Abstract
Much has been written about the various tools for digital reference, technical issues associated with their implementation, and the potential for these tools to reach new patrons. In this article, the author focuses on the need to understand the technical environment within which digital reference occurs, from issues of patron definition and access, to the role of cooperative relationships and networks in meeting the shared needs of librarians and patrons. The author provides an overview of today's reference environment along with data and practical examples from services like QuestionPoint™ [1], the Library of Congress, and Ask Joan of Art® to demonstrate the importance and effect understanding audiences, appropriately using technology, and working cooperatively can have for libraries in digital reference.

Introduction
Significant change in reference librarianship had been brewing for some time before the introduction of the World Wide Web in 1995. The 1980s and early 1990s saw this change express itself in debates such as "mediated versus unmediated online searching"; "access versus ownership" and "print versus electronic"; and professional concerns that gradually widened to include electronic licensing and consortial collection development. The Web introduced new possibilities and additional interactive technologies such as e-mail, chat, and instant messaging to the reference desk; however, the effort of keeping current with the pace of change in technology and tools can redirect focus from services and patrons to tools, and make the process of gathering information and assessing tools to arrive at an informed decision more difficult. Within this context of digital reference, the pace of change and new interactive technologies often dominate the discussion rather than the library's service goals and the appropriate roles technology plays in supporting these goals. This discussion of technological challenges associated with digital reference does not focus on which interactive technologies support the reference interview, but on challenges libraries face in establishing and supporting an efficient, patron-focused digital reference service, based on library values.

Gorman summarizes the eight central values of librarianship as stewardship, service, intellectual freedom, rationalism, literacy and learning, equity of access to recorded knowledge and information, privacy, and democracy [Gorman, 2000]. Against this backdrop, libraries encounter wave after wave of technological innovations, each offering new options, features, opportunities, and potential distractions. Libraries face the ongoing and sometime paradoxical challenges of keeping up with these changes, implementing the new technologies, and maintaining a perspective on the technologies in relation to the libraries' work and core values.

Janes sums up the challenge of conducting reference services in an increasingly digital environment in this way: "All professions and sectors must pay greater attention to how ever-rising connectivity and the
digitization of resources are affecting their work, their professions, and the communities they serve [Janes, 2002]. To this end, it becomes critical for libraries to understand the current technological landscape and to have an articulate vision of the customers or patrons they intend to serve. Without this clarity, technology—rather than vision and needs—may end up driving change.

Maturing of Digital Reference

When libraries first started providing digital reference services through the Internet in the mid 1990s, it primarily consisted of email addresses where patrons might submit a question and get an answer. Since then, libraries have begun to assess and adopt a variety of asynchronous and synchronous technologies like web forms, knowledge bases, and chat products to help them provide services in the web environment. Many of these efforts could be classified as ad-hoc and homegrown solutions where libraries and organizations looked at the available technologies and cobbled together solutions that met their local needs. Based on requests from libraries creating these types of solutions, software vendors who traditionally served other industries began to look at ways to retrofit and adapt their call-center products to the digital reference market. These efforts became more organized with the introduction of solutions like Library Systems and Services, L.L.C. (LSSI) and 24/7 Reference in the late 1990s created specifically for libraries. Other developments demonstrated the maturation of digital reference as well. The Library of Congress' Collaborative Digital Reference Service (CDRS) pilot, for example, explored the growth of cooperative systems worldwide in 1998. In 2002, QuestionPoint—a collaborative effort from the Library of Congress (LC) and OCLC Online Computer Library Center, Inc. (OCLC) [1]—became the next generation of the CDRS.

Several developments characterized the growth of digital reference. Dramatic growth occurred in the number and type of tools available to support digital reference services, and products and services directed specifically at libraries. At the Virtual Reference Desk 2002 Conference, Milewski provided a comparison of 18 products and services currently used by libraries offering digital reference synchronously and asynchronously. Of those presented, six were specifically developed or targeted directly to libraries, including QuestionPoint, LSSI, and 24/7 Reference [Milewski, 2002]. Two more characteristics of growth in digital reference were an increase in research and development in that area, and standards development for digital reference systems. Recent research on librarian experiences and attitudes about digital reference [Janes, 2002], statistical and qualitative measuring of reference service [McClure et al., 2002], and the establishment of a research agenda at the Digital Reference Research Symposium [2] demonstrate this growing priority on reflection and assessment in digital reference. And in 2002, NISO initiated the AZ standards committee for networked reference.

