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Advisor: Jeffrey Pomerantz

This study describes a content analysis of reference transcripts taken from the NCknows virtual reference service. The analysis was performed to determine why the librarians consider some questions to be unanswerable at the time that they are submitted by users. Transcripts were coded by a classification of question causes, by how complete the reference interview was during the transaction, and then according to the reasons given for ending the chat early. The analysis showed that most reference interviews were incomplete and that the most common explanation for why the questions could not be answered at the time was that the librarians were already busy assisting other users. The study indicates that more North Carolina librarians should be hired to staff the service and that librarians should make a greater effort to conduct a complete reference interview so that more questions can be answered while the user is still online.

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REFERENCE TRANSACTION HANDOFFS: FACTORS AFFECTING
THE TRANSITION FROM CHAT TO EMAIL

by
Nora E Wikoff

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Jeffrey Pomerantz

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Introduction

The primary function of a reference service is to give users the answers they need when they need them and how they need them. In his seminal article, “Personal Relations Between Librarians and Readers,” Samuel Green set forth the four major tenets of reference service on which modern reference services are still based: “instructing the reader in the ways of the library; assisting the reader with his queries; aiding the reader in the selection of good works; and promoting the library within the community” (Tyckoson, 2003, p. 13). His 1876 article was the first written about reference service in the United States, and it remains timely even today. His four functions serve as guidelines for reference librarians in deciding how much service they should provide and how far they should be willing to go to reach out to users to meet their information needs.

Many chat reference services meet the goals set forth by Green most of the time; users can access these reference services from any location, so long as there is an Internet connection, and many of these services allow librarians to send answers and documents to users through chat software. Occasionally, however, librarians cannot answer a user’s question when it is received, whether it is because either the librarian does not have enough time to find the answer or the user does not have time to wait, because the resources needed to answer the question are not available at the time, or because the question would be better answered by another person. In these cases, chat reference services rely on email to complete the reference transaction and deliver answers to users.

This paper will attempt to determine why librarians working with the NCKnows chat reference service are occasionally unable to answer certain questions when they are received. This study will focus on three questions: First, what are the types of questions that are being answered later through email? Second, how complete are the reference interviews for the questions being answered later through email? Third, what are the reasons why these questions need to be answered later through email? It is postulated that questions not answered in the chat session but answered instead after the chat transaction has ended may share certain features. Librarians may be using the email response option because the questions submitted require more time and/or resources than the librarians have when they receive the questions and conduct reference interviews.

To answer these questions, a content analysis was conducted on the unfinished reference transactions of questions submitted to the NCKnows reference service from January to February 2005. By addressing and reducing the number of situations that make certain questions difficult to answer at the point of need, NCKnows will be an effective form of reference that users can rely on for more of their information needs.

Literature Review

Reference Services: Past, Present, and Future

Digital reference is the newest development in a long line of technological advances that have influenced how librarians have provided reference service over the last century. During that time, rising literacy rates, technological advances, and the pursuit of higher education by more people powerfully influenced libraries and the services that they have offered. In the United States, the major impetus for change within

libraries and academic institutions came with the Morrill Federal Land Grant Act of 1862, which gave state governments land to open universities and schools. This created a flood of new students and researchers needing information who may never have entered a library before. The first reference desks in the United States were formed in the late nineteenth century to meet the needs of these untrained scholars. Up to that point, most libraries had served primarily as warehouses of books. Reference librarians sought to transform them into places of learning. These librarians recommended books to users and assisted them in catalog searches (Fritch & Mandernack, 2001, p. 288).

Librarians' job responsibilities have evolved as technological advances over the course of the last century have reshaped research, communication, and information retrieval. Student enrollment at universities and the research output from those universities increased steadily after the end of the nineteenth century. By the early 1900s, reference librarians began expanding the services they offered in response to increasing demands for service. They spent more time helping users find detailed information that was difficult for the users to locate on their own, and the field of library science took on a more scholarly focus (Fritch & Mandernack, 2001, p. 288). Many reference services began offering telephone reference services in the 1930s, enabling librarians to provide ready reference service to users away from the library. Librarians also answered questions received in the mail, and later by fax (Coffman, 2003, p. 2).

Huge technological changes during the twentieth century were also changing how things were done in other aspects of librarianship. Cooperative cataloging began in the 1960s with the development of the Online Computer Library Center (Coffman, 2003, p. 1). Libraries worked together to create inter-library loan agreements and rural outreach

programs (Fritch & Mandernack, 2001, p. 289). Libraries now make an impressive amount of their resources and services available over the Internet. Web-based OPACS are the norm, and many libraries have fully integrated their catalogs so that users can search the collections of several libraries simultaneously. Sophisticated inter-library loan systems bring resources from other libraries quickly and conveniently to users' home libraries, allowing users to return items to their home libraries when finished (Bostick, 2001, p. 129). Proxy servers enable users to search within their library's e-journals, finding aids, and databases from the convenience of their homes (Cain, 2003, p. 246). Finally, digitization projects are making even rare and historic artifacts in library collections available to the remote researcher. Although most of the nation's libraries' resources are not available to users through the Internet, the increasing amount, along with the ready availability of Internet resources, means that users often feel even less incentive to leave the comfort of their homes to seek the resources and assistance of the library reference desk (Munson & Frisque, 2004, p. 11).

Furthermore, many users see no reason why they should bother using library resources, since they believe that most of the information they need is freely available over the Internet. Librarians must work hard to overcome these assumptions. One librarian noted: "(T)he biggest change is increased user expectations. Increasingly, users expect to be able to find everything online, full text. Technology lets us do much more, but it also increases expectations about what we can do" (Gray, 2000, p. 365). Bringing reference services into the digital environment will help reference librarians teach users how to locate and evaluate useful information sources effectively (Fritch & Mandernack, 2001, p. 294, Gray, 2000, p. 365).

Most users now have ready access to computers that bring the world of information available over the Internet directly to them. They no longer need to struggle with library catalog systems to find information. Internet search engines make it possible for users to find quick answers to questions for which they once might have had to contact a librarian or library collection to find answers. As a result, most Internet users have developed false confidence in their search skills, due to the sheer number of results they retrieve from most search queries. (Grant, 2002, p. 20). Internet sources may actually be better sources of information for quick ready reference type questions than sources in a library collection, since the Internet sources are often more up-to-date (Coffman, 2003, p. 4, Janes 2003, p. 24). The task for today's searchers is to differentiate between the questions they have that can be answered quickly using Internet sources, and questions that need better sources of information. Librarians can help users locate accurate information that may be available in multiple formats from different sources, and that may be intermixed with biased, untrustworthy, or inaccurate sources (Fritch & Mandernack, 2001, p. 290).

Reference services are experiencing a new period of evolution brought about by all of these changes. Tyckoson (2003) discusses the future of libraries and reference services, and states that certain themes will remain constant. First, a library's sole purpose will continue to be serving its local communities, so libraries need to craft policies and develop services that meet the needs of their communities. Second, Green's four core functions will remain important parts of the missions of libraries. Third, users will continue to value personalized assistance from librarians, and the promise of

personalized assistance will be the draw that brings users back to the library (Tyckoson, 2003, p. 15).

Bailey-Hainer reminds librarians that for libraries and their reference services to remain viable in the future, librarians must reach out to users where and when they need assistance, in a manner that makes users comfortable and more willing to consult a librarian. Although today's librarians and library users may not be very comfortable with virtual reference and may bemoan its perceived failings, tomorrow's users will perceive things differently. The University of Southern California's Center for the Digital Future conducted a study in 2004 that found that possibly 97.5 percent of children in the United States under the age of eighteen are now online (Bailey-Hainer, 2005, p. 46). Thus, reference librarians should remain open-minded and willing to explore the possibilities that digital reference offers, while continuing to offer top-quality existing reference services. "Services and programs must become more responsive, more flexible, more convenient, and more personalized for users, taking into consideration many different learning styles, attitudes, belief systems, and orientations to technology (Fritch & Mandernack, 2001, p. 300)."

Background on digital reference

"Virtual reference," "digital reference," "live online reference" and "chat reference" are all synonymous terms. Stephen Francoeur defined digital reference, online reference, and virtual reference as "the provision of reference assistance via the Internet (Francoeur, 2001, p. 190). Janes defined digital reference as "the provision of direct, professional assistance to people who are seeking information, at the time and point of need" (Tipton & Earp, 2004, p. 102). Breeding defined virtual reference service as "the

delivery of personalized reference resources to users outside the physical library” (Breeding, 2001, p. 42).

Francoeur defined email reference as “services where the user is simply given an e-mail address to which to send questions as well as those services where the user is presented with a detailed Web form to be filled out and sent by means of a button click” (Francoeur, 2001, p. 190). He defined chat reference as “services where the core of the communication between librarian and user is an exchange of text messages sent in real-time using either basic chat technology like AOL Instant Messenger or ICQ or complex Web contact center software like NetAgent or eGain Interact” (Francoeur, 2001, p. 190). Chat reference differs from email reference, even though chat reference services often rely on email to complete the reference transaction.

The history of digital reference is logically tied to the rise of the Internet, since the decline in reference requests at library reference desks due to search engine use on the Internet has led libraries to experiment with new ways to reach users. The Association of Research Libraries reported that the median for reference transactions in member libraries dropped from 133,022 in 1991 to 105,087 in 2001, even though student enrollment at the post-secondary level increased during that time from 18,266 to 19,083 (Ronan, 2002, p. 9). The median number of reference requests in ARL member libraries peaked at 162,336 in 1997, by which point the Internet had begun growing in popularity, and the number of reference transactions then declined by more than 40 percent to 96,228 requests in 2003 (Coffman & Arret, 2004, p. 38-39).

Digital reference services may draw new questions from users who had previously felt uncomfortable approaching traditional reference services for assistance

(Straw, 2000, p. 379). Users who are uncomfortable approaching a librarian in person or who want to remain anonymous can submit questions to a virtual reference service, secure in the fact that they will be able to get information anonymously (so long as they are willing to submit their email addresses) (Coffman, 2003, p. 12, Heise & Kimmel, 2003, p. 3). There are also user groups who may not be concerned about privacy or anonymity issues, but who have difficulty accessing the library. Whether it is distance, a handicap, privacy concerns, or a scheduling issue that prevents users from getting to the library, virtual reference services tear down these restrictive walls, providing access to users in any location and increasingly at all times of the day (Coffman, 2003, p. 12). Of course, users need to be able to access the Internet.

Email reference services

Email services gave librarians the opportunity to experiment with offering electronic reference services. Libraries began offering email reference slowly in the 1990s by placing small 'AskALibrarian' links on their Web sites. As reference librarians became more familiar with the technology (and realized that users were not submitting questions in droves), they moved the links to more prominent areas of their library Web sites and began publicizing their services (Coffman, 2003, p. 9).

These services paved the way for the possibilities of live virtual reference services. Users can send emails to reference desks whenever they have questions, without having to wait for the libraries to open, although they may have to wait for responses (Moeller, 2003, p. 2). If questions would be better answered by people at other libraries, it is easier for librarians to provide triage and connect users' questions to other librarians. This is more convenient for the users, and the forwarded emails can include any notes

made in the course of finding the answers (Janes & Silverstein, 2003). If a user's question is unclear, the librarian can respond to the user's request and ask for further information. Most importantly, when composing the message with the user's answer, the librarian can send relevant citations or documents in full text and include information about how the answer was found. Unfortunately, email reference relies on asynchronous communication, which may require an exchange of emails back and forth between the librarian and user to determine exactly what information is needed, and there is always the risk that the user may 'disappear' midway through the transaction. If the user does not reply to the librarian's email requesting clarification or further information, the librarian is left to guess at the user's information need (Coffman & Arret, 2004, p. 39). The concept of the disappearing questioner is new to digital reference, so librarians need to develop strategies to overcome this problem (Janes & Silverstein, 2003).

Email reference services have not received the heavy use that librarians had expected, perhaps in part because of the widespread introduction of virtual reference services that offer live, immediate, responsive assistance. Most libraries developed extensive backup plans in preparation for an onslaught of questions that has yet to arrive (Coffman, 2003, p. 12). Users' slow adoption of email reference (most services receive only a few questions a day) may also be a result of the drawbacks of email reference technology. Many email services offer responses within one to three days, and this delay may turn off users who want answers quickly. They are accustomed to the immediacy that email technology offers and may not realize how long it can take for librarians to check emails, determine a user's real information need, and complete a full search with citations and information about the search process (Coffman, 2003, p. 10). When faced

with immediate information needs, users may be more likely to look to a search engine for results that may not be complete, fully accurate, or provide exactly the information needed, but which are available instantly (Coffman, 2003, p. 12). Chat reference services promise assistance from real librarians without making users leave their computers. Chat services can approximate the immediacy with which search engines provide information, especially for complex or obscure questions, but users can trust that the information received from librarians will be authoritative and unbiased (Lipow, 1999, p. 51).

