Reference Transaction Handoffs

Factors Affecting the Transition from Chat to E-mail

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This article describes a content analysis of virtual reference transcripts taken from the NCknows virtual reference service. The analysis sought to determine why librarians consider some questions to be unanswerable at the time they are submitted by users. Questions were coded by a classification of question causes and by how complete the reference interview was in the transaction. The transcripts were then coded 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 librarians could not answer questions at the time was that they 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 users are still online.

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Reference's primary function is to provide users answers when and how they need them. Chat reference services assist users from anywhere with an Internet connection where librarians can send users information immediately. Occasionally librarians cannot answer questions when received because of time constraints, because necessary resources are unavailable, or because questions require referrals. Librarians may then send answers to users' e-mails.

This paper examines why librarians staffing the NC*knows* chat reference service are sometimes unable to answer questions when received by focusing on three questions: (1) What types of questions are answered later through e-mail?; (2) How complete are the reference interviews?; and (3), Why do transactions end prematurely? Librarians may use the e-mail response option when questions require more time or resources than are available when the question is received. A content analysis was conducted on unfinished reference transactions of questions submitted to the NC*knows* reference service from January to February 2005. By minimizing situations that make certain questions difficult to answer while users are still online, NC*knows* will be an effective form of reference that users can rely on for their information needs.

Digital reference services help remote users locate useful information sources. These services draw questions from users who may have never used library reference, as some users are concerned about anonymity, and others cannot visit libraries. Whether it is distance, a handicap, privacy concerns, or scheduling issues that prevent users from accessing libraries, virtual reference services tear down these restrictive walls, assisting users in any location and increasingly at all times of the day.

Librarians can also send users information later. If users disconnect prematurely, librarians can send them e-mails requesting more information. Librarians also have more flexibility to respond if more time is needed to answer questions. Once users log off, they receive a transcript of the chat session that can be consulted later.

But even virtual reference services' proponents concede that there are drawbacks. Bibliographic instruction has always been an important aspect of reference, but chat service technology often hinders librarians' attempts to teach users search skills. Not all services permit co-browsing, while Web sites and proprietary databases often prevent it. When librarians send e-mail responses, the search process becomes solely the librarians' responsibility. For users to learn how answers were found, librarians must type the search strategy.

Librarians staffing virtual reference services without co-browsing compensate by typing out searches, which is very time-consuming. Questions requiring only a few minutes of time at the desk may require nearly fifteen minutes for librarians to find an answer and then explain in text.[1] On average, NC*knows* chat sessions last 13.7 minutes.[2] Besides the additional time required, low levels of use have been cited as another problem associated with chat reference.[3]

Librarians today may bemoan virtual reference's failings, but tomorrow's users will perceive things differently. In 2004, the University of Southern California's Center for the Digital Future found that possibly 97.5 percent of children ages twelve to seventeen in the United States use the Internet.[4] Reference librarians should remain open-minded about digital reference's possibilities. "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."[5] By doing so, librarians will position themselves to serve users who are increasingly accustomed to locating information without physically visiting the library or contacting a librarian by telephone.

COLLABORATIVE CHAT REFERENCE MODELS

Collaborative virtual reference services comprising multiple types of libraries are more sustainable than individual chat services, as they share startup, maintenance, and staffing costs. Use statistics are understandably much higher for collaborative reference services because they reach more people representing diverse user groups. Families, students, and the elderly in rural, urban, and suburban environments enjoy access to reference services if they or their libraries have Internet access.[6]

The North Carolina State Library's Virtual Reference Advisory Committee debated whether virtual reference should be provided by one library or by several working cooperatively. The committee chose the latter, citing cost, marketing, and service concerns. A collaborative model shares libraries' resources, regional knowledge, and staff expertise, while costs are spread out among member libraries.[7] On the other hand, collaboration often means compromise, and public, academic, and special libraries have to negotiate what level of service to offer.[8]

DIGITAL REFERENCE AND THE REFERENCE INTERVIEW

Despite technological advances that have expanded reference service, it remains a relatively static practice. Many librarians view desk reference as the ideal model because verbal and nonverbal cues are present to clarify users' information needs. Also, librarians can easily provide bibliographic instruction and show resources to users in person. After conducting the reference interview and locating potentially useful sources of information, they can then ask users if the documents are helpful. Other reference formats lack aspects of the traditional reference interview, thus rendering them less efficient forms of reference.