QuestionPoint

In 2002 the Library of Congress (LC) and OCLC began exploring ways to take the pioneering work done by LC in the Collaborative Digital Reference Service (CDRS) project to the next stage. The notion behind CDRS was that creating online networks of libraries would combine the power of local collections and staff expertise with the diversity and availability of libraries and librarians throughout the world, 24 hours a day, 7 days a week [Kresh, 2000]. The CDRS pilot project eventually involved over 260 libraries of various types in the United States, Canada, the United Kingdom, Europe, and Asia. While LC explored the global potential for networked reference services, OCLC was working on pilot projects with several U.S. library consortia to develop tools with which librarians could establish a more effective online presence within their own communities and work cooperatively within their existing institutions and consortia.

In June 2002, LC and OCLC introduced QuestionPoint, a cooperative digital reference service that evolved from CDRS and operates on a subscription basis. A QuestionPoint subscription includes:
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Access to a professional community of librarians working together to develop standards, best practices, and the QuestionPoint service based on their experiences and needs.

An interface that enables libraries to offer online reference services locally and to refer questions to libraries locally, regionally or globally.

Tools to support synchronous and asynchronous digital reference, including walk-up questions, email, web-based forms, and live chat, including the ability for librarians to see and talk with patrons over the Internet.

The ability to route and track the status of questions, including system views for the patron, the librarian and the administrator.

Local and global knowledge bases that store previously asked and answered questions for later retrieval and use as a reference resource.

Usage statistics and reports to help librarians implement and maintain QuestionPoint successfully in their libraries.

Integration with other virtual reference systems that participating libraries already use.

A customizable administrative module.

QuestionPoint is hosted at OCLC, requiring only a Web browser for the patron and librarian. Six months after its introduction in June 2002, over 300 libraries are using QuestionPoint, including users in Australia, Canada, China, England, Germany, the Netherlands, Norway and Scotland.

LSSI (Library Systems & Services, L.L.C.)

LSSI, a commercial library solutions company, has worked with a number of commercial software vendors to create various products and services for libraries interested in providing digital reference. They offer both software and a Web reference center for outsourced virtual reference.

Subscribers to LSSI do not install any hardware or software locally. The servers supporting the system operate on an application service provider (ASP) model. The library operator uses a Web browser to control the remote sessions [Breeding, 2001].

LSSI has also developed a fully functional 24x7 Web Reference Center. The center operates out of their headquarters in Germantown, Maryland, and is staffed remotely with professional librarians trained in online reference. Their reference staff provides everything from backup and overflow reference support, and second-level and after hours reference services, to a fully staffed 24x7 online reference service. The librarians come from a variety of backgrounds including special, academic, and public libraries, and are trained by LSSI to meet specific library requirements.

24/7 Reference

24/7 Reference is a cooperative project of the Metropolitan Cooperative Library System that is supported by U.S. government and by LSTA funding (administered by the California State Library). This service offers a suite of products and services that enable libraries to offer live online reference to their patrons. The 24/7 Reference team has assessed the needs of its membership and worked with various commercial software vendors and developers to build tools that support the goals of its libraries. In addition to furnishing tools allowing libraries to offer live reference to their patrons, this project also uses the cooperative efforts of its members to provide additional staffing.

Other Signs of Growth

The ever-increasing number of resources as well as research focused on digital reference also signify a maturing domain. Resources such as Bernie Sloan's Digital Reference Pages [3], the VRD sponsored DIG_REF Listserv [4] and various cooperative communities like the Global Reference Network associated with the Library of Congress and QuestionPoint [5] provide libraries with access to a host of resources to understand, define, and discuss the nature of digital reference in librarianship.

Understanding the Landscape

In the evolving digital reference landscape, tools and functionality play a supporting role to the goals of the libraries providing digital reference. It is by understanding and focusing on patron needs and library
issues, rather than simply adopting the newest technology, that libraries can look holistically at their reference offerings and build adaptable, goal-oriented systems.

The following section provides some perspective and data on potential digital reference users, as well as library issues that digital reference services might consider.

Patron Needs
In understanding a library's goals for digital reference, it is critical to define the target audience and understand the context and conditions of those using a digital reference service. By considering the end user's point of view, libraries can better shape technology systems and define their own service offerings more clearly.

Where Are the Users?
According to a September 2002 survey by Nua [Nua.com, September 2002], there are over 600 million users on the Internet (see Table 1: How Many Online).