Email reference services have been an important bridge for reference librarians moving from traditional desk and phone reference services to chat reference. Librarians gained experience in writing out the steps of their search processes, so that users could learn search tips and potentially use the librarians' explanations of their searches when conducting future searches (Coffman, 2003, p. 9). The email format allowed for conversational threads to develop between users and librarians, as the librarians clarified users' questions, suggested sources, and answered follow up questions (Lankes, 1999). Having users' requests written in email messages made it possible for librarians to forward the requests to other librarians or libraries if they needed assistance or were unable to answer the questions sufficiently. This flexibility encouraged librarians to explore ways that reference services could be integrated through collaborative systems and consortia, eventually leading to the creation of services such as the Collaborative Digital Reference Service (Coffman, 2003, p. 10). Finally, the emails stored the text of the reference transactions, allowing librarians to analyze the reference interviews for training and quality purposes (Coffman, 2003, p. 9).

Chat reference services

People have struggled to determine exactly how many chat services are currently running and how many libraries are working together in these services. In February 2004, Francoeur suggested that there may be as many as 500 services offering virtual reference on the Web, whereas McKiernan thought it may be as low as 132 services. These numbers are not fully indicative of how many libraries are involved in the services and offering chat reference, however, because many of these services are supported by several libraries (Coffman & Arret, 2004, p. 42). Most libraries began their services modestly, offering only a few hours of service a day and not advertising the services widely, until librarians became more familiar with the chat software and the reference medium itself. There are benefits as well as limitations associated with chat reference, and it will take time to develop an understanding of what these services can bring to reference as a practice. Many librarians were initially concerned that they would be unprepared for heavy traffic to their service, and they wanted to make sure that they would be able to handle a possible glut of users requesting information. As chat services have matured, reference staffs have become bolder, increasing their hours of availability, advertising their service more widely, and increasing the number of staff members answering questions at a given time (Kresh, 2003, p. 24-26).

The simplest forms of chat reference services use instant messaging software, because it is usually free and can be set up merely by downloading the software onto computers. In cases of libraries that use software such as AOL Instant Messenger, most users already have the software loaded, so there is no barrier to service (Francoeur, 2001, p. 191). Some libraries use chat software that only needs to be loaded on library

computers; a user accesses the service by clicking on the chat reference button on the library's Web site. A chat window pops up, and users can begin asking their questions. These types of software make it easy for libraries to start up chat reference services and experiment with them before committing to more expensive Web contact center software. Unfortunately, simple chat software often places limitations on what services librarians can offer to their users during the chat (Francoeur, 2001, p. 190-91).

Web contact center software offers much more functionality than simple chat software, as it was designed for use by companies to assist consumers on their Web sites. eGain is one such company that has been licensed and then modified by two organizations, Library Systems and Services Inc. and the Metropolitan Cooperative Library System's 24/7 Reference Project, for use in the library world (Francoeur, 2001, p. 192). In August 2004, MCLS and OCLC merged 24/7 Reference with QuestionPoint, thus combining two of the most important virtual reference services together for use by other libraries (<http://www.247.ref.org/aboutus.htm>). NCKnows uses 24/7 Reference for its chat software (<http://www.ncknows.org>).

This type of software allows librarians to push pages through to users, so that they can co-browse, and some software packages allow users to push pages through to librarians as well. Users may be able to learn better search skills by watching the librarian enter search terms in a database. This gives the user a brief but useful introduction to searching in that database, and the user can employ that knowledge in later searches. The librarian and user can then evaluate the results together to make sure that the information found answers the user's questions. (Francoeur, 2001, p. 193).

Contact center software also offers benefits, visible only to librarians, that make replying to users faster and easier. Users can be queued and routed to librarians so that they receive assistance in the order that they contact the service, and some even allow users to be transferred to other librarians when necessary. The system can hold canned messages that librarians then send to users, letting them know that it will be a short wait, that the librarian is searching and will be back shortly, etc. Some messages can be automated so that users receive a message letting them know that the librarian is still searching, if the librarian has not sent a response recently. Perhaps most importantly, this software generates a transcript of the chat transaction including any links that the librarian may have sent to the user. This is emailed to the user at the conclusion of the chat (Francoeur, 2001, p. 194). For these reasons, Web contact center software has the greatest potential among the types of chat software used in chat reference (Francoeur, 2001, p. 198).

Co-browsing is a wonderful attribute of Web contact center software when it works, but unfortunately many Web sites and proprietary databases do not allow co-browsing. This can interfere with the chat, making it harder for the librarian to provide bibliographic instruction, search for results with the user, and present sources to the user. Some Web sites even disconnect the chat when librarians attempt to co-browse them (Francoeur, 2001, p. 202).

Services that request the email addresses of users when they submit their questions make it possible for librarians to send information to users later. If they are disconnected before the librarian can determine what information the user needs, then the librarian can send a quick email to the user requesting more information. The librarian

also has more flexibility to respond if either the user or librarian is running out of time or the question will require extensive research. The user can at least submit the question, if not also clarify what is being sought and potentially get some information from the librarian immediately. If the transaction ends prematurely, the librarian can send an answer to the user based on what the librarian could glean was needed, in case the user cannot or chooses not to reconnect to the service (Coffman, 2003, p. 12). Regardless of whether users receive assistance before the transactions or after the transactions have ended, they do receive transcripts of the sessions containing any information or materials that the librarians may have found. Users can store these sessions for consultation later. A transcript also provides a perfect copy of any documents or Web pages that the librarian may have sent, whereas in other remote reference formats, it may take time for the user to receive the information in the mail or over fax, and the user may need to go to the library to get it (Sen-Roy, 2004, p. 131).

Even proponents of virtual reference services concede that there are certain drawbacks to virtual reference, however. These drawbacks subtly affect the benefits that users can gain from reference librarians (Carter, 2002/2003, p. 119). Bibliographic instruction has always been an important aspect of reference services, but chat service technology often hinders the librarian's attempt to teach the user search skills. Although some services allow the librarian and user to browse and search together, often with the librarian wielding control of the user's browser, many do not. Many Web sites and proprietary databases also prevent co-browsing. This inevitably forces the librarian to take on most of the searching responsibilities, and it is often difficult to explain quickly to the user the process by which the librarian found the answer. Furthermore, it creates a

model of library service that more closely approximates that of call centers than of traditional reference services, where users come to expect that they can simply submit a query and an answer will be provided (Carter, 2002/2003, p. 119).

Librarians staffing virtual reference services that do not allow page-pushing or co-browsing have tried to circumvent this inability to provide bibliographic instruction by typing out the processes by which they found their answers, as part of the chat transaction. Ideally, users will look at the transaction later to model future searches on the librarians' search processes. Although this recording of the search process is a benefit unique to electronically based reference services, it is very time-consuming. A question that would only take one or two minutes to answer at the desk may take up to fifteen minutes for the librarian to conduct a search and then explain in text (Carter, 2002/2003, p. 119, McGlamery & McClennen, 2003). The most current statistics about NCKnows shows that the average duration of a chat session is 13.7 minutes (Pomerantz & McClure, 2004, p. 106). In cases when the librarian needs to send the answer to the user's email, the search process becomes solely the librarian's responsibility, and if the user is to learn the process by which the librarian found the answer, the librarian has to type the process out. This time-consuming aspect may increase the danger that librarians will look quickly to find convenient digital sources of information instead of focusing on the best sources of information, regardless of their formats (Kresh, 2003, p. 25).

Librarians should find a way to present sources when chatting in such a way that they are not forced to sacrifice their commitment to using the best sources, simply because the user is online and would prefer electronic sources delivered immediately to better sources available in print at the library (Francoeur, 2001, p. 191). The fact that

users select virtual reference services for assistance does not mean that they would be unwilling to switch to another reference medium or come into the library if needed. Users have traditionally been willing to come into the library to continue a request that may have begun over the telephone, so there is no reason why some users would not be happy to receive results via email or from the reference desk (Carter, 2002/2003, p. 119).

Detractors of virtual reference cite the time involved, as it takes far longer to complete a reference transaction online than in person or over the phone (Katz, 2002/2003, p. 7). A survey at Carnegie Mellon University of graduate students and librarians found that two of the biggest drawbacks associated with digital reference services were the amount of time involved and the lack of information provided to the librarian when the user's query is received. It takes longer to type the questions and answers, which may cause the user to end the session early, or technical issues may slow the communication down enough that users either disconnect or choose not to connect (Katz, 2002/2003, p. 9). In addition to the increased time that librarians must divert to often lengthy chat transactions, the low levels of use has been pointed to as another problem associated with chat reference.

Many early adoptors of this technology are concerned about the generally low usage levels of online reference. The problem is that it may be too early to tell whether the reason is lack of awareness on the part of the community being served, or a lack of interest...we need more experiences and better measures before we can determine where the problems lie (Tennant, 2003, p. 38).

Library professionals who are suspicious of the virtual reference movement suggest that the quality of answers provided through virtual reference services will diminish over time, due to the constraints of the chat reference transaction. It is difficult to conduct the traditional reference transaction, as described by Taylor, since the librarian

is not speaking to the patron in person and necessarily loses some of the visual cues (Kresh, 2003, p. 25). This is not always a loss, though. Librarians are human, and they inevitably make assumptions about users that may not be accurate, based on appearance, skin color, age, and many other seemingly insignificant factors, such as cleanliness (Carter, 2002/2003, p. 116).

McKinzie and Lauer said that libraries have jumped too quickly on the virtual reference bandwagon out of a fascination with any new technology that comes along. Because it takes longer for librarians to answer a digital reference question than a face-to-face or telephone reference question, and because maintaining the software and integrating the service into existing work patterns create burdens on libraries, they conclude that digital reference has too high a cost for the benefits it can offer (McKinzie & Lauer, 2002). In response to critics of virtual reference who say that digital reference is inferior to face-to-face reference, Kresh advises, "Again, the point is not either or. Offer a range of communications options and let the patron decide" (2003, p. 25). Janes (2002) expressed reservation about the possibility that digital reference will be used in situations where other forms of reference would be more appropriate, as in the case of subject-based research questions, and that librarians would feel rushed into sending a less-than adequate response. He also advocated that librarians begin to think in terms of "situational reference," which acknowledges that each reference format offers certain advantages in the right situation (Janes 2002).

Collaborative chat reference models

Chat reference has received a great deal of attention during the last four years, as increasing numbers of libraries started their own real-time reference services. Many of

these services have since struggled to keep afloat, when faced with high staffing and equipment costs (Coffman & Arret, 2004, p. 42-43). As a result, Coffman and Arret expressed concern that virtual reference models may be unsustainable without LSTA subsidization. Most virtual reference services running today used LSTA grant funding to begin, but these grants were only intended to provide start-up money for pilot projects, so services need to find ways to become self-sufficient (Coffman & Arret, 2004, p. 43). Bailey-Hainer defends the sustainability of virtual reference models implemented on the statewide level. She reports that collaborative virtual reference services comprised of multiple types of libraries are more likely to be self-sustaining since they can share the costs of starting, maintaining, and staffing the service (Bailey-Hainer, 2005, p. 46).

Bailey-Hainer also pointed out that use statistics are understandably much higher for collaborative reference services, since these services reach more people who represent many different user groups. Families, students, and elderly members of rural, urban and suburban environments enjoy equitable access to reference services, so long as they or their libraries have Internet access (Bailey-Hainer, 2005, p. 46).

The North Carolina State Library grappled with the issue of whether virtual reference should be provided by one library or by several libraries working cooperatively. When planning the creation of NCKnows, the Virtual Reference Advisory Committee decisively chose the latter, due to cost, marketing, and service concerns. A collaborative statewide model would allow libraries to share their resources, regional knowledge of the state, and staff expertise, and costs would be spread out among the member libraries. The service would also attract statewide the interest of citizens around the state as well as state legislators, who would be more likely to support a statewide service that served their

constituencies (Bailey-Hainer, 2003, p. 46, Crisp, 2003, p. 2). On the other hand, collaboration often means compromise, and it can be difficult for public, academic, and special libraries to come to an agreement about what level of service should be offered (Coffman, 2002, p. 58).

