, electronic publishing, etc.) you think are important for your state's libraries to implement:

D. Roles of NISO and Your Agency in Standards Activities
1. Please describe what you perceive as NISO's **current** roles and responsibilities as they relate to your agency and its standards activities.

2. Identify three key roles for state library agencies to assist libraries in adopting and implementing technical standards.

a. _____

b. _____

c. _____

3. Please describe what you think NISO's roles and responsibilities **should be** to assist your agency and its standards activities.

4. Should state library agencies be involved in the development of national standards?

_____ YES

_____ NO

If yes, what do you see as your agency's future role related to standards development (e.g., voting member of NISO, participant on standards committees, NISO Board member, etc.)?

5. How will the increasing use of electronic/digital information in the emerging networked environment of libraries affect state library agencies' roles, responsibilities, opportunities, challenges, etc. related to technical standards for libraries?

6. Identify three key areas in which you believe new technical standards are needed.

a. _____

b. _____

c. _____

Thank you for your participation in this study.

Return the completed questionnaire by July 15, 1998 in the self-addressed envelope provided to:

State Library Agency Standards Study
William E. Moen, Ph.D.
SLIS, University of North Texas
P.O. Box 311068
Denton, TX 76203-1068

If you are completing an electronic version of this questionnaire, please return it as an attachment to an email message to:

untniso@unt.edu

Appendix B
List of Respondents to Survey Questionnaire

Alabama	Missouri
Arizona	Montana
Colorado	Nebraska
Connecticut	Nevada
Delaware	New Jersey
Florida	New York
Georgia	North Carolina
Idaho	Ohio
Illinois	Oregon
Indiana	Pennsylvania
Iowa	Rhode Island
Kansas	South Carolina
Kentucky	South Dakota
Louisiana	Texas
Maine	Utah
Maryland	Virginia
Massachusetts	Washington
Michigan	Wisconsin
Minnesota	Wyoming

Appendix C
State Library Agency Profiles from Survey Questionnaire Responses

Following the list is a brief summary profile for each state library agency (in alphabetical order) and its standards activities.

Alabama

Alabama has no legal responsibility for standards. Appropriate roles include advice and continuing education. Standards-related activities checked were identification of standards, recommendation, promotion and education. They have tried to stress the importance of standards and will make standards a requirement for receiving LSTA funds. Proof of compliance is provided by written documentation. There are no NISO standards that are required or recommended; however they have made libraries aware of Z39.50. Alabama will be working with a statewide database and Z39.50 compliance will be required for participation in resource sharing. The respondent is not familiar with NISO standards or with the standards organizations listed in the survey. However, they identified certain standards as being important for their state library to implement (Z39.50, Z39.44, Z39.58, ISO 10160/10161). The respondent could not answer the questions about NISO's roles due to lack of knowledge about NISO, but they indicated state libraries should be involved in development of national standards.

Arizona

Arizona has no legal responsibility and further has no standards activity at all. They recognize the importance of standards but have not taken an active role, with the main reason being lack of leadership. However, the respondent said the new State Librarian has indicated this will change. They are very familiar with ISO, somewhat familiar with NISO, but not familiar with Internet organizations. They are aware of most of the standards but none are required or recommended. Most of the survey questions were not answered but they did say NISO's role should include education about standards.

Colorado

Colorado has no legal responsibility for standards. Appropriate roles relate to design of technical infrastructure to support resource sharing and other statewide cooperative activities. There were no specific standards related activities checked. Compliance is not monitored but libraries cannot get LSTA funding if they are non-compliant. The respondent is only somewhat familiar with NISO, NISO standards and ISO, and not familiar with Internet standards organizations. They are looking at Internet connectivity standards. Currently only one NISO standard is required (Z39.2) and one is recommended (Z39.50). They may adopt ISO 10160/10161 in the future. They think state library agencies should participate in standards development but are unsure how.

Documentation on their web site includes information on Public Library Standards for Colorado. Though most are internal operating requirements or service goals, the section on the collection requires MARC and AACR2 standards and the technology section again references MARC as a requirement.

Connecticut

Connecticut does not have statutory responsibility related to standards. An appropriate role for the state library agency is to encourage adherence to standards that enable access to the services of the Connecticut Library Network (CLN). The libraries they work with are only those that participate in the network and any library participating in the network is subject to the state's standards requirements. Of the activities listed in the questionnaire, the only one checked was that of requiring standards, specifically in relation to the library network.

The respondent is somewhat familiar with NISO, NISO standards, ISO, and Internet standards-setting bodies. One standard (Z39.2) is required and this is required for the statewide library catalog. Compliance is not monitored but is required for participation in the network. Connecticut is planning to implement a statewide intranet. They would like NISO to provide notices when new standards are adopted, when old standards are revised or withdrawn, or when new initiatives are undertaken. New standards are needed in the areas of patron authentication and authorization, interlibrary loan policy directories, and broadcast searching of Web-accessible catalogs.

Documentation referenced in the survey response is the CLN Participation Agreement, available on the state library web site. The Agreement specifies the use of MARC when bibliographic records are contributed. It also mentions the use of an ISO compliant Interlibrary Loan management system.

Delaware
Delaware has legal responsibility for recommending standards and they monitor compliance by reviewing purchases prior to grant payments. Standards related activities include all those listed, from identification of standards to education about standards. They are somewhat familiar with NISO, NISO standards and ISO, but not at all familiar with Internet organizations. Delaware has written policies and procedures but all they submitted was a brochure for the state digital library. Delaware requires Z39.2, Z39.9, Z39.21, Z39.44, Z39.50, Z39.57 and Z39.71, but is unaware of the other listed NISO standards. They recommend X.400 and X.500. They are undecided about whether or not state library agencies should be involved in the development of national standards.