<table>
<thead>
<tr>
<th>Region</th>
<th>Users (in Millions)</th>
</tr>
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<tbody>
<tr>
<td>World Total</td>
<td>605.60</td>
</tr>
<tr>
<td>Africa</td>
<td>6.31</td>
</tr>
<tr>
<td>Asia/Pacific</td>
<td>187.24</td>
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<tr>
<td>Europe</td>
<td>190.91</td>
</tr>
<tr>
<td>Middle East</td>
<td>5.12</td>
</tr>
<tr>
<td>Canada &amp; USA</td>
<td>82.67</td>
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<tr>
<td>Latin America</td>
<td>33.35</td>
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These numbers provide a quantifiable view of the potential global audience for libraries providing services through the Internet and carry implications in terms of library policy, digital reference practice and research. Policy issues range from languages served to patron authentication for various resources, while practice and research areas include the need to understand the technology used by these users, the nature of reference services culturally, and the models for collaboration by libraries globally to meet the needs of this shared audience.

What Technologies Are Patrons Using?
Libraries must understand that cutting-edge, state-of-the-art technology may only be able to serve a small percentage of the Internet population. Some patrons pursue technologies with higher bandwidths and higher speeds, while others rely on older technologies. Thus, the chat-rooms, listserv discussions and instant messenger conversations integral to digital reference may not always work at optimal levels for all patrons. In December 2002, 46 million Americans or 32 percent of total Internet users in the US connected to the Internet via broadband [Nua.com, December 10, 2002]. However, there are only 18 million residential broadband subscribers in North America, representing roughly 11% of the total Internet users in the United States [Nua.com, December 4, 2002]. Only four percent of urban households in the UK are currently connected to broadband, a figure that is expected to rise to 10 percent by the beginning of 2004. Sweden has 25.7%; Belgium 19.4%; Austria and the Netherlands with 16.3% and 11.6% of urban households having broadband connections [Nua.com, December 12, 2002]. These kinds of data provide a broad perspective on potential audiences.

The same technologies that currently provide reference services can help to evaluate them by creating service records like transcripts and question histories, generating concrete satisfaction data and assessment criteria, tracking referral patterns, and connecting reference professionals with previously unavailable peers. By gathering and analyzing this data, digital reference systems administrators can evaluate their services according to their patrons' needs, rather than on other industry models or software functionality.

The next section presents several examples of more specific investigation into the users of individual digital reference services.

Who Are the Patrons?
Developing a technology profile about target patrons must include...
consideration of the operating systems, browser types and versions, access
speed, and internet service providers (e.g., AOL) they use. Libraries can
use available technology like web form surveys and web server logs to
gather more specific data about their current users and form a clearer
picture of the audience they serve.
In a discussion of service, Cox describes "Going Out to the User" as the
reference librarian moving into the patron's own environment [Cox, 1996].
In the physical world this requires libraries to identify their target
audience and understand their environment, so the library can then
establish services in such a way to meet the patrons at that point of need
in their own environment. Digital reference provides the same opportunity;
however, the definition of the patron's environment is more specific than
the Internet. When looking at access patterns by users, the library web
site is a good place to start; however, this does not provide a complete
picture of the patron's environment. In the same way that libraries have
established a presence in unconventional locations like malls and grocery
stores to meet their patrons at their point of need, meeting users at
their point of need on the Internet will likely involve partnerships with
web locations patrons already use like government and community sites or
destination portals such as American Online, Amazon.com™, and Google. Web
logs can show where users come from to reach the library's web site. The
following provides some information on usage patterns of some possible
patrons and examples of how libraries can use these of types statistics
and partnership opportunities to better position their digital reference
services to meet patron needs.
In December 2001, OCLC commissioned Harris Interactive to conduct a blind
research web survey on the information habits of college students to help
inform how academic libraries deliver relevant services to their patrons.
The study [OCLC, 2002] reported "college students have confidence in their
abilities to locate information for their study assignments.
Three-out-of-four agree completely that they are successful at finding the
information they need for courses and assignments, and seven-in-ten say
they are successful at finding what they seek most of the time. The
first-choice web resources for most of their assignments are search
ingines (such as Google or Alta Vista®), web portals (such as MSN®, AOL or
Yahoo!™), and course-specific websites." The data offers libraries
concrete information on student's habits and perceptions, as well as a
baseline for future study on how academic libraries meet student
information needs. Using statistical trends and feedback from the
participants, the study suggests methods libraries can use to connect with
students and increase visibility among web resources including promotion,
instruction, access positioning, and integration with other resources like
existing course materials and student information portals.
When the Smithsonian American Art Museum's "Ask Joan of Art" reference
service conducted an audience analysis in the mid 1990s, they determined
that many of their potential users were on America Online™ (AOL). The
reference service approached AOL about providing links to their services
inside of service's user interface. AOL agreed and links to the Ask Joan
of Art reference service were established within AOL's Research and Learn
Channel and as a resource link within the AOL@SCHOOL web portal. Through
2002, the Joan of Art reference service continued to see approximately 40%
of its traffic from AOL users. The service continues to seek out
partnerships to meet patrons at their points of need, and now provide
access through a number of art related information portals, as well as the
Smithsonian American Art Museum's homepage.
By investigating usage patterns, libraries can better understand how to
meet patrons' needs, and establish strategies for service offerings.
Library Issues
As libraries grow these patron-oriented services, they will encounter
issues of workload, efficiency, interoperability, and service quality.
Understanding the digital reference workflow and the role of cooperation
can clarify how technology can be used to assist with workload
efficiency, and quality service assessment. Technical and quality
standards also play an important role in defining systems that support library needs for interoperability, cooperation, and quality.