Digital reference and the reference interview

In spite of all of the technological changes that have occurred in the past hundred years, reference has remained a relatively static practice. Many librarians continue to view desk reference as the model reference service, since it allows them to engage with users and gauge their information needs by interpreting verbal and nonverbal cues. Also, it is easier for a librarian to provide bibliographic instruction and show resources to a user if the user is already speaking with the librarian in person. After conducting the reference interview and locating possibly useful sources of information, the librarian can then ask the user if the documents are helpful. Other forms of reference are all perceived as lacking certain facets of the reference interview, thus rendering them less efficient forms of reference. The telephone makes it convenient for users to contact librarians with quick ready reference or directional questions, but documents cannot be delivered to the user immediately and it is hard to provide bibliographic instruction. Fax machines and written correspondence make it possible for some documents to be delivered to users, but without a conversation or interaction between the user and librarian, the librarian may not be able to tell what information the user needs (Stanley & Lyandres, 2001, p. 246).

The reference interview can be difficult for librarians to conduct in desk reference settings, in spite of the many subtle verbal and nonverbal cues provided by users. This difficulty is compounded in chat reference settings, where the librarian is forced to rely

solely on the information entered by the user during the chat (Carter, 2002/2003, p. 116). Psychologist John Suler calls chat an “austere mode of communication” where “there are no changes in voice, no facial expressions, no body language” (Suler 1997). There is no doubt that many important clues about the user and the user’s need are lost in the transition from desk or telephone reference to digital reference. The librarian may need to ask what grade a student is in, to determine how complex or detailed the materials sought should be, although this is a clue that would readily be perceived by the librarian if that student were to approach the reference desk in person or call the reference desk for assistance (Straw, 2001, p. 376). Perhaps even more importantly, in a traditional desk reference environment, librarians would almost instantly be able to sense if users were stressed or pressed for time, based on the stress in their voices or speed of talking, whereas the persona and typing style of a stressed, hurried user of chat reference could be misconstrued as an indication of poor chat etiquette. Additionally, librarians can better sense when users do not understand something or need clarification about something if they are speaking to users face to face or over the phone, as a user’s silence or pause can communicate much about the user’s state of understanding (Francoeur, 2001, p. 200). Librarians may be able to glean certain clues about users and their information needs through the chat reference interview that would not be seen in a traditional in-person reference interview, however (Sen-Roy, 2004, p. 128). For example, users may be more willing to discuss details about a sensitive health matter or personal issue if they perceive that they will be able to do so anonymously.

Nonetheless, librarians differ about the importance of the reference interview, when it should be conducted, and for what questions it should be used. Wilson says that

questions should be taken at face value, even if what the user asks for is actually quite far from what the user actually needs (Ross, 2003, p. 38). Janes has found that many librarians think that the reference interview is overrated, and that it may not be needed in digital reference (Janes & Hill, 2002, p. 60). Ross, on the other hand, says that all reference transactions would be enhanced by a reference interview. Although proponents of the face value approach balk at how long it would take librarians to serve users if reference interviews became part of every reference transaction, Ross points out that taking the time to clarify a user's need early on will save time in the long run. In the world of virtual reference, reference interviews can save time for both librarians and users if the librarians do not have to waste time searching for information that does not meet the users' needs (Ross, 2003, p. 39).

Janes suggests that those who claim that reference interviews are unnecessary in digital reference may be trying to resolve the guilt they feel due to their frequent inability to conduct a full reference interview for questions received by email. Respondents to a study he conducted in 2002 reported that they generally request that users call the desk or come in if their question seems to be too complex or amorphous to answer by email. Since chat software allows a librarian to develop the user's question while the user is still online, this may be less of a problem for chat reference (Janes & Hill, 2002, p. 62).

Librarians are split as to whether research questions can or should be answered through chat. A 2002 study by Janes showed that an overwhelming majority (80.0 percent) of the librarians surveyed felt that ready reference questions would be well served through digital reference, whereas only 4.8 percent felt that they would be poorly served through digital reference (Janes, 2002, p. 560). Conversely, 32.9 percent of the

librarians surveyed felt that detailed research questions would be well served through digital reference, while 46.2 percent felt that these questions would be poorly served (Janes, 2002, p. 560). As librarians become more familiar and comfortable with digital reference, they may be able to reach consensus about which questions are best served by this form of reference, and which questions are best answered through other forms of reference (Janes, 2002, p. 561).

Some digital reference services skirt this problem, of receiving complex research questions that are difficult to answer immediately via chat, by stating that their services are only intended to answer simple ready reference questions (Janes, 2001). In a study about questions types submitted to chat reference services, Diamond and Pease questioned the usefulness of limiting the scope of questions that can be submitted by users. "Limiting digital reference service to 'ready reference' questions alone does not adequately meet users' needs and may not even be understood by them (Diamond & Pease, 2001, p. 218)." This reticence to accept research questions may be explained by the fear of many reference librarians that they will not be able to answer these questions properly (Janes, 2002, p. 561).

Katz suggested that the solution may be to give more librarians experience answering complex research questions online and offline, so that they will feel comfortable answering these questions in a digital environment. "Inevitably those who frequently are involved with in-depth queries develop skills and confidence not found among librarians who concentrate only on ready reference (Katz, 2002/2003, p. 3)." He set forth four points that all librarians should strive to meet when conducting reference interviews. "(1) Obtain the greatest, most precise, information about what is needed. (2)

Understand at what level the material is needed and how much is required. (3) Complete the interview, and arrive at the necessary key data, in as short a period as possible. (4) Complete the interview, and arrive at the necessary key data, in as short a period as possible (Ronan, 2003, p. 141).”

Many researchers and librarians have acknowledged that librarians feel pressured to provide results quickly when chatting with users, and this pressure comes from both users and themselves. Marsteller and Neuhaus found that librarians felt “(self-induced) pressure to answer questions quickly, sometimes at the expense of a better reference interview (2002, p. 465).” Librarians also report an inability to steer the reference interview as well when chatting (Marsteller & Neuhaus, 2002, p. 465, Franceour, 2001, p. 200-201). Users “can be impatient and demanding during the chat, and in general help to create a reference encounter that feels more pressured than is typical at a reference desk” (Franceour, 2001, p. 200). Responding to a question submitted by a user in real time is far more daunting than responding to a user’s question submitted through email. Brandt wrote, “they are more demanding than email. They tend to put pressure on you to respond *right now*” (2000, p. 66). This strengthens the view shared by many librarians that chat reference should be reserved for ready reference questions instead of research questions (Marsteller & Mizzy, 2003, p. 151).

The best way to resolve this debate may be for librarians to accept research questions from users and conduct as much of a reference interview for each question as possible until further research is done. Otherwise, the perception that “the synchronous digital reference environment is not suitable for conducting a reference interview ... could become a self-fulfilling prophecy” (Marsteller & Mizzy, 2003, p. 159). Preliminary

research has suggested that the reference interview still has a function in chat reference (Marsteller & Mizzy, 2003 p. 160, Ward, 2004, p. 52).

Reference Interview Completeness

Ward developed criteria to measure the completeness of chat reference interviews for a study researching questions received by a virtual reference service. Following the RUSA Guidelines for Behavioral Performance of Reference and Information Services Professionals, Ward identified four crucial criteria: negotiating the question, providing source instruction, offering applicable keywords or subject headings to use for searching, and conducting a follow-up interview (Ward, 2004, p. 48-49). Listed below are the four criteria that he created:

- Did the librarian ask how much information/how many sources you needed? (question negotiation)
- Did the librarian guide you to and/or recommend a specific database? (instruction 1)
- Did the librarian give you keywords or subject headings to search with, and explain how to type in your topic? (instruction 2)
- Did the librarian confirm that you found sources appropriate for your topic? (follow-up)

After the transactions were coded for these questions, they were divided into five categories based on how well they met the “completeness” criteria. When all four criteria were met within the reference transaction, the transaction was considered complete (C). If the user was guided to appropriate sources of information or was offered potential sources and two of the other criteria were present within the reference interview, the transaction was considered mostly complete (MC). Transactions that included only two of any of the four criteria were coded mostly incomplete (MI). When one or none of the criteria were present in the transaction, the interview was coded incomplete (I). Finally,

transactions that immediately ended with a referral to another service or librarian, without reference interviews, were coded as referrals (R) (Ward, 2004, p. 49).

Ward made some interesting discoveries about the continued effectiveness of the reference interview when conducted in the digital environment. In his study of chat transcriptions from the University of Illinois Ask A Librarian reference service, he found that 78 percent of the transactions included both instruction criteria, and 12 percent more included one instruction criteria. This illustrates virtual reference's potential for offering effective bibliographic instruction at a time when users are more receptive to it (Ward, 2004, p. 52). Of the seventy-two transactions studied, 47 percent met the criteria for complete transactions, 32 percent were mostly complete, and only 18 percent of the transactions lacked acceptable levels of bibliographic instruction (Ward, 2004, p. 50).

Perhaps most interesting, however, was his finding that the transactions that met the criteria for completeness were finished more quickly than the other transactions. The average length of transactions with complete interviews was fourteen minutes and thirty-five seconds, with transactions that had mostly complete or mostly incomplete interviews taking about a minute longer. The reference transactions with incomplete interviews took nearly eight minutes longer to complete than those with complete interviews, requiring on average twenty-two minutes and twenty-five seconds (Ward, 2004, p. 51).

NCKnows and the Collaborative Virtual Reference Pilot Project

The State Library of North Carolina started NCKnows, a statewide collaborative chat reference service, as part of its Collaborative Virtual Reference Pilot Project. Planning for the service began in 2001, when the LSTA Advisory Board learned that several libraries in the state had shown an interest in virtual reference service. Since the

most successful digital reference services nationally have been collaborative models, the LSTA elected to provide grant money for a statewide pilot project, instead of giving the money to individual libraries to develop their own virtual reference services (Bailey-Hainer, 2005, p. 46, Crisp, 2003, p. 2). A collaborative model offered the added benefit of allowing even small libraries to participate, and it gives librarians who work for smaller libraries a chance to learn from librarians who work for larger libraries and who may already have experience providing digital reference (Bailey-Hainer, 2003, p. 17-18).

The North Carolina State Library used LSTA funding to begin the NCKnows service. The service was launched in February 2004, and as of this writing NCKnows is in an eighteen-month pilot phase, which will end in June 2005 (Crisp, 2003, p. 1). Eighteen libraries now contribute reference services to the program (<http://ncknows.org/partlib.htm>). The libraries that have elected to participate in the pilot service are drawn from a wide pool and include public, academic, and government libraries. The academic libraries taking part in the project are from universities, colleges, and community colleges. Libraries from large urban centers and small rural towns are also represented (Pomerantz & McClure, 2004, p. 104).

The goals of the project were to give the participating librarians training in using the virtual reference software to provide service, to create a collaborative model for the libraries to share reference questions, and to test whether a collaborative virtual reference model meets the information needs of North Carolinians. Small libraries would also have less time and resources to devote to applying for the competitive LSTA grants, and this project enabled them to profit from a grant project (Crisp, 2003, p. 1).

The Metropolitan Cooperative Library System of Los Angeles developed 24/7 for use by large library consortia virtual reference services. The software can be used in both public and academic libraries (<http://www.247ref.org/aboutus.htm>). 24/7 uses eGAIN, a call center software that allows the librarian to push pages through to the user and to co-browse the pages pushed through by the librarian. Call center software like eGAIN offers the additional benefits, transferred from commercial call centers, of enabling question queuing and routing. Additionally, a transcript of every session is created, which can be sent to the user and used to create a knowledge base of answered questions (Kresh, 2003, p. 24).

NCKnows is available to users from around the world, free of charge, twenty-four hours a day. Users access the service simply by going to its Web site, ncknows.org, and submitting their question. Since questions can be submitted by anyone from anywhere around the globe, users do not need to access the service through a library, although the participating libraries do have links to the service. Librarians from the 18 libraries donating reference services answer questions submitted to the service, and other librarians nationwide answer questions for the service when librarians from North Carolina are not available. North Carolina librarians now staff the service sixty hours a week. The software vendor, 24/7, provides staffing for the remaining 108 hours of the week, and NCKnows pays the cost of outsourcing those hours. NCKnows' goal is eventually to develop consortia agreements with other libraries nationwide so that staffing is shared and those libraries can provide service during evening and weekend hours (Crisp, 2003, p. 2).

NCKnows makes its service easily accessible to users. Users do not need to download anything to their computer before submitting a question, and the librarians staffing the service request only a small amount of identifying information from users. Although the service requests that users submit their names, email addresses, and zip codes, users can elect to remain anonymous. Librarians request users' email addresses so that, in cases when questions are not fully answered during the chat reference transaction, these questions may be answered later, via email. Some questions are forwarded from the initial recipient to another within the same service, or to another service to be answered, although the initial recipient may also send a response to the user at a later time.