Florida

Florida has legal responsibility for recommending standards. Compliance with written agreements is monitored by the state and is required for continued participation in the Florida Library Information Network (FLIN). Reports from OCLC are used to monitor compliance. Standards related activities are identifying, recommending, requiring, adopting, implementing, and promoting standards. Promotions methods include a FLIN manual, a library network plan, workshops, and annual meeting, and Division of Library and Information Services grant rules. Z39.2 is the only required standard; Z39.44 and Z39.57 are recommended. Standards that may be adopted in the future are Z39.71 and ISO 10160/10161.

The respondent is somewhat familiar with NISO, NISO standards, ISO, and Internet standards bodies. They would like to see NISO provide consulting services to assist state library agencies in using and understanding standards. They indicated state library agencies should be involved in standards development by commenting on draft standards or participating on committees. New standards for archiving of electronic serials are needed. Florida works with libraries of all types, but not with archives.

Documentation accompanying the Florida response includes the FLIN Manual and the initial report of the Florida Library Network Council Committee on Standards. The latter document describes the step-by-step process for setting standards. In addition to the standards committee, there is a Proposal Development Working Group structure, and this is further defined in the report. Draft standards proposals include and impact statement, according to the report. Standards specifically mentioned are TCP/IP, USMARC, and Z39.50. The FLIN Manual explains network structure and processes, and provides forms, sample report formats, and other detailed information needed by libraries to participate in the network. This document also refers to TCP/IP, USMARC, and Z39.50.

Georgia
Georgia does not have statutory responsibility for standards. Appropriate roles include identifying and recommending standards, as well as education about standards and their practical application. In addition to these three roles, the other standards related activity that was checked was promotion of standards.

Compliance with standards is monitored through the use of annual reports of libraries and technology plans that are required of every public library system. Georgia conducts training classes for librarians and educates the Office of Public Library Service (OPLS) staff about standards.

The respondent is somewhat familiar with NISO standards and with standards organizations. They recommend four NISO standards (Z39.2, Z39.9, Z39.44 and Z39.50) and may adopt five others. They also may adopt ISO 10161 in the future. They commented that NISO needs a higher profile and should have greater national publicity of standards. Georgia believes NISO should identify standards by level (critical, recommended, etc.), educate and be an advocate for standards and be represented in professional journals/literature. They think state libraries should participate on standards committees and should lead the way for developing the infrastructure for state, regional, national and international library information networks. New standards are recommended for materials for the blind and physically handicapped and digitization and retrieval of digitized materials.

Idaho

Idaho has no legal responsibility related to standards but believes its role is to inform and advise libraries about standards. Standards may be required for federal and state funds. They perform multiple activities related to standards, everything listed except to require standards. The respondent indicated they are very interested in standards because they are starting to implement statewide services such as a statewide license to full-text databases and a Z39.50 client on a central web site to search Z39.50 compatible OPACs in Idaho. Libraries cannot obtain grant funds if they are not Z39.50 compliant.

The respondent is somewhat familiar with NISO, NISO standards and ISO, but not at all familiar with Internet standards organizations. Of the listed NISO standards, they require only Z39.50. They recommend Z39.2 and Z39.81. They are not aware of most of the others. ISO 10160/10161 are also recommended but they are not aware of the other non-NISO standards listed. The Idaho respondent suggested that NISO have a web page to keep people informed, but was unaware there was one. They believe state libraries should serve on standards committees but that most probably do not have the time or expertise to do so.

Illinois

Illinois does not have statutory responsibility for standards. Appropriate roles include setting standards for grant applications and setting performance standards. Standards related activities are identification of standards, recommendation, requiring and implementation of standards. The state library agency encourages the regional library system to promote the adherence to standards. Compliance monitoring is through the signing of contracts with organizations such as OCLC and through the review of grants. Standards also may be part of the products purchased from vendors. Illinois is very familiar with NISO and NISO standards, somewhat familiar with ISO and the W3C, but not at all familiar with the IETF and Internet Society. Required standards are Z39.9, Z39.21, Z39.44 and Z39.71. Z39.50 and Z39.56 are recommended. They are just starting to work in the digitization area and they are also interested in standards related to Internet/web, electronic publishing.

Illinois stated NISO should continue standards work in all areas for information distribution. They expressed the belief that libraries have been well served and that the establishment of NISO standards eliminates duplication and excessive spending by individual institutions. NISO should also raise awareness and stress the importance of standards organizations. State library agencies should be involved with standards development through membership in NISO and solicitation of involvement by libraries throughout the state.

Indiana

Indiana has legal responsibility for promulgating standards. Standards must be formally adopted. They hold hearings and send copies of publicized standards to all libraries. Compliance is monitored through a required annual report. The consequence for non-compliance is loss of funding. They say they are very familiar with NISO, somewhat familiar with NISO standards and with ISO, but not at all familiar with Internet organizations. They require or recommend only 4 of the listed NISO standards and none of the others. Lack of technical expertise was mentioned as a reason for why state libraries may not be able to serve on standards committees.

Activities related to standards include identification, recommending/requiring standards, implementation and promotion. They would like NISO to solicit input from state libraries on new standards and to provide information on new standards and their impact for use in education and awareness activities. They also would like help in choosing future standards.