Digital Reference Workflow

The question of how to build technology that supports the reference workflow presupposes that we have a clear understanding of the workflow. Much of the research to date around reference work has focused on the reference interview or the discovery aspect of the workflow, which only represents the beginning of the process. A more complete look at reference workflow includes activities like question assignment, fulfillment, routing, question management, archiving, retrieval, assessment, evaluation, and reporting. These components underlie the issues libraries encounter in providing digital reference. A full consideration of all these workflow components is beyond the scope of this paper; however, a brief discussion follows on the issues of cooperation, quality standards, and quality assessment.

The Role of Cooperation

Bunge and Ferguson assert that librarians must establish cooperative relationships with each other and with technologists in building systems that support their core values [Bunge & Ferguson, 1997]. Historically, cooperation and collaboration have played a significant role in technological and social advancement. Libraries have recognized this in their development of shared service values and through resource sharing in areas like interlibrary loan and consortial purchasing. In 1973, Kilgour stated that, "Computerized cooperation opens up untrodden avenues of research and development and by making unnecessary the imposition of uniformity on library processes, the cooperation creates hitherto unexplored opportunities for intellectual development in the profession" [Kilgour, 1973]. Thirty years later, these principles still hold true.

In looking at cooperation in digital reference and how it is supported by technology, one must begin by understanding the various types of cooperation that exist. For the purpose of this discussion, five types have been identified: internal, informal, formal, affinity, and anonymous.

Internal: Internal cooperation occurs when library staff work together to solve a problem or meet a shared need. This may seem a bit of a simplified view; however, this model often represents the most frequently encountered form of cooperation within a library. If this type of cooperation is not recognized, the areas where technology can begin to support cooperation and collaboration will be neglected.

Examples of this type of cooperation in digital reference might include transferring a chat session to a more appropriate subject expert or assigning a question to the staff member with the highest likelihood of responding within a given time period.

Informal: Many times, as reference professionals work to answer patron questions, they use other resources, including contacting knowledgeable individuals, that might not be publicly available or widely known. These informal resources could range from a little known web resource to a friend who seems to know obscure facts.

Formal: Established consortia or groups with some form of publicly known charge are examples of formal cooperatives. Many times these relationships have been established to share resources and expertise and to increase purchasing power and efficiency. Within digital reference, these groups might help monitor a live reference queue, staff a central reference center or service for the group, or route questions and patrons based on expertise or coverage.

Affinity: Groups formed around subject areas or meeting a common need that have no other type of formal arrangement represent affinity groups. These types of groups might start as an ad-hoc affinity group and grow to become a formal cooperative over time.

Anonymous: Finally, anonymous cooperation occurs when a librarian can forward a query or patron to another library that is automatically selected based on a set of criteria like expertise or availability. In this model, the libraries may have no previous relationship and may simply have agreed to a common set of service terms through a referral.
service. For the purpose of this discussion, anonymous means that the human beings in the process do not require direct knowledge of one another.

Planning and developing technology without understanding the levels of cooperation, may cause a myopic view of the role technology can play in supporting collaboration in digital reference.