Research Methodology

When participating librarians in the NCKnows chat reference service receive questions that cannot be answered during the chat, the librarians resolve the questions with a code indicating that the question must be answered later by email. The questions are coded so that a librarian in one of four types of library will answer it: Academic, Legal, Public, and Special. Using the chat reference transcripts, the questions coded for later answers by email were categorized by question type, reference interview completeness, and rationale for ending the transaction. The results were then analyzed to determine ways that the service can reduce the number of answers that must be sent to users by email.

Classification of Causes of Questions

Lipow (2003) included a worksheet for charting the types of questions that are received by the reference desk in her book, *The Virtual Reference Librarian's Handbook*.

The sheet listed eleven categories for possible causes of questions received at the reference desk. Although the categories address questions that may seem to be library or building specific, they continue to be relevant in the virtual world because this is where many users now experience the library. People increasingly rely on libraries to provide remote access to electronically based materials, and it is clear that most users who submit questions to NCKnows assume that they will be talking to a librarian from their home library. The chat service is an extension of the reference desk into the virtual world, so users continue to use it to address the needs that they associate with their local reference desk. Lipow's categories are also relevant to the classification of the questions in this study. The categories she identified were directional, known item request, confusing class assignment, searched in vain on shelves, subject advice, technology assistance, equipment/facilities, other library services, complaints, out-of-scope, and other (Lipow, 2003, p. 149).

For this study, two of her terms were merged together because they described similar questions when applied to a digital setting, and the 'other' category was omitted in favor of four categories not included in Lipow's classification schemes. 'Technology assistance' and 'equipment/facilities' had virtually identical meanings and functions in the NCKnows setting, since users submitted questions to the service about library equipment/facilities when they were having technical difficulties with library log-in pages, databases, or remote access. Questions associated with library services or library collections were more appropriately coded under 'other library services' and 'known item request'. The 'out-of-scope' category was omitted because it did not identify the user's motivation for contacting the service. The librarians working for the NCKnows service

were responsible for determining if a question was out-of-scope and should be referred to another librarian or service.

The four categories added in place of the 'other' category were factual, genealogical, unknown item request, and reading advisory. The factual category was intended for simple fact-based questions that sought information about people, places, events, etc. These questions may have been starting points for more in-depth subject advice interactions, but the scope of information sought by users was more limited than the scope of information sought for subject advice questions.

Users requesting genealogical information generally sought very in-depth information about their topic, often requiring more information than subject advice questions. A unique category for genealogical questions was created because many users are expressing an interest in learning about their family history, and some libraries are starting to offer classes that teach users how to look for information about their family. Looking for genealogical information for users also often requires different sources and search strategies from other factual or subject advice questions. For example, one user asked for information about his father's high school so that he could surprise his father with it. He wanted any information or materials about the high school that might be available.

The unknown item request category was created because many users contacted the service to locate items that they were not sure existed, but believed that they might, and users wanted assistance finding those items. Users generally had an idea of how they wanted the information packaged (as a book, journal, photograph, etc.), but they did not

know a title, collection, or even whether the objects that they sought existed. For example, one user requested “a source for medical office layout and design.”

A final category was created when the user asked for suggested reading materials about a given subject. Although their questions were often as broad as subject advice questions, they were more interested in receiving suggestions for reading or further learning than they were in receiving assistance from the librarian in the development of a topic. One user asked if the librarian could “recommend a good self help audio tape,” and another requested “the most recommendable source of parenting styles.”

Causes of questions coded for later response

Class assignment	User needs help interpreting class assignment	How do I access Tutor.com? My teacher said that I could find this at the library.
Complaints	User has complaint about library services or policies	No example of this type appeared in the data for this study.
Factual	User's question has factual answer (ready reference)	What is the population of North Carolina?
Genealogical	User seeks information for genealogical research	I'm looking for information about the town that my mother grew up in.
Known item request	Requests specific item by title or name	Do you have a copy of Huckleberry Finn?
Other library services	Seeks information about library services beyond technology or reference	When is the book sale? Does the library offer free tax prep?
Reader's advisory	User seeks recommendations about sources on given subject matter	Can you suggest any good books about weight loss? Do you know of any good English novelists?
Searched in vain on shelves	User cannot find library resource after looking	I've been looking for this book for two weeks now, but it's not on the shelves. Where is it?
Subject advice	User needs consultation about research topic; needs help finding information about a topic	I'm doing a paper about SIDS. Where do I start?
Technology assistance	User needs help in searching a database, using the catalog, etc.	How do I check to see if I have any books that are overdue? Do you have any photos of the old theatre in Greensboro? I want a book about repairing antique tractors.
Unknown item request	User requests specific type of item but user is not sure that it exists	

Many transactions were coded into multiple categories, as some included multiple questions that fell into different categories. For example, many transactions were simultaneously coded into categories like factual, subject, and unknown item request, simply because one question may have asked about the date that something occurred, another asked for assistance in the development of a topic, and another question asked for photographs of a place or event.

Question Completeness Categories

The categories for determining the completeness of reference interviews, once the transactions had ended, were derived from the completeness categories developed by Ward. They were altered to reflect the nature of the NCKnows service and the resources available to both librarians and users when librarians are answering questions. Although each of the completeness criteria were used, it was assumed that most, if not all, of the reference interviews in the transcripts would be incomplete, since librarians would have been unable to check that the sources found were appropriate. The scope of what constituted adequate instruction was expanded because the librarians needed to be able to provide information using sources that both they and the users could access. Therefore, guiding users to appropriate databases was modified to guiding users to appropriate sources or suggesting appropriate resources. Giving users keywords or subject headings to search under, and explaining how to type in those terms, was modified to suggesting keywords or subject headings to search with, and explaining how to search for information in the suggested resources.

Question Completeness Categories

- Did the librarian clarify the user's question to see what information was needed and how many sources would be useful? (question negotiation)
- Did the librarian guide the user to possible sources or suggest appropriate resources? (instruction 1)
- Did the librarian give the user appropriate keywords or subject headings to search with, or explain how to find information in the suggested resources? (instruction 2)
- Did the librarian confirm that you found sources appropriate for your topic? (follow-up)

Coding Criteria for Reference Interview Completeness

- Complete (C): All four criteria fulfilled
- Mostly complete (MC): Proxy was guided to appropriate database, and two other criteria present
- Mostly incomplete (MI): Only two of the four criteria present
- Incomplete (I): One or no criteria present
- Referral (R): Proxy was immediately asked to come into library (or call/email)

Development of Response Categories

Three categories were devised to explain the reasons why certain questions were determined by librarians to be unanswerable through the chat service or otherwise could not be answered at the time of the user's request. The first category was that the librarian needed or wanted more time or resources to search for the answer. The second category was that either the user or librarian disconnected before the chat transaction was completed, whether intentionally or not. The third category was that the librarian felt that another librarian or information professional would be better able to answer the question.

The first category was created for when the librarian received the user's question and conducted a reference transaction to clarify what information the user needed. Five sub-categories were created that state the reasons given for needing more time: (1) the librarian was already busy assisting other patrons, (2) the librarian wanted more time to research the question, (3) the librarian needed more time to consult references not readily available, or (4) technical difficulties kept the librarian from accessing the databases or websites needed to provide an answer to the user. A fifth sub-category was created for when the librarian did not give the user a reason for needing more time.

The second category was created for transactions that were severed due to technological reasons before the librarian could provide an answer to the user's question(s). In the course of the reference transaction, either the user or the librarian

experienced technical difficulties that severed the connection or the user disconnected from the service before obtaining a full answer. Four sub-categories were created for disconnections that occurred before an answer was provided: (1) the librarian was disconnected before providing an answer, (2) the patron was disconnected from the service or vanished before receiving an answer from the librarian (3) the patron logged off intentionally before receiving an answer, or (4) the patron requested that the librarian send the answer to the user's email.

The final category was created when the nature of the user's question made it difficult for the librarian who received it to answer it properly. Three sub-categories were created for questions that were referred by librarians to other information professionals: (1) the questions addressed library specific policies or collections, (2) the responding librarian felt that the information could be better answered by another librarian within the NCKnows service, because that librarian would have more knowledge about the subject, or (3) the librarian felt that the information could be better answered by a person or institution outside of the NCKnows service. In the third sub-category, the user was responsible for contacting the person or place that the librarian had suggested.

Response Categories

Librarian asks for more time	<ul style="list-style-type: none"> Librarian is already assisting other users Librarian wants or needs more time to research question Librarian wants or needs to consult resources that are not readily available Technical difficulties prevent librarian from consulting appropriate source of information Librarian does not give reason for needing more time
Connection is severed	<ul style="list-style-type: none"> Librarian's connection is severed User connection is severed or user disappears for reasons unknown User logs off of the service intentionally User requests email response Librarian forwards policy or library-specific question to specific library for answer
Referral	<ul style="list-style-type: none"> Librarian forwards question to another librarian who is more familiar with subject matter and can provide more assistance Librarian refers user to someone outside of the NCKnows network

Detailed descriptions of these categories appear in Appendix A. The author developed the coding criteria, based on the content of the chat transactions, using the constant comparative method. Grounded theory allows for categories to develop naturally from the dataset, and letting categories emerge from the data ensures that the categories are best fit for the data. The categories were created and modified in the course of coding the chat transcripts, and certain categories that were expected to be important categories turned out to be meaningless. For example, the author expected that an out-of-scope category would be important, for questions of a legal or medical nature (Glaser & Strauss, 1967, p. 36).

Coding

Each reference transaction was first coded according to the types of question(s) asked by the user. After all of the questions were identified by type, the reference transactions were coded based on how well they met the completeness criteria for the reference interviews. Finally, the reference transactions were coded according to the reasons given for why the librarian chose to code the transaction for an email response. Because users may have asked multiple questions during the chat, and because a user's question may have fallen into several categories within the question taxonomy, multiple coding was allowed for the causes of question(s). Reference transactions could only have one code for reference interview completeness. There may have been multiple reasons for ending a chat transaction early and sending a later response by email, however, so multiple coding for responses was allowed.

Sampling

NCKnows is at present a pilot virtual reference project, so it has only been up and running for a year at the time of this study. In that time, however, usage has increased steadily enough that there was a sufficiently large sample size of transactions to study. During the period from January to February 2005, 210 transactions needed to be answered by email after the chat sessions ended. Most were sent to NCKnows Academic or Public; eighty-two were in NCKnows Academic, and 126 were in NC knows Public. By contrast, none were in NCKnows Special and only two were sent to NCKnows Legal. This period was selected for sampling because it was thought to be a useful sample, as most of the responding librarians would have had several months to become familiar with the chat software and the chat reference format. Therefore, fewer questions would have

been transferred to the email format unnecessarily, simply because the librarian did not have the expertise to deal with the question or locate appropriate sources.