Documentation was submitted for Automation Standards, which are used for evaluating library automation systems under consideration for purchase. Covers bibliographic data records, hardware and software, resource sharing and interlibrary loan. USMARC and Z39.44 (both required standards) and Z39.50 and Z39.58 (both recommended standards) are referenced in the documentation. Also, the web site has Standards for Public Libraries Eligible to Receive State and Federal Funds.

Iowa

Iowa does not have legal responsibility for standards but sees modeling best practices as an appropriate role for the state library. The statewide union database (SILO locator) is voluntary but any submissions must be in MARC format. They are very familiar with NISO and the W3C, and somewhat familiar with NISO standards, ISO and IETF/ISOC. The agency's responsibilities include all possible activities listed in the questionnaire from identification of standards to education. They currently require or recommend 6 of the listed NISO standards but none of the others. The required standards are Z39.2, Z39.9 and Z39.56; the recommended standards are Z39.21, Z39.44 and Z39.47. They follow the work of the Z39.50 Implementors Group (ZIG). In regard to NISO they believe appropriate roles include explaining standards in plain English and advocating practical implementation of standards.

Documentation includes information on SILO (State of Iowa Libraries Online), a Z39.50 implementation project. The Iowa web site has An Evaluation of Z39.50 within the SILO Project. A Z39.50 page includes links to NISO and Interlibrary Loan protocol resources. The web site also has information on minimal MARC record input guidelines, which recognizes the importance of AACR2.

Kansas

Kansas has legal responsibility for recommending standards but did not indicate how they monitor compliance. In regard to standards activities, none were checked. The respondent said it could be any of these activities, but they haven't worked with technical standards. They are somewhat familiar with ISO but not at all familiar with NISO, NISO standards or Internet standards organizations. They "encourage" Z39.50 and Z39.2. Most of the survey questions were not answered but they did say they think NISO is doing a fine job.

Kentucky

Kentucky does not have legal responsibility for standards but they are establishing library technical standards as part of Kentucky's Architecture and Standards for Commonwealth government. Activities include identification of standards, evaluation, recommendation, promotion and education about standards. Requiring standards will be an activity with grants that are given. To monitor compliance, they will be doing more surveying. Consequences for non-compliance include the inability to share information effectively. The respondent is very familiar with NISO and actively supports the

IETF/Internet Society by being a member, but is only somewhat familiar with ISO, the W3C and NISO standards. They currently require Z39.50 and may adopt the other listed NISO standards in the future. They also may adopt ISO 10160/10161, ISO 9000 and X12 EDI. They suggest that NISO use "push technology" to communicate with state agencies about standards. Involvement with the development of national standards could be through representation on committees. Recommended new standards are for common data standards for government information.

The web site has information on IT Enterprise Architecture and Standards that defines requirements for hardware, software, email, imaging, video conferencing and networks. Documentation sent by Kentucky includes a revision cycle log of enterprise standards, a log of exceptions to technology standards and a gap analysis related to IT standards.

Louisiana
Louisiana has no legal responsibility for standards but an appropriate role is to coordinate the development of public library standards. All listed standards related activities were checked except for requiring standards. Statistical evaluations are done annually. The respondent(s) are not familiar with NISO standards or with the standards organizations. They are not aware of any neither of the listed NISO standards nor with any of the other listed standards. Many of the questions were not answered.

Maine
Maine does not have statutory responsibility for standards but believes it is appropriate to understand standards and inform/assist. Specific activities checked were recommendation of standards, implementation, promotion and education. The Statewide Maine InfoNet will increase the usage of standards.

The respondent is somewhat familiar with NISO standards and the standards organizations identified in the survey. Only one standard is currently recommended (Z39.2) but Z39.50 may be adopted in the future. They may also adopt ISO 10160/10161. It is recommended that NISO make standards available in the quickest, easiest and most complete way possible. Free, full-text information online was suggested, or at least online with the instantaneous generation of an invoice. Respondent thinks state libraries should perhaps be involved in standards development if they have the time and insight to contribute.

Maryland
Maryland does not have legal responsibility and did not indicate what appropriate roles are related to standards. They listed no activities related to standards and there are no library types that are subject to their standards policies. They are somewhat familiar with NISO but not at all familiar with NISO standards, ISO and Internet organizations. The respondent is aware of Z39.2 but not aware of any other NISO standards. They are aware of ISO 10160/10161 and ISO 9000, but not aware of other listed standards. Many of the survey questions were not answered.

Massachusetts
Massachusetts does not have legal responsibility for standards. They do, however, have guidelines for state telecommunications and the catalog program supporting ten resource sharing networks. Activities related to standards were all checked except for adoption of standards. The respondent is somewhat familiar with NISO standards and with the standards organizations, as well as with CORBA, IIORB, DCOM, JAVA and Internet protocols. Required standards include Z39.2 and Z39.50. Z39.50 is promoted through grant funding and is required for procurement of electronic databases provided to libraries with state funds. In addition to monitoring the grant process, compliance is monitored through use of a periodic, informal survey.

Massachusetts recommends that NISO provide "down to earth" education on the meaning and benefits of standards. They would like to see updates on standards development and explanations of the interrelationships between standards. They do not believe state library agencies should be involved in the development of national standards, but if they have the expertise the agency could offer some experience to NISO.

Documentation includes a strategic plan for the future of library services, which discusses statewide networks, and the need for cooperation. Goals include promoting adherence to standards and guidelines. The long range plan's introduction describes the three networks in Massachusetts and references MARC, TCP/IP and Z39.50. An RFI for a Virtual Catalog/Interlibrary Loan references Z39.50, ISO 10160/10161, MARC, ISBN, ISSN, HTML, USMARC, SIP2 (Standard Interchange Protocol) and Z39.81.