In an example that illustrates the levels of cooperation, QuestionPoint librarians can assign questions within known cooperative groups (formal or affinity) or route them to an automated algorithm to locate a "best match" among the participating libraries. QuestionPoint usage statistics from the first six months of service have shown that libraries use each of these levels of cooperation. With over 300 libraries participating, about 15% of the questions libraries manage within their QuestionPoint account are routed either to the global reference network anonymously or to a formal or affinity group partner. The remaining questions were answered by the original librarian or assigned internally within the library, examples of informal, internal, and formal cooperative networks. The use of QuestionPoint's anonymous and affinity networks has steadily increased; there was an increase of over 60% of this type of cooperative activity in the final three months of 2002.

Technical Standards

As libraries have become more automated and digitally based, technological systems and services permeate every part of reference workflow and interactions. Along with implementing, presenting, and integrating these systems, libraries face the challenge of maintaining an appropriate perspective on the technology and a focus on assessing and providing their services to a measurable level of quality. Both of these challenges point to the need for technical standards for interoperability and service quality standards or best practices.

Coffman notes that virtual reference software must be compatible with thousands, perhaps even hundreds of thousands, of other resources [Coffman, 2001]. Such system interoperability requires open system architectures or established technical standards for exchanges between software packages and services.

One of the primary bodies responsible for generating these types of technical standards is NISO, the National Information Standards Organization, a non-profit association accredited by the American National Standards Institute (ANSI). NISO "identifies, develops, maintains, and publishes technical standards to manage information in our changing and ever-more digital environment. NISO standards apply both traditional and new technologies to the full range of information-related needs, including retrieval, re-purposing, storage, metadata, and preservation" [NISO, 2002]. The NISO Standards Committee AZ on Networked Reference Services is charged with the development of a question processing transaction protocol for interchange between systems. The development of practical standards requires the involvement of both the library and technology communities and a commitment by the standards body to present experimental drafts for implementation and iteration. Organizations like QuestionPoint and 24/7 Reference support standards-based development and serve on the NISO AZ standards committee to help ensure that all development applies to implemented industry standards. As the standards develop, cooperation between organizations on the committee provides a principle test bed for the protocols, impacting both how the standards for exchange between services will work and how the standards will be implemented.

Interchange between systems doesn't always require implementation of standards; open architectures or known Application Program Interfaces (API) can also provide means for libraries to pull together various software and services into a cohesive offering for their patrons. For example, QuestionPoint provides an open API for libraries, library portals, OPACs, and other reference services to link into QuestionPoint's functionality while maintaining the look and feel of the application. This kind of open architecture helps libraries provide a consistent experience for their patrons while providing access to core services at the patron's
point of need. As digital reference moves forward, standards and open systems will become increasingly important. Examples of other applications in the digital reference arena that require attention to standards include: record retrieval from knowledge bases, patron authentication, statistics, fulfillment, document delivery, and others still to be identified.

Quality Standards and Best Practices

Cooperation and interchange require trust. From a technical point of view, trust means a system will perform reliably based on a set of predefined criteria, thus the role of standards and agreed upon architectures. Trust also plays a critical role when looking at human interaction or assessment of service quality; however, technology can really only play a supporting role by gathering data based on agreed upon measures or assessing that data with defined criteria. Collaborative digital reference services must develop best practices and shared professional standards for quality of service to establish environments where trust can be built and established.

McClure, Lankes, Gross, and Choltco-Devlin propose a series of quality standards that can be used to evaluate the quality of digital reference services: 1) courtesy of library staff; 2) accuracy of answer; 3) user satisfaction with the service; 4) rate of repeat users; 5) awareness that the service exists; 6) cost per digital reference transaction; 7) completion time; and 8) accessibility. Harnessing technology to automate the collection and analysis of accepted metrics will provide a common vocabulary within librarianship about the services provided [McClure et al., 2002]. These metrics can also help educators, researchers, and service providers identify technology, education, and research areas that would benefit libraries and ultimately benefit patrons as well in meeting the common goal of quality service.

As a global cooperative with hundreds of participating libraries, QuestionPoint has established a variety of guidelines, policies, and practices to ensure quality and build trust within the global reference network. For example, each library that responds to a question through QuestionPoint takes responsibility for the accuracy of its response. In addition, a board comprised of QuestionPoint members and OCLC and LC staff monitors the quality of the answers provided to patrons and maintain standards to ensure the quality of the global knowledge base. Peer monitoring is also used to help ensure service quality.