Data Analysis

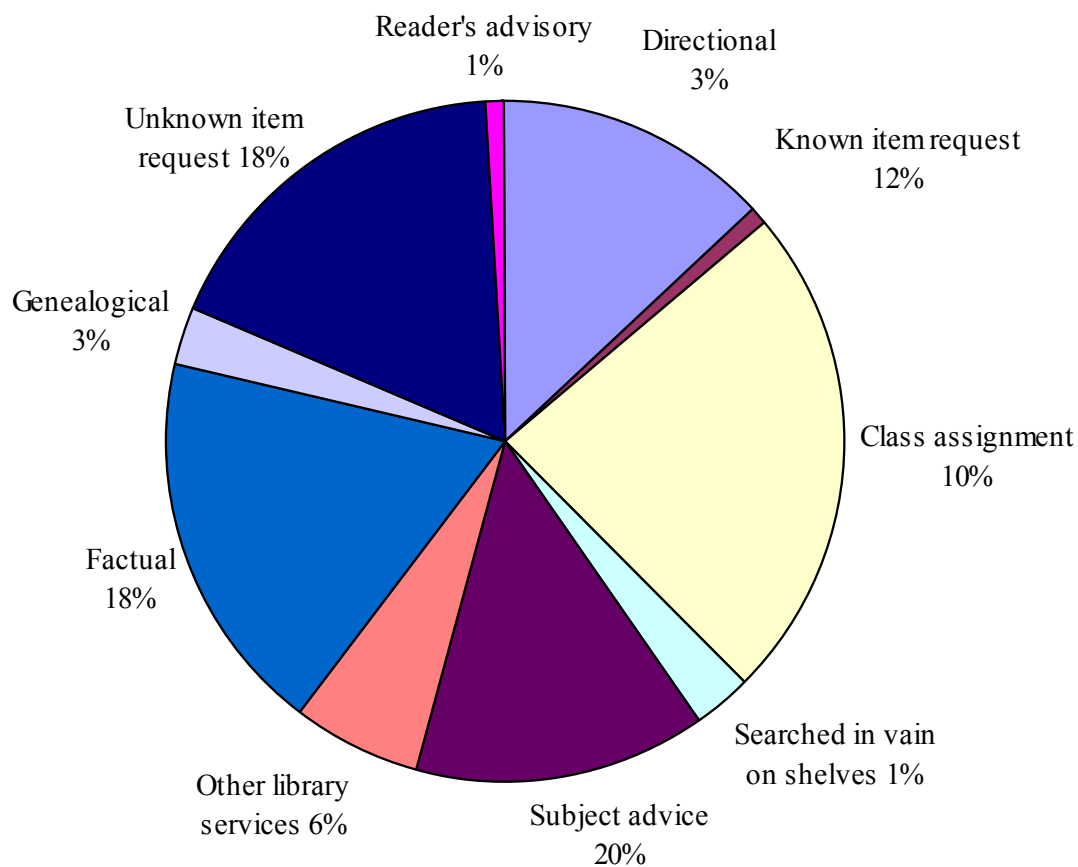
Taxonomy of the Causes of Questions

The transactions in the sample were coded into eleven of the twelve categories for causes of questions received at the reference desk. Eighteen of the transcripts fit into two of these categories simultaneously, and five of the transcripts fit into three categories. The category with the highest incidence of transactions was subject advice, which had fifty incidences, followed by factual with thirty-nine incidences, and unknown item request with thirty-eight incidences. The next were technology assistance with thirty incidences, known item request with twenty-eight incidences, and class assignment with twenty-three incidences. Questions about other library services comprised thirteen of the transactions, followed by incidences. The last three categories were genealogical questions, which each had six incidences, and there were two incidences each about class assignments and reader's advisory. There were no incidences of complaints in the transactions sampled.

Although no complaints appeared in the transactions that were sampled and coded, it is possible that transactions that end before answers are provided to the questions asked could contain complaints. For example, a user could contact the service with a question and complaint, and the question could end up needing a later response by email, or a user could contact the service with a complaint about a local library policy that the answering librarian could choose to forward on to the local library for response.

Thus, it merits inclusion as a category, even though complaints did not appear in this sample.

Causes of questions that were answered by email



These findings reiterate the trend identified by Diamond and Pease and then by Moeller that the questions received by NCKnows are similar to the questions received by traditional reference desks (Diamond & Pease, 2001, p. 213, Moeller, 2003, p. 56). From the way that users phrased their questions to the librarians, it is clear that users connected

the NCKnows service to the other services provided by their library and assumed that they were contacting their local librarian. Some expressed surprise when they learned that the librarian that they were chatting with was not their local librarian and may not even be in the state of North Carolina.

Reference Interview Completeness

The vast majority of the chat transactions examined in this study lacked complete reference interviews. Only three of the 210 transactions met the coding criteria for a complete reference

Reference Interview Completeness by Cause of Question

	R	I	MI	MC	C	Total
Subject	7	31	7	2	1	48
Unknown item request	10	17	9	1	1	48
Factual	14	24	1	1	0	40
Technical assistance	14	13	0	3	0	30
Known item request	11	15	2	0	0	28
Class assignment	5	13	2	1	1	22
Directional	2	3	0	1	0	6
Genealogical	2	4	0	0	0	6
Other library services	2	3	0	0	0	5
Reader's advisory	0	1	1	0	0	2
Verification	2	0	0	0	0	2
Total	69	124	22	9	3	

interview, whereas 112 of the reference interviews were incomplete. Thirty-three of the interviews fell in between, although only eight of the interviews met the criteria for mostly complete, and eighteen of them were still mostly incomplete. Sixty-nine of the reference interviews were referrals.

In one of the transactions that had a mostly complete reference interview, the librarian ended the session because the user had not been responding to several messages sent by the librarian. Before ending the session, the librarian did some research, suggested book titles available at the user's library, and sent some links to company sites that dealt with the user's question. The user only replied to the librarian's initial message,

after which the librarian sent five messages before writing, "I haven't heard from you in a while, are you still there?" After sending a few more messages, the librarian wrote, "I have not heard from you in a while. I need to attend to other customers. If you need further assistance, please contact us again." In this case, it may have been that the user's browser was keeping messages from coming through, or it may have been that the user simply "disappeared." Either way, the librarian could not tell if the user was still there and receiving messages.

In one of the transactions that had a complete reference interview, the librarian and user worked together to find sources. The user had contacted the service because she was having trouble locating information about her topic:

User: im not real fluent in obtaining articles, journals, for example. Using NCLive, ebsco host, etc...

Librarian: Does your college library have databases available to search?

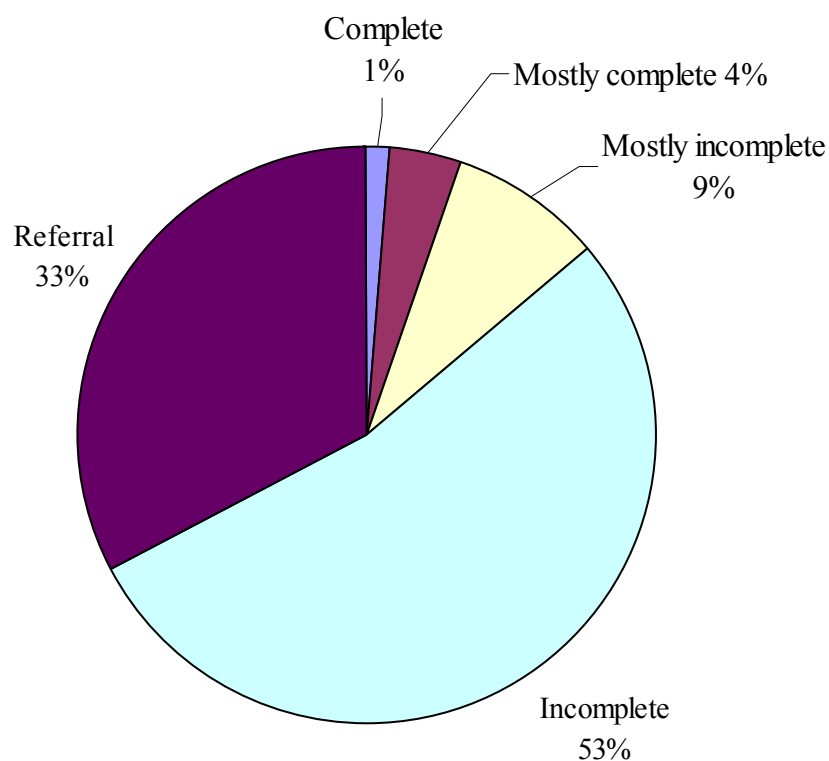
User: yes, but like i said...im trying my best to use these databases and im not finding what im looking for. Maybe im not doing it right?

Librarian: I searched Literature Resource Center database and it has a list of 85 articles, but on a few are about the book "The Other Side" and so far I have only found book reviews.

User: and that is my dilemma! I thought i was doing something wrong. What about any information on the author herself?

The librarian then suggested some databases that the user could search and emailed her some information. The transaction ended with a referral to the user's local library for information that would be available in print but not online.

Reference Interview Completeness



The reference interviews for sixty-eight of the eighty-two transactions that ended by the librarian's request were incomplete (only one or none of the completeness coding criteria was present), and six interviews were mostly incomplete (two of the completeness coding criteria were present). Only one of the eighty-two transactions ended by the librarian's request had a mostly complete interview, with three of the coding criteria present, and the final seven questions were referred to other librarians within the NCKnows network.

Motivations for Ending the Chat Transaction Early

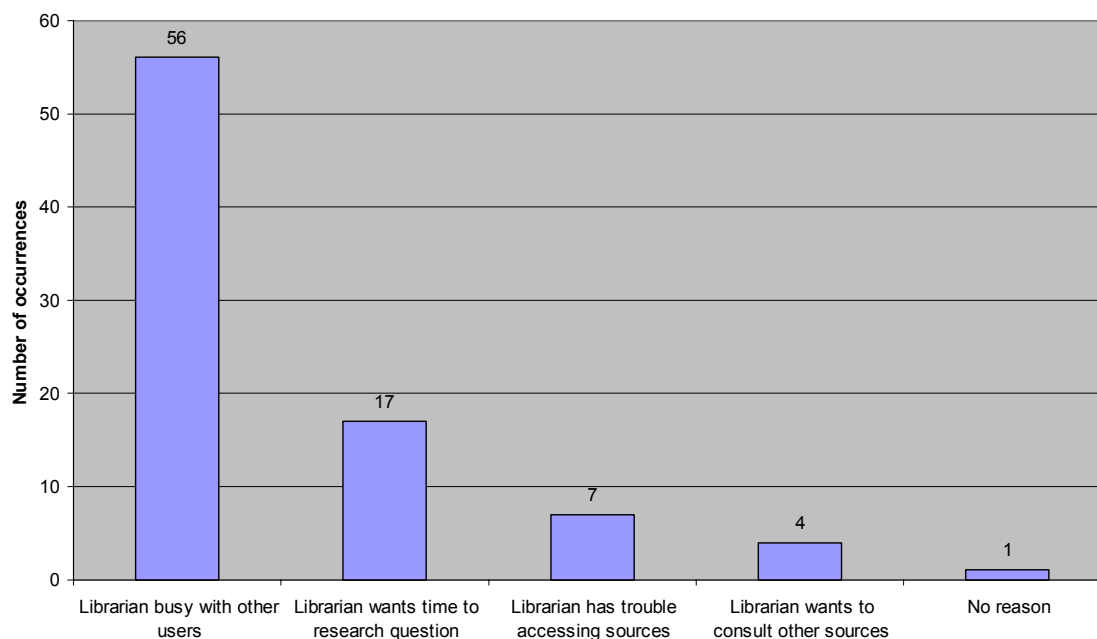
Several factors influenced the termination of these chat transactions. Only factors that affected whether a question could be answered while the librarian and user were still online were counted as having influenced the decision of the librarian to code the user's question(s) for later response. For example, the fact that a user disappeared during a chat session did not get counted if the librarian had already told the user that the question would have to be answered later, because the librarian was already busy assisting other users or did not have the right resources on hand to answer the question. Forty of the sessions did end for multiple reasons, however, which affected the percentages for each category. For many, a message from the librarian may have influenced the user's actions, such as the user's decision to log off the service without submitting more than a question, after receiving a message from the librarian suggesting that the user might want to leave an email address and receive an answer later. Thus, the actions of both librarian and user were considered as factors that led to the premature conclusion of the chat session.

Librarian asks for more time

In eighty-two of the 210 chat sessions sampled, the session ended in part because the librarian asked for more time to consult sources or compose an answer to the user's question. The most common reason for the librarian to ask for more time was that the librarian was already busy assisting other users, and asked to send the user an answer later. This occurred in fifty-six of the 210 transactions, or twenty-seven percent of the time. In fifty-three of those transactions, the librarian told the user that he/she was busy with other patrons as part of the greeting when the user logged on and posed a question.

In the other three, the librarian did not tell the user that he/she was already too busy assisting other users to provide a full answer until midway through the chat.