Michigan
Michigan does not have legal responsibility for standards but said appropriate roles for state library agencies include publicizing standards and providing continuing education. They did not respond to the question about specific activities related to standards. There is no compliance monitoring. The respondent is somewhat familiar with NISO but not at all familiar with NISO standards, with ISO or with Internet organizations. They recommend Z39.2, Z39.9, Z39.21 and Z39.50 but are unaware of other NISO standards. They are aware of ISO 10160/10161 and ISO 9000 but none of the others listed. They would like NISO to publicize the benefits of standards and to make concepts understandable to elected and appointed officials and non-technically-oriented library staff. They do not necessarily believe state library agencies should be involved in standards development but they believe that there will be a need to help staff, supporters and funders understand why standards are important.

Minnesota
Though Minnesota does not have legal responsibility for standards, statutes say the state library should encourage the sharing of library resources and the development of interlibrary cooperation. Agency responsibilities related to standards are identification, recommendation, requiring, adoption and promotion of standards. They work closely with MINITEX on production of "Standards and Guidelines" for libraries and there is a committee structure to support this endeavor. The respondent is somewhat familiar with NISO, NISO standards and ISO, but is not familiar with Internet standards organizations. Z39.50 is the only required standard. Recommended standards are Z39.2, Z39.9, Z39.21, Z39.44 and Z39.58. They responded that NISO's role is to develop and promote standards, and to give training on their importance and implication. Also, state libraries should be involved in the development of national standards.

Documentation submitted with the survey response was Standards and Guidelines for Automated Library Systems. It has sections about standards for telecommunications, bar codes, bibliographic record formats, exchange of bibliographic information, data privacy and indexing. They are jointly developed with MINITEX, a voting member of NISO. Standards referenced in various sections of the document are MARC, USMARC, ANSI X3, X12, X.25, X.75, X.400, X.500, CCITT standards, FDDI, IEEE standards, ISDN, ISO 2709, ISO 8879, ISO 10162/10163, VT100, Codabar and Code 39 for bar codes, ISBN, STRN, AACR2 and ISSN. Referenced NISO standards are Z39.2, Z39.9, Z39.44, Z39.45, Z39.47, Z39.49, Z39.50, Z39.55, Z39.57, Z39.58, Z39.63, Z39.64, Z39.69, Z39.70 and Z39.71. The MINITEX/LDS Joint Standards Review Task Force Meeting minutes are available online and give further background information on the standards development process in Minnesota. Additional standards referenced in these documents are EDIFACT, the ISO ILL protocol, Z39.56, Z39.80 and UNICODE.

Missouri

There is no legal responsibility for standards but appropriate roles for Missouri's state library is to disseminate information, encourage the adoption of standards and promote adoption by incorporating standards into grant and education programs. Standards related activities include identification of standards, recommendation, requiring, promotion and education. Compliance with standards is monitored through review of purchase order reports and site inspections if needed. The consequence for non-compliance is loss of funding.

Missouri's respondent is only somewhat familiar with NISO standards and with ISO and not at all familiar with Internet standards organizations. They require Z39.2 and Z39.50. They are aware of several other listed standards but not aware of many. They recommend that state librarians be recruited to serve on standards development committees and that a COSLA officer be included on the NISO board.

Montana

Many of the survey questions were not answered. Montana does not have legal responsibility for standards but roles should include education and encouragement. Activities related to standards are the promotion of standards and education about standards. They are not familiar with NISO standards or any of the standards organizations. None of the listed standards are required or recommended and the most frequent response was that they are not aware of the standard. They may adopt Z39.2 in the future. NISO's role should be to educate state library agencies, because education of libraries will be increasingly important in the future. The respondent also thinks state libraries should participate on standards committees. New standards are needed for resource sharing.

Nebraska

Nebraska has legal responsibility for recommending standards in the state. Roles for the state library include formally adopting standards and providing information through publications and training. Their activities relating to standards include all those listed, from identification of standards to education and training about standards. They do not monitor compliance with standards but standards are a requirement for grant funding and library accreditation. The respondent is only somewhat familiar with NISO, NISO standards, ISO, and Internet standards organizations.

Of all the NISO standards listed, Nebraska requires two (Z39.2 and Z39.71) and recommends all the others. They recommend the three listed ISO standards and X12 EDI. They believe NISO should assist with training. They also believe state libraries should be given the opportunity to provide input on standards.

Nevada

Nevada does not have legal responsibility for standards. Appropriate roles for the state library are to inform, promote and encourage the use of standards with grant programs. Annual reports and on-site visits are used to monitor compliance and the consequence for non-compliance is ineligibility for state and federal grants. Standards related activities checked were identification of standards, evaluation, recommendation, promotion and education about standards. Costs are definitely the factor affecting the adoption rate for standards.

The respondent is somewhat familiar with NISO standards and the standards organizations identified in the survey except for the W3C. Z39.50 is the only recommended standard. Individual state library agencies should not be involved in the development of national standards but should have representation through an organization like COSLA.

New Jersey

There is no statutory responsibility for standards in New Jersey. However, activities include identifying, recommending, requiring, adopting, implementing, and promoting standards. There is a requirement that equipment and software meet standards before grants are awarded. The consequence for non-compliance is the inability to participate in specific programs.