Implementing a Vision: The Work of Making Good Ideas Reality

Tenopir and Ennis summarized a decade of change in reference this way: "Although the exact number of reference questions seems to be declining in most libraries, the nature of the questions and the modes used to receive and answer questions have increased in variety and complexity" [Tenopir & Ennis, 2002]. In this context, libraries must reflect on how they can address this perceived decline and the growing number of modes used to provide service. The following example shows how the Library of Congress, the world’s largest library, has worked to understand and address patron needs and library issues.

A team of project coordinators and librarians at the Library of Congress under the direction of Diane Kresh, Director of Public Services, manages involvement in activities like QuestionPoint and NISO and applies these collaborative principles to define and support the shared vision of electronic reference for the library’s twenty-two reading rooms. To form a clear picture of the patrons they wanted to serve, the team used an informal assessment including web statistics, patron feedback, and the shared experiences of over 200 library professionals working in the reading rooms and participating in the Collaborative Digital Reference Service.

Through this assessment, the team concluded that patrons were often unaware of the services available; the services were often difficult to locate; and the interfaces and experiences for the patron were inconsistent. To better understand where their patrons were and what technology they were using, the team used web server logs to identify high
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Traffic areas and browser technology used. Based on this data, links were placed to the "Ask a Librarian" service directly from the Library of Congress homepage and on the highest traffic locations on the Library's website and affiliated sites. All these links take patrons to access points where they can select the type of reference they need. At any time, a patron is no more than two clicks from a reference librarian. The server logs and assessment also helped inform the technology profile and decisions about how to present the service (e.g., ADA compliance) and which technology to offer, like web forms and chat. To provide a consistent interface and experience for the patron, the reading rooms worked together to define their approach to meeting patron needs as a whole service rather than a collection of various services. In early 2002, the Reading Rooms established a uniform approach and created a web template for queries to provide a common interface and ensure that a uniform set of information was gathered from patrons across all the reference services, regardless of where the query originated.

The team encountered issues of workflow, cooperation, and standards, both technical and quality, as the over 200 reference librarians in the 22 reading rooms worked together to define service. The reading rooms implemented QuestionPoint as their reference management and workflow service, which allowed them to handle question assignment, referral to other reading rooms, interaction with patrons, question management, statistical reporting, knowledge base creation, and routing to QuestionPoint's Global Reference Network as required. With a goal of maximizing research and reference service and minimizing the number of unserved patrons, the reading rooms formed internal and formal cooperative reference networks to address question referral between the reading rooms based on expertise and load. This use of collaboration extends to the reading rooms' participation in anonymous and formal cooperation in the QuestionPoint Global Reference Network, both for question submission and answering. An ongoing commitment to standards is illustrated by the Library of Congress' leadership role on the NISO AZ standards committee and its sponsorship and participation in various quality studies and standards setting activities.

Through the implementation of this structured, patron and mission-driven approach, reference traffic has increased dramatically. In the Main Reading Room alone, the number of reference queries received via e-mail grew from 280 in May 2002 to nearly 1200 in October 2002. Much of this traffic continues to come from web forms, suggesting the need to better understand how libraries provide reference, where patrons access it, and what is done to support digital library workflow, rather than focusing principally on the modes or channels in which it occurs. The assessment and planning accomplished by the Library of Congress team has produced manageable systems, efficient processes, and support enabling this kind of increase without the need to increase staffing.

Ongoing assessment, revision, and growth are the final, and perhaps the most critical, components of the Library of Congress strategy. In its commitment to providing quality reference, the Library of Congress continues to work for innovation by: participating in evolving standards; constantly re-evaluating and challenging its own practices; assessing service statistics and trends; continuing to provide and evaluate new modes of reference like chat and voice over IP; participating in projects to evaluate new technology; shaping the development and management of the QuestionPoint service and Global Reference Network community; and working to stay current with the Library's patrons by understanding and anticipating their current and future needs.

Summary

Lankes noted that "the core question in today's emerging digital reference field is: how can organizations build and maintain reference services that mediate between a patron's information need and a collection of information via the Internet?" [Lankes, 2000]. Examples like the Library of Congress and Ask Joan of Art point out that when libraries define their users and identify where they are and how best to serve them, the mission...
and goals for the service drive technological need, development, and support. Moving forward, as libraries develop their digital reference services, technology will play a critical role in their ability to effectively identify and meet patrons' needs and efficiently address service growth and quality through issues of workflow, cooperation, assessment, and interoperability.

References