Reasons that librarians ended sessions



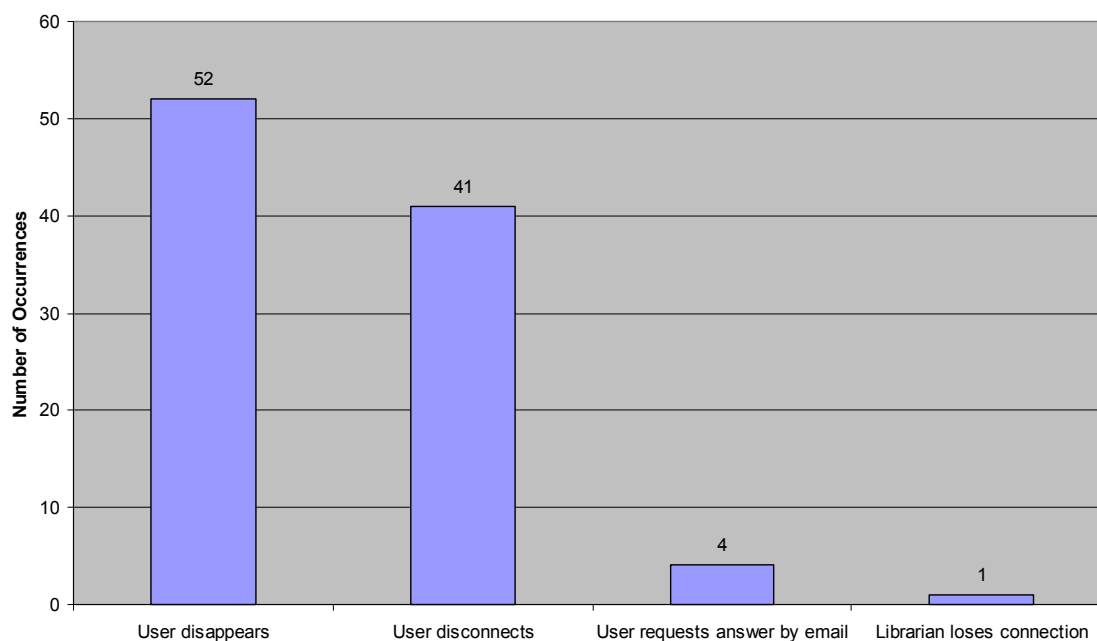
The second most common reason for a librarian to request more time was that the librarian wanted to consult more resources before giving the user a final answer. This occurred in seventeen of the 210 transactions, or 8 percent of the time. Although only one librarian who asked to end one of these seventeen sessions also stated a need to assist other users, the librarians answering two of the other questions mentioned time as a constraint in those two transcripts, and one user mentioned time as a constraint in another transcript. Thus, the librarians' desire to spend more time than available while chatting with these users, to consult sources and compose an answer, could have been influenced by the need at that moment to serve several users at once, even if the librarians did not explicitly mention it.

Four of the 210 transactions, or 2 percent, were coded for later response in part because the librarian wanted to consult other resources not available while chatting with the user. The librarian did not specify what types of resources were required in two of the transcripts, but mentioned that print resources were needed to answer the user's question in the other two transcripts. In none of the transcripts did the librarians mention a need to consult electronic resources not presently available to them. Seven of the 210 transactions (3 percent) were cut short in part because the librarian had technical difficulties accessing library catalogs, databases, or websites. In only one transaction did the librarian not provide a reason why he was not able to answer the user's question at the time that it was asked.

Connection is severed

The second most common reason for ending the chat transaction was that the user disappeared in the course of the chatting with the librarian. Fifty-two of the 210 transactions (25 percent) ended at least in part because the user stopped replying to responses sent by the librarian before the reference interview was completed or any answers had been found by the librarian. It may be assumed that some users were disconnected unintentionally for these transactions, although some may have gotten bored, moved onto other searches, decided to watch TV instead, or gotten up to make a sandwich. Without more evidence in the transcripts, it was only clear that the librarian had decided that the user was no longer available online and chose to end the transaction. In 14 transactions, the user disappeared after receiving a message from the librarian stating that there was a wait.

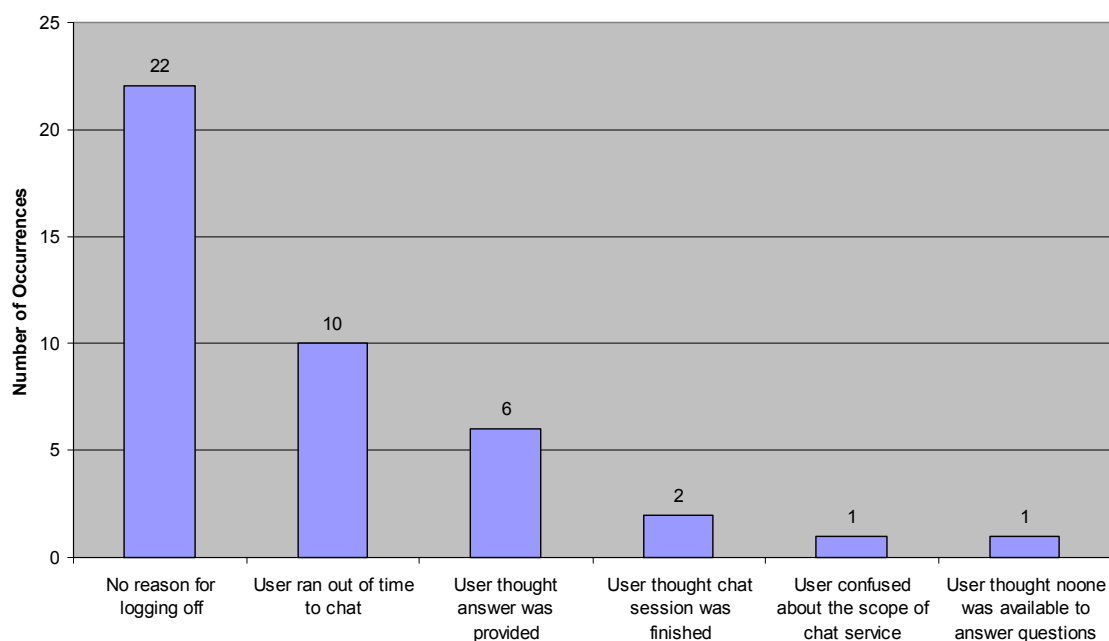
Reasons that Chat Sessions were Disconnected



In thirty-seven of the 210 transactions sampled, or 18 percent, there existed evidence showing that the user had intentionally logged off the service before receiving a complete answer from the librarian. In these cases, the message [user – has disconnected] appeared in the transcript, and the librarian would see that the user was no longer online and receiving messages. No reason could be found to explain why the users logged off in twenty-one of these transactions, although the librarians had asked to send an email response later in seven of the twenty-one transactions, so it is possible that those users disconnected as a result of the librarians' requests. The reason that they were coded as the user disconnecting in addition to the librarian asking for more time was that the users disconnected instead of leaving further information about their topics that the librarians could have used to answer their questions. In seven of the thirty-seven transactions, users logged off because they believed that they had received an answer or believed that they

would not receive an answer. Four users ended the session because they were running out of time to chat with the librarian, and two logged off because they thought that the submission of the question and their email address was what the ‘chat’ entailed. In one transaction, the librarian sent a message asking for the user’s email address, just in case they were disconnected. The user submitted her email address, thanked the librarian, and then disconnected. Finally, one user each logged off for the following reasons: one because of a stated difficulty working with the log-in screen, one because the user was confused as to the scope of the reference service and logged off upon learning that the librarian responding was not from her local library, and one because the user thought that no one was there.

Reasons that Users Disconnected



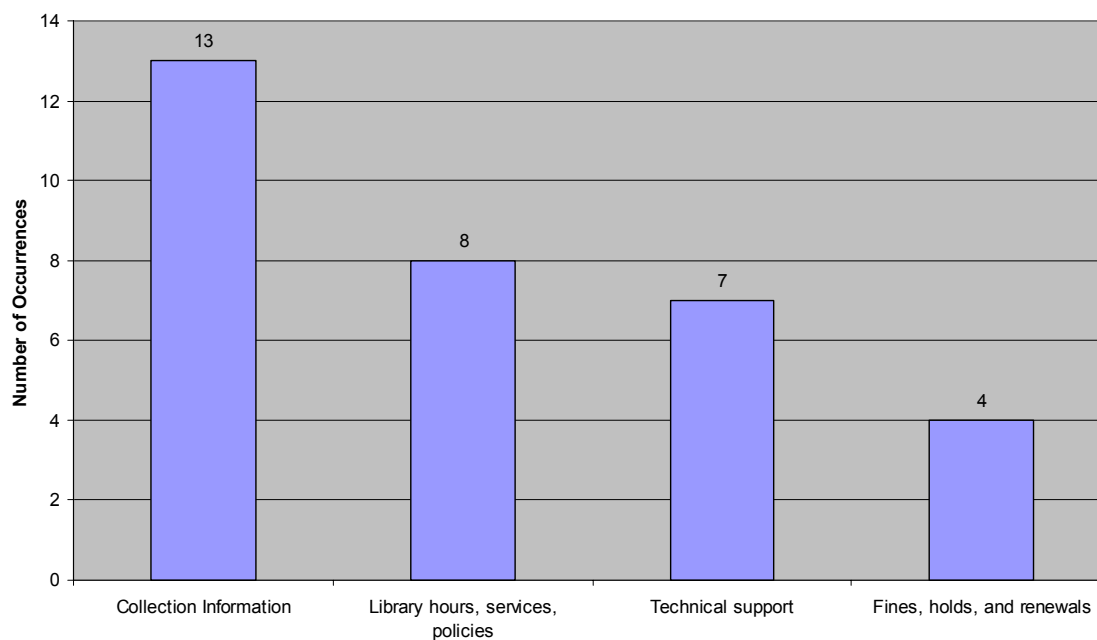
Referral to other library or librarians

Thirty-two of the 210 transactions, or 15 percent, involved questions that the librarian felt would be better answered by a librarian working at the users’ home library.

Twenty-seven transactions were questions that were referred by the responding librarian to another librarian within the service for later response. Twelve questions were referred to librarians or sources not affiliated with the NCKnows service.

Thirteen of the questions were about collections at their local libraries, including questions about books, journals, and library databases. Four questions concerned holds, fines, or renewals at the user's library, and eight questions concerned library hours, policies, or services offered. In seven of the transactions, users had questions about getting access to databases, electronic resources that their library subscribed to, or their library accounts.

Causes of Library-Specific Referrals



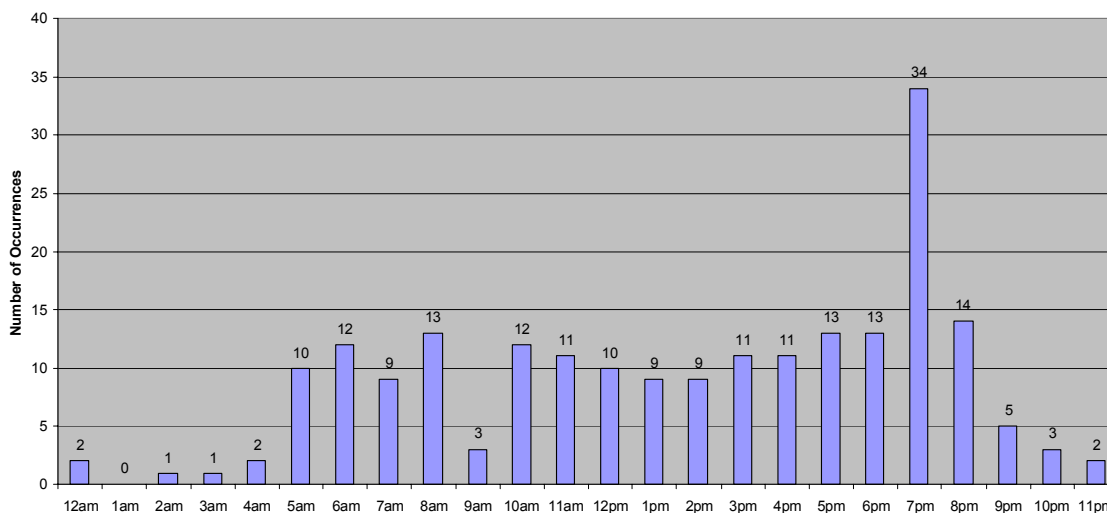
Twenty-two questions were referred to the user's home library, since the librarians there knew more about the subject than the responding librarian and would be able to access print resources needed to answer the user's question. During only seven of

these transactions were librarians able to identify and suggest types of print sources that would be able to answer users' questions. Most of their recommendations were vague: reference books, history books, newspapers, etc. Sources mentioned by the librarians in these transcripts included North Carolina history books, microform collections, and newspaper archives. The resources suggested were sources that the librarians expected would be available at the user's library, and local librarians would be able to find the exact sources that the users would need. One librarian, however, did search the user's library catalog and suggest specific books that the user could find in the library. In the other fifteen transcripts, the librarians either could not find or suggest sources and felt that local librarians would have more knowledge about their collections, or they felt that more research was needed to identify appropriate sources. The other five questions were referred to subject librarians not working at the user's home library, who would have the knowledge and resources needed to answer the user's question. Librarians did not suggest actual sources in these transcripts.

In thirty-three of the transactions, the librarian chose to refer the user's question to another librarian. These questions were unrelated to library policies or services, and involved more research from the librarian. Twenty-two were referred to the user's home library. Librarians' reasons given for referring the question to the user's home library instead of other libraries involved the librarian having more knowledge about the user's question and having adequate resources to give the user a proper answer or appropriate sources. Librarians referred users to other subject librarians when the questions were too difficult or complex for the responding librarian to answer well (for example, math questions or questions requiring knowledge about law databases).

Time and question incompleteness

Times that Chat Transactions ended Early



This chart shows the number of transactions per hour that were ended before users' questions were fully answered. Although time was not always a contributing factor for sessions that ended prematurely, it does show a steep rise in the number of questions that could not be answered from 7 p.m. to 8 p.m. However, this rise may be explained by a rise in the number of questions submitted to the service from 7 p.m. to 8 p.m. each evening.