New Jersey's respondent is somewhat familiar with ISO, NISO, and NISO standards, but not familiar with Internet standards organizations. No standards are required but Z39.50 and Z39.57 are recommended and Z39.58 may be adopted in the future. Though none of the state library agency's staff has been involved in standards activities, they indicated agencies should participate in the standards development process. They want NISO to provide information about the practical need for standards in networking or other situations. New standards are needed for electronic interlibrary loan. New Jersey works only with public libraries.

New York

New York has statutory responsibility for recommending standards. Regulations require statewide compatibility regarding bibliographic data and telecommunications. They do not monitor compliance but retrospective conversion projects are not approved if a library does not comply with MARC. Standards related activities are recommendation, requiring and promotion of standards, and education about standards. There is a statewide Library Technology Plan. New York's respondent is very familiar with NISO, NISO standards and with ISO. They are somewhat familiar with the IETF/Internet Society but not at all familiar with the W3C. The only required standard is Z39.2 and the only recommended standard is Z39.50. Z39.44, Z39.56, Z39.57, Z39.58 and Z39.71 may be adopted in the future. They believe state library agencies should be involved in development of national standards either by participation on committees, as a voting member or as a board member of NISO. New standards are recommended for digitization, electronic publishing, interoperability extended to retrieve and combine records/holdings from multiple servers with no loss of data.

Regulations pertaining to libraries describe requirements for grants for regional bibliographic databases and interlibrary resource sharing. They also sent Doorways to Information in the 21st Century, which references Z39.50, USMARC and ISO 10160/10161.

North Carolina

North Carolina does not have legal responsibility for standards but does have legal authority for assisting libraries, coordinating cooperative efforts and distributing federal funds. Standards related activities are identification, recommendation, requiring and promotion of standards. North Carolina had two responders to the survey. The Library Development Consultant is very familiar with NISO, ISO and IETF, and somewhat familiar with W3C. The State Librarian is somewhat familiar with NISO, NISO standards and ISO, but not at all familiar with Internet standards organizations. They currently require Z39.2, Z39.44 and Z39.50, and recommend Z39.47 and Z39.58. ISO 10160/10161 may be adopted in the future. They recommend that the NISO newsletter be sent to all state libraries for free, that free copies of standards and drafts be available, and that NISO more actively recruit representatives from state libraries to serve on standards committees. They believe state libraries should participate in the standards development process and that COSLA could be a voting member (too expensive for individual state libraries to do this). A new standard or protocol is needed for circulation transactions.

Documentation includes Enhanced Connectivity Grant application information that is available on the North Carolina web site. It discusses requirements for funding, including telecommunications, hardware, software, security and disaster recovery. The actual grant application form is also available online. Documentation on Minimum Standards for Library Automation references AACR2, USMARC, LCSH,

Z39.44, ISBN, ISSN, STRN, Codabar or Code 39 for barcodes, Z39.58, Z39.50, telnet, HTTP, IEEE 801.xx, Z39.47 and UNICODE.

Ohio

Ohio has no legal responsibility for standards but they encourage the use of standards. The only activity checked was recommendation of standards. They are somewhat familiar with the standards organizations except for IETF and Internet Society. They require Z39.50 for their statewide resource-sharing project. Many of the questions were left unanswered.

Oregon

Oregon has no legal responsibility for standards but they provide consulting and grant assistance to help libraries comply with standards. They employ a network development consultant who advises and educates about standards. Activities of the state library related to standards include identification, evaluation, recommendation, promotion, education and funding of standards-compliant systems. They track compliance and do not fund non-compliant projects. Oregon is somewhat familiar with NISO, NISO standards, ISO and the W3C, but is unfamiliar with the IETF or Internet Society. Recommended standards are Z39.2, Z39.9, Z39.21, Z39.44 and Z39.50. They are aware of all other listed standards (NISO and other). They would like NISO to provide information and training and to solicit participation in the development and maintenance of standards. State libraries should participate on standards committees.

Pennsylvania

Pennsylvania has legal responsibility for standards but only recommending them. None are required and compliance is monitored through grant review. The consequence of non-compliance is the decreased likelihood of a successful grant request. The only standards activity checked was identification of standards. They promote standards by making them part of the eligibility requirements for grants. The respondent is somewhat familiar with NISO standards and the listed standards organizations. Z39.50 is required for automation grants and for retrospective conversion projects that the state library agency pays for. They are aware of the other NISO standards but not aware of the non-NISO listed standards. In the future, as the state library invests in technology, they will stress compatibility with other libraries and community resources.

Rhode Island

Rhode Island has statutory responsibility for requiring standards and compliance is monitored through the grant process. All standards-related activities listed on the questionnaire were checked. Z39.2 is the only required standard and is the only one the state library agency promotes. The respondent is aware of several other NISO standards and EDI, but is not aware of many of the standards listed in the survey. The respondent is not sure of NISO's current role but believes state library agencies, through COSLA, should be involved in the development of standards. Roles for NISO should include dialog between NISO and state libraries, as well as presentation of online workshops and explanations via a web site. New standards are needed in the area of metadata (Dublin Core). Rhode Island works with academic, government, public, school, and special libraries.

South Carolina

South Carolina works with public libraries only. There is no legal responsibility for standards activities within the state library agency. Appropriate roles include encouraging the use of standards and specific activities related to standards are to identify and recommend them. There are no formal mechanisms in place to promote standards and compliance is not monitored.

The respondent indicated they are somewhat familiar with NISO, NISO standards, ISO standards, and Internet standards organizations. They also indicated awareness with all the listed standards and noted

that they do no formally recommend standards but encourage their use when appropriate. Often this will occur during consultation on a specific issue. They indicated they would benefit from a NISO education program that makes standards understandable and relates them to daily library activities. In regard to being involved with standards development, the respondent gave a positive answer and said they should consider an expanded role related to education. New standards are needed for preservation of data in digital format and continued updating of information transfer standards.

South Dakota

South Dakota does not have legal responsibility for standards but encourages the use of standards as part of library development. Support is provided at the network level and they rely on MINITEX to keep them informed about standards. Compliance is not monitored but there are consequences for non-compliance, specifically the inability to join the only statewide library automation network. The only standards related activity checked was promotion of standards, and one way this is done is by MINITEX training sessions.

South Dakota is only somewhat familiar with NISO, NISO standards and ISO, and not at all familiar with Internet standards organizations. The required standards are Z39.2, Z39.9, Z39.21, Z39.44, Z39.47, Z39.50, Z39.58, Z39.71, ISO 10160/10161, X12 EDI and EDIFACT. The primary role for state library agencies is definitely training about standards. Roles for NISO should include timely communication about standards in terms that library administrators and their funding source can understand. They believe their involvement in standards development activities should be to support MINITEX expertise in NISO activity.

Texas

Texas does not have statutory responsibility for standards. Appropriate roles include providing technical guidelines to libraries, education about standards and their usefulness, and integration strategies and consulting about how standards can be integrated into projects. All listed activities related to standards were checked except for requiring and adoption of standards. Texas has written policies and procedures for library automation. They use workshops and continuing education as ways to promote standards. They are very familiar with NISO standards and the identified standards organizations. They recommend most of the listed NISO standards (Z39.2, Z39.9, Z39.21, Z39.44, Z39.50, Z39.56, Z39.57 and Z39.71). They also recommend ISO 10160/10161, ISO 9000, X12 EDI, X.400 and X.500. They are aware of EDIFACT and may adopt UNICODE in the future.

Texas believes NISO should provide education on the practical reasons for implementation of standards and the possible results of not implementing certain standards. They also recommend that standards be provided free of charge via the web. They believe state library agencies should be involved in standards development by facilitating communication between NISO and libraries in the state. The future role for state libraries will be to take a lead role for the state and be conversant on the subject of standards. New standards are needed for circulation statistics, patron record information, and a more specific Z39.50 standard for its satisfactory use.

Documentation was submitted for Library Automation Standards and Guidelines. Referenced standards within this documentation are AACR2, USMARC, Z39.2, ISBN, ISSN, STRN, IEEE 802.xx, Z39.47, Z39.58, Z39.50, ANSI IT9.1 for microfilm, ISO 9660, ANSI/AIIM MS44 for image scanners, ASCII, SGML/ISO 8879 and CCITT telecommunications standards. There is a general statement that automation projects shall adhere to current Z39 NISO standards.

Utah

Utah does not have legal responsibility for standards. Activities include identification of standards, recommendation, promotion and education. They have written policies and procedures for how to

automate your library. Compliance with standards is monitored through the grant administration process. Utah encourages the use of standards for the exchange of bibliographic records in relation to participation in interlibrary loan activity. They are somewhat familiar with NISO, NISO standards and other standards organizations. Lack of expertise was mentioned as an issue. Z39.2 is the only recommended standard. The respondent is familiar with the other listed NISO standards, with ISO 10160/10161 and ISO 9000. They believe NISO should keep state library agencies better informed but do not believe state libraries should participate in standards development due to lack of funds and technical expertise. New standards are needed for electronic and web publishing.

Documentation returned with the questionnaire was a booklet on Automating Your Library: Hints, Helps and How To's, guidelines to use for automation projects and eligibility criteria for funding. Standards referenced in this booklet include USMARC, AACR2, ISBN, ISSN, STRN and CCIT telecommunications standards.

Virginia
Virginia has legal responsibility for recommending standards. They did not indicate how they monitor compliance or what specific activities they perform related to standards. They are somewhat familiar with NISO, NISO standards and ISO, but not at all familiar with Internet standards organizations. Though they are aware of all the listed NISO standards, they do not require or recommend any. The same is true for the other standards listed in the survey. Many of the questions were not answered.

Washington
Though they do not have statutory responsibility for standards, Washington State has a section that monitors compliance. They have a Library Information Technology Committee that reviews and recommends standards for state public libraries. Appropriate roles include recommending standards, facilitation of standards development and consensus building. Activities checked were identification, evaluation, recommendation, promotion and education. The respondent is very familiar with the various standards organizations but only somewhat familiar with NISO standards. Washington recommends Z39.2, Z39.9, Z39.21, Z39.50, Z39.58 and Z39.71. They also recommend ISO 10160/10161 and X12 EDI. They do not believe state libraries should be involved in development of national standards, but they think that the state library should lead the development of standards for systems integration and sharing of information. New standards are needed for electronic statistics and search engines/searching technology.

Wisconsin
Wisconsin has statutory responsibility for recommending standards. Compliance with standards is monitored. An example given is that non-MARC records cannot be accepted into the state catalog and non-compliant libraries cannot participate in the state catalog. Standards related activities include all those listed except evaluation of standards.

The respondent is very familiar with NISO, IETF/Internet Society and W3C, and somewhat familiar with ISO and NISO standards. Required standards are Z39.2 and Z39.50. Z39.9 and Z39.58 are recommended, as are ISO 10160/10161. They have recommended that NISO make state libraries more aware of standards using plain English and simple examples. They believe state library agencies should be more actively involved in the standards development process.