	The busiest hours	
	Number of Instances	
	Weekdays	Weekend
12-4am	1	0
4-8am	4	1
8-12pm	0	2
12-4pm	6	5
4-8pm	25	5
8-12pm	5	2

Many of the fifty-six transactions that could not be completed during the chat because the librarian was too busy assisting other users occurred at roughly the same times. Twenty-two, or 39 percent, of these transactions occurred between 7 p.m. and 8 p.m., and

seventeen of those twenty-two, or 27 percent, occurred on a Tuesday, Wednesday, or Thursday. This was by far the most common time for librarians to need to end sessions in order to assist other users.

Thirty-four, or 60 percent, of the questions that needed to be answered later because the librarian was too busy occurred between the hours of 5 p.m. and 9 p.m., with questions dwindling off before and after that period. There was a small surge in the number of questions needing to be answered later because librarians were too busy between 3 p.m. and 4 p.m. as well, as six questions (11 percent) of these questions occurred during that hour. The hours of 5 a.m. to 7 a.m. and 9 a.m. to 11 a.m. each had smaller surges, as 9 percent of the questions that needed later response because librarians were too busy to assist these users occurred during each of those time periods.

Looking at all of the transactions as a whole, regardless of whether they ended because the librarian was too busy to answer the user's question or not, librarians mentioned time as a constraint in sixty-one of the transactions, or 29 percent of the time.

A common opening script used by librarians during busy periods was:

Hello! This is the reference librarian. There are at least three people ahead of you in line. If you would prefer not to wait, you can receive a response by email if you type in the following information: 1) your email address, 2) your deadline, and 3) as many details as you can provide about your topic.

Librarians sent messages similar to this at the beginning of forty-four of these transactions. In the other seventeen, the librarians mentioned time later on during the transactions, generally as a reason for ending the chat sessions. Users mentioned time as a constraint in seven of the transactions. In those transactions, users needed to log off the service because they had no more time to chat with the librarian. In one transcript, the

user mentioned early on in the chat that his time was limited, but all of the others only mentioned time when they needed to log off.

Discussion

Can't chat right now, can I get back to you later?

The fact that the librarians were already busy with other users probably kept them from conducting a more thorough reference interview for these transactions. A full reference interview could have helped librarians answer the users' questions more quickly, by clarifying exactly what information was needed. For some of the questions, it may even have been possible for the librarian to provide an answer right then had the librarian known more about what the user needed. If this were not possible, the librarian could have gathered enough information about the question to send the user a useful response when the librarian did have time, or realize that the question should be referred to another librarian for an email response.

Many of the reference interviews for the chat transactions studied could not be completed because the user logged off or disappeared before the librarian could finish the interview, or because the librarian began the reference interview by giving the user the opportunity to submit the question and any backup information so that an answer could be sent later, once the librarian had more time. In other cases, the librarian referred the user to other librarians or to individuals outside of the NCKnows network before doing a reference interview, and this prevented the librarian from conducting a reference interview later on in the chat transaction.

Hello, is anybody there?

There are many possible reasons for the high rate of disappearance by users. The Netscape 7.x and Mozilla 5.x browsers do not work with the 24/7 Reference software used by the NCKnows service. According to one librarian (personal communications, March 15, 2005), the users “will connect – but then they will get our messages and we won’t get theirs.” This understandably leads the librarians to log off after sending several messages to users who, as far as they can tell, are not responding. Many of the transactions that had to be coded as the user disappearing in the middle of the session could potentially be attributed to the user’s browser not working with the NCKnows interface.

The only time that the [user – has disconnected] message appears is when the user clicks on the ‘end call’ button. Users may have accidentally disconnected themselves from the service by clicking on the ‘end call’ button instead of the ‘send’ button, since they are close to each other and they are the same sizes. Conversely, users may have decided that the chat was over, but did not remember or know to end the session by clicking on the ‘end call’ button. Without a message appearing in the transcript stating that the user had disconnected, it could not be assumed that the user had logged off.

Users often expressed confusion as to whether a librarian was actually on the other side, receiving questions and providing answers. Some users may have given up on the librarian prematurely, simply because they were not sure that there was anyone on the other side looking at their questions. In one transaction, after the user submitted the question, the librarian replied that they were experiencing a busy time, and asked if the

user would like an answer emailed later. The user submitted three replies without hearing from the librarian again, before disappearing from the service:

User: “Yesterday I hear the same thing and I asked for an email response and did not receive any feedback.”

User: “How long do you think this will take?”

User: “Is anybody home?”

The phrasing of many of the users’ questions suggests that they assumed that they were chatting with a librarian at their local library. Examples of this include requests such as “Do you have “The Virgin’s Suicide” available to read?”, “Do you keep consumer reports magazine for reference?”, and “When is the Wake County Library Book Sale?” One user disconnected after learning that the librarian answering her questions was not a local librarian:

User: I need help on find topics on this essay please.

Librarian: Are you a college student? If so, your school library may have guides, reference works, and databases online. What school do you attend?

User: Sorry I thought this is our school e-library.

Librarian: What subject are you researching?

[**User** - has disconnected]

Several transactions showed a heightened sense of urgency coming from the user. One user entered “HELP ME!!!!!!!!!!!!!! with tutor.com.”¹ Another user submitted a question, written in lower case, but disconnected before receiving help from the librarian. The user then submitted the question again three minutes later, although the request was

¹ Incidentally, Tutor.com is a competitor with 24/7 Reference, the service used by NCKnows.

written entirely in caps the second time. The librarian asked the user to either wait or try later, and the user disconnected again.

The two main reasons for not completing a reference interview resulted from the librarians not having enough time to answer each user's question as soon as it is asked. In order to prevent this from happening, more North Carolina librarians should be brought onto the service to answer questions submitted to the service, especially since North Carolina librarians currently staff the service only sixty hours a week. During the remaining 108 hours, librarians working with 24/7 Reference are answering users' questions. Ward's finding that conducting a complete reference interview actually shortens the average lengths of chat transactions suggests that librarians should make it a priority to conduct as complete a reference interview as soon as possible with each user. This would not only increase the likelihood that users would actually receive the information that they need, as it is often difficult to determine what information is truly needed, based simply on a short email message sent from an anonymous user, but it may also speed up the completion times for chat transactions and thereby reduce the amount of time that users must wait for assistance. This could also reduce the number of users who either log off or disconnect from the service before getting a chance to talk with a librarian. A properly conducted, complete reference interview can insure that users receive the information they need in a timely manner, and will reduce the number of incomplete transactions.

More librarians working online at the same time would also reduce the number of times that librarians end a session because they want to do more research or consult other sources before sending answers to users. Librarians would feel less pressure to answer

questions quickly simply because they know that other users are waiting or will be submitting questions. Having more librarians working online at a time would also reduce the number of questions that need to be referred to other librarians or libraries within the NCKnows service, since there would be a greater chance that another librarian would be able to assist the responding librarian for complex, subject-specific questions. It is even possible that a librarian from the user's home library could be online answering questions and would be able to answer any questions that the user might have that were library-specific and would have been referred. Adding enough librarians to counteract the long waits that users experience during busy periods may be a prohibitively expensive proposition, unfortunately. It may be less expensive for NCKnows to use North Carolina librarians instead of outsourcing service hours to 24/7 Reference, though, so it may be possible to reduce these costs somewhat.

Study Weaknesses and Suggestions for Future Research

This study only looked at the questions submitted to the NCKnows service that required a librarian's response after the chat transaction had ended. Once they found an answer to the users' questions, they would send the answers to users' emails. These questions are thus not necessarily representative of the types of questions that are submitted to the service, nor are they representative of most of the responses that users receive from librarians. There are many different reasons why transactions ended before librarians could provide complete answers, and these reasons need different solutions to minimize their occurrence. A content analysis of a fully randomized sample of questions received by the chat service would be required to obtain a fuller understanding of the

service. Furthermore, NCKnows does not store any email exchanges that occur after these transactions are finished, so they could not be analyzed to clarify whether librarians continued the reference interviews or checked to see that users received the information they needed.

The only person responsible for coding the transactions by question types, reference interview completeness, and reasons for ending the chat was the author, so the research findings would be more conclusive if others had also coded the questions and come to similar conclusions. In addition, content analysis of a fully randomized sample of all of the questions received by the service would lead to a better understanding of the types of questions that are received by the service.

Similarly, the levels of reference interview completeness in the chat transcripts analyzed for this study do not accurately represent the levels of reference interview completeness for all the questions answered by librarians. To determine the level of reference interview completeness for all questions received by the service, a study would have to examine a fully randomized sample of those questions. It is likely that the transcripts sampled for this study are more likely to have incomplete reference interviews than transcripts of questions that are answered while users are still online.

Certain categories were omitted from the taxonomy of reason for email response categories because none of the transactions fit those categories. An out-of-scope category was initially included, but none of the questions were coded as being out-of-scope, even though librarians did often refer questions to libraries or institutions that do not participate in the NCKnows service. Other categories not included in this study may be questions about library equipment and facilities or bibliographic instruction.

Even though the chat transcripts accurately recorded textual information and provided clues as to why a transaction may have ended prematurely, very important information was left out that would help researchers understand what occurs during these transactions. For example, the transcripts did not show how long users waited for a librarian to respond once the initial question had been submitted, nor did they show much time elapsed between responses and exchanges. If there were several messages from the librarian early on letting the user know that the librarian was just finishing up with other users, and that it was taking a little longer than expected to answer their questions, one can assume that the user waited for some time to receive assistance. One can also assume that if there was a record of the librarian sending five messages to the user without any return responses, then there must have been lapses of time between each message in which the librarian waited for a response. Although it may appear that librarians logged off quickly when users were not heard from after a few messages, the librarians may have waited a long time between each message before giving up on users and moving on to others. Observing or recording librarians as chat transactions are happening would provide much better information about the factors that prevent the librarians from answering certain questions immediately.

Similarly, for transactions that ended because the user logged off, these transcripts did not always show whether the user had intended to log off or had accidentally been disconnected from the service. Some transcripts included the message [user has disconnected], but most did not include these messages. Most of the time, there existed only subtle clues that hinted at why the user may have logged off, but these clues were unreliable, as were the messages written by the librarians once they decided that users

had been disconnected. This blurriness probably kept many transcripts from being accurately coded as users intentionally disconnecting, simply because it could not be assumed that the users elected to log off, without evidence in the transcripts. Conversely, other transcripts may have been inaccurately coded as the user intentionally disconnecting, if the users accidentally hit the 'end call' instead of the 'send' button, or if technical difficulties severed the connection without the users intending that to end their sessions.

Even if users were disconnected accidentally after waiting to receive assistance from the librarians and were not logging off intentionally from the service because the wait was too long, it is possibly that these users would not have been on the service long enough to be disconnected, had the librarians been less busy and able to assist them immediately. The librarians and service administrators may not always be able to prevent technical difficulties on the users' side from interfering with providing a full reference service, but librarians can work to answer users' questions quickly enough that users are not disconnected before receiving assistance.

For the most part, librarians did not cite lack of access to appropriate sources as a problem in most of the transactions, with the exception of four transcripts. In two of those transcripts, they specified a need to locate at print sources. Librarians may have wanted more time to spend researching users' questions or consulting other sources in more sessions than were counted, but they did not say so explicitly, instead stating only that they needed more time because they were busy with other users. A survey of the librarians staffing that service that asked what they felt to be the main limitations of the

service would get at more of the factors that interfere with librarians' ability to provide optimal service.

Future research should explore whether questions are deferred primarily because librarians need more time (i.e. they're too busy multi-tasking to completely answer a question immediately) or because they need more resources than they currently have on hand (i.e. they need time to go to the right sources required to answer the user's question). Future research should also study why users are disconnecting and whether or not they are intentionally disconnecting.

Conclusion

This study has shown that time is the major issue interfering with librarians' abilities to provide complete answers to users while users are still online. Technological difficulties may also be ending many of these sessions prematurely, but the data available do not fully explain why some users disappear midway through the transaction. Users who log off may be doing so because they are tired of waiting or because they do not really need an answer immediately, or they may be logging off accidentally. Without surveying users about their motivations for ending their chats and their expectations of the service, their reasons for ending the session cannot be assumed.

Despite this, this study shows that adding librarians to the service, especially during the busier evening hours, would decrease the number of questions that are unanswerable at the time that they are submitted. If librarians felt less pressure to move onto users waiting in the queue, they could spend more time with users, navigating their questions, searching for appropriate sources, and verifying that users' questions are

answered. Librarians would be more likely to conduct a complete reference interview, when appropriate, that would guarantee that both user and librarian understand the user's question, that the librarian is able to show the user how to search for information, and that the information presented meets the user's need. Fortunately, more North Carolina librarians will be staffing the service once the pilot project ends in July 2005, and this may alleviate some of the time pressures that the librarians currently face. The number of referrals may also be reduced, as North Carolina librarians will be available more hours of the day.

Although the results of this study may reiterate the view of many who believe that chat reference is inappropriate for questions that are more complex than ready reference, it is too early to assume that that is the case. The sample studied do not accurately represent the quality of reference interviews conducted for all of the questions received by the service, nor are they a representative sample of the quality of answers provided by the librarians staffing the service. More research must be done before it is conceded that chat is inappropriate for research questions. As Langdon Winner writes, "if the experience of modern society shows us anything, however, it is that technologies are not merely aids to human activity, but also powerful forces acting to reshape that activity and its meaning (Sen-Roy, 2004, p. 128-129)." The chat medium may even lead to a restructuring of the reference interview to take advantage of what is gained by using the chat format. It is important for librarians to approach all new reference formats openly and be willing to consider the benefits and drawbacks associated with each format. Chat reference services may alter how we think of the reference interview and what we expect

of it, but the library profession should not reject a new technology simply because it does not operate under the same rules as previous services (Sen-Roy, 2004, p. 128).

If the benefits of chat reference can be maximized, and the limitations can be minimized, chat service could match, if not surpass, traditional desk reference services in terms of usefulness to many users. Chat reference services are still in their infancy and thus may need to go through several stages of development before they are accepted readily as a reference service equal to desk reference, but they do offer the immediate benefits of reaching new users and providing them much needed assistance when navigating the Web and electronic sources of information.

Appendix A

Coding Criteria for Librarian Responses

I. Librarian asks for more time:

A. Librarian is assisting other users: librarian may say that he/she is already busy assisting other users, and that answer will be found when librarian has time, or suggests that the user leave information that the librarian can email a response when less busy

1. The librarian states that he/she is already busy assisting users within the first paragraph.
2. The librarian states that he/she is already busy assisting other users midway through the chat transaction.

B. Librarian needs more time to research the question: librarian says that he/she would like to spend more time on the question, but does not say that lack of time is result of assisting other users

C. Librarian needs to consult resources: Librarian says that he/she would like to consult additional resources to provide answer

1. The librarian does not specify the types of resources.
2. The librarian specifies that print resources are needed.
3. The librarian specifies that electronic resources are needed.

D. No reason is given: no reason is given in text to explain why answer cannot be provided immediately

- E. Technological issues with electronic databases/ resources: the website, catalog, or database that librarian is trying to use to find answer is not working at the time, and librarian asks to email user response when the resource is working again.
- II. Connection is severed
- A. Librarian has technical difficulties with own computer or loses connection: the librarian is unable to send messages to the user or is disconnected from the user
 - B. User disappears: there is no message in transcript stating <user has disconnected>
 - C. User logs off: there is message in transcript stating <user has disconnected>
 - 1. Unknown reason
 - 2. When the librarian asked for email address in case of disconnection, the user thought that chat was finished.
 - 3. The user felt that answer had been provided or that chat was complete. The user gave indication that he/she felt that answer was provided or that answer could not be found.
 - 4. The user ran out of time to chat.
 - 5. The user was unclear about the scope of service and thought he/she was talking to a librarian at local library: disconnected on finding out otherwise.
 - 6. The user thought that no one was available to receive questions.
 - D. Request for answer by email: The user states preference for receiving answer through email. This does not include incidents when librarian is busy with other patrons and asks user for email to which to send later response, nor does it include incidents when user asks for email response because user needs to log off

1. The user is having technical problems with the chat software system or with loading the pages sent by the librarian.
2. No reason is given.
3. The user's initial request when logging in was to receive a contact name by email.

III. Referral: the question is referred to another librarian

A. Librarian refers question to librarian(s) at a specific library because it needs policy or factual information that is best provided by staff at that library. This category includes questions about call numbers, collections, fines, database access, and information about the library.

1. Collection info: books, databases, journal subscriptions
2. Fines, holds and renewals
3. Library hours, services, and policies
4. Technical support

B. Librarian states that question will be referred a librarian who is more familiar with the subject matter of the question or who may be able to provide more assistance.

This category includes more in-depth questions related to finding information about a given topic or about searching for information within that library.

1. The question is referred to librarians at the user's home library, who have the knowledge or resources needed to answer the user's question.
2. The question is referred to librarians at a library other than the user's home library, who have the knowledge or resources needed to answer the user's question.

C. Librarian refers user to someone or someplace not affiliated with the NCKnows service. The librarian may suggest that the user contact someone who is not part of the service or suggest that the user contact a business or institution that is unaffiliated with the NCKnows service.

References

- Bailey-Hainer, B. (2005). Virtual reference: Alive and well. *Library Journal* 130(1), 46-47.
- Bailey-Hainer, B. (2003). Collaborative virtual reference in Colorado. *Colorado Libraries* 29(1), 15-18.
- Bostick, S.L. (2001). The history and development of academic library consortia in the United States: An overview. *The Journal of Academic Librarianship* 27(1), 128-130.
- Brandt, D.S. (2000). Email makes the world go 'round. *Computers in Libraries* 20(10), 64-66.
- Breeding, M. (2001). Providing Virtual Reference Service. *Information Today* 18(4), 42-43.
- Broughton, K. (2001). Our Experiment in On-line, Real Time Reference. *Computers in Libraries*, 21(4), 26-31.
- Budd, R.W., Thorp, R.K., & Donohew, L. (1967). *Content analysis of communication*. New York: Holt, Rinehart, and Winston.
- Cain, M. (2003). Cybertheft, national security, and the library without walls. *The Journal of Academic Librarianship* 29(4), 245-248.
- Carter, D.S. (2002/2003). Hurry Up and Wait: Observation and Tips About the Practice of Chat Reference. *The Reference Librarian* (79/80), 113-120.

- Coffman, S. & Arret, L. (2004). To chat or not to chat: Taking another look at virtual reference, part 1. *Searcher* 12(7), 38-46.
- Coffman, S. (2003). *Going live: Starting and running a virtual reference service*. American Library Association: Chicago.
- Coffman, S. (2002). What's wrong with collaborative digital reference? *American Libraries* 33(11), 56-58.
- Crisp, J. (2003). LSTA Statewide Leadership Project Plan for 2004-2005: Collaborative Virtual Reference Pilot Project. Available at <http://ncknows.org/ncvrplan03-04.pdf> (accessed April 7, 2005).
- Diamond, W. & Pease, B. (2001). Digital reference: A case study of question types in an academic library. *Reference Services Review* 29, 210-218.
- Francoeur, S. (2001). An analytical survey of chat reference services. *Reference Service Review* (29)3, 189-203.
- Fritch, J.W., & Mandernack, S.M. (2001). The Emerging Reference Paradigm: A Vision of Reference Services in a Complex Information Environment. *Library Trends* 50(2), 286-305.
- Grant, S. (2002). Using the web for research. *Teacher Librarian* 29(5), 17-20.
- Gray, S.M. (2000). Virtual reference services: Directions and agendas. *Reference and User Services Quarterly* 39(4), 365-375.
- Heise, J. & Kimmel, S. (2003). Reading the river: The state of the art of real-time virtual reference. *Internet Reference Services Quarterly* 8(1/2), 1-7.
- Janes, J. (2003). What is reference for? *Reference Services Review* 31(1), 22-25.
- Janes, J., & Silverstein, J. (2003). Question Negotiation and the Technological Environment. *D-Lib Magazine*, 9(2). Available at

<http://www.dlib.org/dlib/february03/janes/02janes.html> (accessed March 29, 2005).

Janes, J., & Hill, C. (2002). Finger on the Pulse: Librarians Describe Evolving Reference Practice in an Increasingly Digital World. *Reference & User Services Quarterly* 42(1), 54-65.

Janes, J. (2002). Digital reference: Reference librarians' experiences and attitudes. *Journal of the American Society for Information Science and Technology* 53(7), 549-566.

Janes, J. (2002a). Live Reference: Too Much, Too Fast? *Library Journal netConnect*, 127(17), 12-14. Available at <http://slj.reviewsnews.com/index.asp?layout=article&articleid=CA251681> (accessed March 29, 2005).

Janes, J. (2001). Digital reference services in public and academic libraries. In C. McClure and J.C. Bertot (Eds.), *Evaluating networked information services: Technology, policy and issues*. Information Today.

Katz, B. (2002/2003). Digital reference: An overview. *The Reference Librarian* (79/80), 1-17.

Kresh, D. (2003). Virtually Yours: Thoughts on where we have been and where we are going with virtual reference services in libraries. *The Reference Librarian*. (79/80), 19-34.

Lankes, R. D. (1999). Question Interchange Profile, version 1.01D (white paper). Syracuse, NY: ERIC Clearinghouse on Information & Technology. Available at <http://www.vrd.org/Tech/QuIP/1.01/1.01d.htm> (accessed March 29, 2005).

Lipow, A.G. (2003). *The Virtual Reference Librarian's Handbook*. Library Solutions Press, Berkeley. In association with Neal Schuman Publishers, Inc. New York.

Lipow, A.G. (1999). "In your face" reference service. *Library Journal* 124(13), 50-52.

- Marsteller, M.R. & Mizzy, D. (2003). Exploring the synchronous digital reference interaction for query types, question negotiation, and patron response. *Internet Reference Services Quarterly* 8(1/2), 149-165.
- Marsteller, M. & Neuhaus, P. (2001). Here, there, and everywhere: Reference at the point-of-need. *Journal of Academic Librarianship* 26(6), 464-466.
- McGlamery, S. & McClennen, M. (2003). QRC: Integrating live chat with email follow-up in a collaborative reference service. Paper presented at the Virtual Reference Desk 5th Annual Digital Reference Conference, San Antonio, TX, November 17-18, 2003.
- McKinzie, S., & Lauer, J. D. (2002). Virtual Reference: Overrated, Inflated, and Not Even Real. *The Charleston Advisor*, 4(2). Available at <http://www.charlestonco.com/features.cfm?id=112&type=ed> (accessed March 29, 2005).
- Moeller, S.E. (2003). Ask-A-Librarian: An analysis of an e-mail reference service at a large academic library. *Internet Reference Services Quarterly* (8)3, 47-61.
- Munson, K. & Frisque, M. (2004). How we treated our clients' need for remote access through a single interface. *Computers in Libraries* 24(9), 10-15.
- Pomerantz, J. & McClure, C. (2004). Evaluation of a statewide collaborative chat-based reference service: Approaches and directions. In L. Schamber & C.L. Barry (eds.), *Proceedings of the 67th Annual Meeting of the American Society for Information Science and Technology* (pp. 102-109). Medford, NJ: Information Today, Inc.
- Ronan, J.S. (2003). *Chat reference: A guide to live virtual reference services*. Westport, CT: Libraries Unlimited, Inc.
- Ronan, J.S. & Turner, C. *Chat reference: A SPEC kit*. Association of Research Libraries, Washington, D.C., 2002.

- Ross, C.S. (2003). The reference interview: Why it needs to be used in every (well, almost every) reference transaction. *Reference and User Services Quarterly* 43(1), 38-42).
- Sen-Roy, M. (2004). The Social Life of Reference: What the Technology Affords. *The Reference Librarian*, (85), 127-137.
- Stanley, D. & Lyandres, N. Reference assistance to remote users. *The Reference Librarian* 73, 243-252.
- Straw, J.E. (2000). A virtual understanding: the reference interview and question negotiation in the digital age. *Reference and User Services Quarterly* (39)4, 376-379.
- Suler, J. (1997). Psychological Dynamics of Online Synchronous Conversations in Text-Driven Environments. *Psychology of Cyberspace*. Available at <http://www.rider.edu/suler/psycyber/texttalk.html> (accessed March 29, 2005).
- Tennant, R. (2003). Revisiting digital reference. *Library Journal* 128(1), 38-39.
- Tipton, C.J. & Earp, V.J. (2004). One school's experience with virtual reference. *Internet Reference Services Quarterly* 9(3/4), 99-114.
- Tyckoson, D. (2003). On the desirableness of personal relations between librarians and readers: The past and future of reference service. *Reference Services Review* (31)1, 12-16.
- Ward, D. (2004). Measuring the Completeness of Reference Transactions in Online Chats: Results of an Unobtrusive Study. *Reference and User Services Quarterly* 44(1), 46-58.