Documentation available on the Wisconsin web site includes LSTA Information and Guidelines. It includes budget information, a timeline for applications, application procedures, as well as categories of grants. Catalogs within shared or linked systems must be Z39.50 compatible. Also available online is Wisconsin's Library Technology Strategic Plan. It explains the statutory framework for library networks, gives goals, and describes the features of the statewide library network.

Wyoming

Wyoming does not have statutory responsibility for standards. They indicated an appropriate role for their agency to make sure systems for the statewide network are standards compliant by letting vendors know they want products that are compliant. They believe they should stress the importance of standards and remind libraries that IT purchases should be for standards compliant products. Activities related to standards include all those listed except for evaluation of standards. They have conducted training for Z39.50 and ILL standards and there is a committee for the WYLD (Wyoming Library Database) network. Compliance with standards is monitored via certification of technology plans submitted for the USF/E-Rate application process. The consequences for non-compliance include non-certification of technology plans and the inability of technical staff to support what is not recommended.

They are somewhat familiar with NISO, ISO and Internet organizations. They require Z39.44 and Z39.71 and recommend Z39.2, Z39.50, Z39.58 and Z39.63. They identified many more that they are aware of. They also recommend ISO 10160/10161 and X12 EDI, and indicated they are aware of all other listed standards except EDIFACT. They listed multiple other technical standards as being important. The respondent recommended the use of a standards specialist within COSLA or similar organizations to be a liaison with state library agencies. This specialist would provide information, report on standards implications and increase participation. It was suggested that COSLA be on the NISO board of directors and that NISO work with COSLA standards specialists to increase involvement.

Documentation includes a list of recommended systems hardware, software and networking modules. The telecommunications web site has a video user guide and information on the state network for all state agencies. The web site has a page on current resource sharing projects that references an interlibrary loan policy and manual (this was not submitted).

Appendix D
Sample Telephone Interview Protocol

The researchers developed specific and individualized telephone interview protocols for each agency. The following lists the general questions used in the telephone interviews. Not all questions were asked in every interview. Survey questionnaire items are identified below with a LetterNumber combination (e.g., B13).

Questions:

1. Number of actual employees in State Library Agency; if outside contractors are used, how many?
2. Number of employees specifically involved in standards-related activities.
3. Are there any formal structures in place for standards activities (e.g., committees, task forces, work groups through associations)?
If yes, what is the structure? What does it do? Who's in it? Describe activities.
Best Practices—what works and what doesn't work? Would you recommend this structure as a model for other state libraries?
4. B13 is Yes under Identify and Implement -- ask for more information on how they identify and implement standards. Where do you find out about standards? What unit decides what is needed? How are standards implemented? Does your way of implementing standards work for you? If yes, why? (or why not?)
Best Practices—what works and what doesn't work? Would you recommend this process as a model for other state libraries?
5. If answer to C1 is Yes, confirm response and that we have all information on written policies and procedures. (Received Automation standards document via web site.)
Best Practices—what works and what doesn't work? Would you recommend this process as a model for other state libraries?
6. If C9 includes standards that are required, how are they implemented?
7. What is done to get people to use standards?
8. Review training programs that are in place (outlines, notebooks, materials), especially for responses to B15, C2 or C6 that mentioned training or education as a strategy for promotion or adoption of standards. State library agencies with written materials should send them!
9. Other than written policies and procedures or training materials, what is required for successful implementation of a standard?
10. How could NISO help to ensure a successful implementation (e.g., provide tools to help implement or how to quantify the resources needed to implement a standard - number of staff and at what level, hardware, software, etc.)?
11. Under C5 you identified knowledge about standards, state requirements and vendor adoption as factors impacting adoption of standards.
And under D3 you indicated that NISO's role should include soliciting input from state libraries on new standards and providing information on new standards and their impact (information that could be used in education/awareness activities).
If NISO did these things how would that increase the adoption rate of standards?
12. What do state libraries need to know to help them show prioritization for budget dollars? What's needed to justify standards?
13. Give examples/stories of things that happened when you did NOT implement standards. What is the price of NOT conforming?
14. How can users (local libraries) benefit from the use of standards? Short-term vs. Long-term value. What's the degree of understanding at the local library level regarding the benefits of standards.
15. Explain a little more about the new standards (Internet-video, Internet protocols in general, and smart library cards) that you suggested should be developed.

Appendix E
Reference List of Selected Titles of Standards Indicated in Study

Standard Designation	Standard Name
Z39.2-1994	Information Interchange Format (MARC)
Z39.9-1992	International Standard Serial Numbering (ISSN)
Z39.21/ISO 2108	International Standard Book Numbering (ISBN)
Z39.44-1986	Serials Holdings Statements
Z39.47-1993	Extended Latin Alphabet Coded Character Set for Bibliographic Use (ANSEL)
Z39.50-1995	Information Retrieval
Z39.56-1996	Serial Item and Contribution Identifier (SICI)
Z39.57-1989	Holdings Statements for Non-Serial Items
Z39.58-1992	Common Command Language for Online Interactive Information Retrieval
Z39.63	Interlibrary Loan Data Elements
Z39.69	Patron Record Data Elements (Draft Standard)*
Z39.70	Exchange of Circulation Systems Data (Draft Standard)*
Z39.71-1998	Holdings Statements for Bibliographic Items (replacing Z39.44, Z39.57)
Z39.76-1996	Data Elements for Binding Library Materials
Z39.81	Data Dictionary for Circulation, Interlibrary Loan and User Records (Draft Standard)*
ISO 10160	Interlibrary Loan (ILL) Application Service Definition
ISO 10161	Interlibrary Loan (ILL) Application Protocol Specification
ISO 9000	Quality Standards
ASC X12	Electronic Data Interchange (EDI)
EDIFACT	Electronic Data Interchange (EDI)
UNICODE	Universal Character Set
X.400	Message Handling Standard
X.500	Directory Services Standard

* Standards activities now underway in developing a Circulation Information Protocol

Appendix F
Standards Policies and Processes Documents by State

State	Documentation	URL	Description
Connecticut	Connecticut Library Network Participation Agreement	www.cslnet.ctstateu.edu/cln/	References MARC and ISO ILL
Delaware	Digital Library of the First State (brochure)		Brochure discusses digital library
Florida	Florida Library Information Network (FLIN) Manual	www.dos.state.fl.us/dlis/flin/flinman.htm	Explains network structure and provides forms and sample reports; references TCP/IP, USMARC, Z39.50
	Florida Library Network Council Committee on Standards, Initial Report		Describes processes for setting standards; references TCP/IP, USMARC, Z39.50
Indiana	Standards for Public Libraries Eligible to Receive State and Federal Funds	www.statelib.lib.in.us	
	Automation Standards		Used to evaluate systems under consideration for purchase; references USMARC, Z39.44, Z39.50, Z39.58
Iowa	SILO Locator Minimal MARC Record Input Guidelines	www.silo.lib.ia.us/techdoc/locator/locguide.html	References MARC and AACR2
	An Evaluation of Z39.50 with the SILO Project and Z39.50 Links	www.silo.lib.ia.us/Z39t0/html	References Z39.50 and ILL
Kentucky	IT Enterprise Architecture and Standards	www.state.ky.us/kirm/arcstand.htm	Defines requirements for hardware, software, email, imaging, video conferencing, and networks
Massachusetts	A Strategic Plan for the Future of Library Services in Massachusetts	www.mlin.lib.ma.us/	References MARC and Z39.50
	Background/Introduction	www.mlin.lib.ma.us/	References MARC, TCP/IP, Z39.50
	Request for Information (Virtual Catalog/Interlibrary Loan)	www.mlin.lib.ma.us/	References Z39.50, ISO 10160/10161, ISBN, ISSN, HTML, USMARC, SIP2, and Z39.81

State	Documentation	URL	Description
Minnesota	Telecommu nications Standards and Guidelines		All sections listed below are part of Standards and Guidelines for Automated Library Systems, with reference to multiple standards (MARC, USMARCX3, X12, X.25, X.75, X.400, X.500, CCITT, FDDI, IEEE, ISDN, ISO 2709, ISO 8879, ISO 10162/63, VT 100, Codabar, Code 39, ISBN, STRN, AACR2, ISSN, Z39.2, Z39.9, Z39.44, Z39.45, Z39.47, Z39.49, Z39.50, Z39.55, Z39.56, Z39.57, Z39.58, Z39.63, Z39.64, Z39.69, Z39.70, Z39.71, Z39.80, EDIFACT, ISO ILL, UNICODE
	Bar Code Standards and Gu idelines		
	Bibliographic Records Formats Standards and Guidelines		
	Remote Access Capability for Exchange of Bibliographic Information Standards and Guidelines		
	Data Privacy Standards and Guidelines for Library Automation	kinglear.lib.umn.edu/standards/sgals/dataprivacy.html	
	Indexing Standards and Guidelines for Bibliographic Records	kinglear.lib.umn.edu/standards/sgals/indexing.html	
New York	Regulations pertaining to Libraries, Library Systems, Trustees and Librarians		Gives requirements for grants for regional bibliographic databases and interlibrary resource sharing
	Doorways to Information in the 21st Century		References Z39.50, USMARC, ISO 10160/1061

State	Documentation	URL	Description
North Carolina	Enhanced Connectivity Grant Application Information	statelibrary.dcr.state.nc.us/lsta/lsta.htm	Gives requirements for funding, including telecommunications, hardware, software, security, and disaster recovery
	Minimum Standards for Library Automation in North Carolina	statelibrary.dcr.state.nc.us/lsta/lsta.htm	References AACR2, USMARC, LCSH, Z39.44, ISBN, ISSN, STRN, Codabar, Code 39, Z39.58, Z39.50, telnet, HTTP, IEEE 801, Z39.47, UNICODE
Texas	Library Automation Standards and Guidelines	www.tsl.state.tx.us	References AACR2, USMARC, Z39.2, ISBN, ISSN, STRN, IEEE 802, Z39.47, Z39.58, Z39.50, ANSI IT9.1, ISO 9660, AIIM MS44, ASCII, SGML/ISO 8879, CCITT
Utah	Automating Your Library		Guidelines for automation projects and eligibility criteria for funding. References USMARC, AACR2, ISBN, ISSN, STRN, and CCITT telecommunications standards
	Checkpoint 1990, Creating Your Library's Future with the Upgrade Process	www.state.lib.ut.us/pubs	
Wisconsin	LSTA Information and Guidelines	www.dpi.state.wi.us/dpi/pld	Includes applications procedures, budget information, and a timeline
	Library Technology Strategic Plan	www.dpi.state.wi.us/dpi/pld	References Z39.50
Wyoming	Current Wyoming Resource Sharing Projects	Will.state.wy.us/admin/resource_shar.html	Lists the recommended hardware, software, and networking modules. Includes a video user guide and references ILL