Nonetheless, it can be difficult for librarians to conduct reference interviews at the desk, even using the many subtle verbal and nonverbal cues available. The chat reference setting compounds this difficulty, as librarians must rely solely on what users write. For this reason, chat has been called an "austere mode of communication" in which "there are no changes in voice, no facial expressions, no body language."[9] Important clues are certainly lost in the transition from desk or telephone reference to digital reference. For instance, librarians may need to ask chat reference users their grade level to determine how complex or detailed the materials

sought should be, although that would be apparent to the librarian if students were to approach the reference desk in person. Perhaps more importantly, librarians quickly sense when users are stressed or pressed for time, based on their tone of voice or how quickly they talk, whereas the persona and typing style of a rushed user might be interpreted as poor chat etiquette. Additionally, librarians can tell when users they speak with do not understand something or need clarification about something, as a user's silence or pauses can communicate much about the user's state of understanding. But the chat format may encourage candor, especially concerning certain topics, as many chat services allow users to remain anonymous.[10]

Nonetheless, not all librarians embrace the reference interview. Some advocate that questions be taken at face value, even if what users ask for is actually quite far from what is needed. Many librarians think the reference interview is overrated and may not be needed in digital reference.[11] Conversely, Catherine Ross claims that all reference transactions would be enhanced by a reference interview. Although proponents of the face-value approach balk at how much time would be required if reference interviews became part of every reference transaction, taking time to clarify users' needs will ultimately save time. Reference interviews efficiently reveal what is needed so that librarians do not waste time searching for information that users do not need.

Janes suggests that those who declare reference interviews unnecessary in digital reference may be trying to resolve the guilt they feel from their frequent inability to conduct a full reference interview for questions received by e-mail. His 2002 study found that respondents asked users to call the desk or come in when questions were difficult to answer by e-mail.[12] Chat software can help librarians develop users' questions while online, so this may not be a problem for chat reference.

Librarians remain uncertain about digital reference's suitability for research questions. A 2002 study showed that an overwhelming majority (80 percent) of librarians supported using digital reference for ready reference, while only 4.8 percent opposed it. Conversely, only 32.9 percent supported digital reference for detailed research questions, and 46.2 percent believed these questions would be poorly served by digital reference.[13] As librarians experiment with digital reference, they may reach consensus about its appropriate scope within their library setting.[14]

Some digital reference services avoid complex research questions by limiting their services to simple ready reference questions. Diamond and Pease question the usefulness of this solution. "Limiting digital reference service to 'ready reference' questions alone does not adequately meet users' needs and may not even be understood by them."[15] Janes has found that librarians' reluctance to accept research questions may be explained by their fear that they will be unable to answer these questions properly.[16]

Katz suggests that more librarians should regularly answer complex research questions online and offline, so that they will feel comfortable answering complex 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."[17] All librarians should strive to meet the following standards: "(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."[18]

The best way to determine digital reference's scope is to continue answering research questions from users until further research resolves the debate. Otherwise, the perception that "the synchronous digital reference environment is not suitable for conducting a reference interview . . . could become a self-fulfilling prophecy."[19]

REFERENCE INTERVIEW COMPLETENESS

David Ward developed chat reference completeness criteria for questions received by a virtual reference service. Following the RUSA Guidelines for Behavioral Performance of Reference and Information Services Professionals, Ward identified criteria in four areas: negotiating the question, providing source instruction, offering applicable keywords or subject headings to use for searching, and conducting a follow-up interview. Listed below are his four criteria:

- 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*) [20]

When reference transactions met all four criteria, transactions were considered complete. If users were guided to appropriate sources of information or were offered potential sources and two of the other criteria were present within the reference interviews, transactions were considered mostly complete. Transactions that included only two of any of the four criteria were coded mostly incomplete. When one or none of the criteria were present in transactions, these interviews were coded as incomplete. Finally, transactions that immediately ended with referrals to other services or librarians, without reference interviews, were coded as referrals.[21]

Ward found that transactions with complete interviews ended sooner. These transactions lasted an average of 14 minutes and 35 seconds, while transactions with mostly complete or mostly incomplete interviews took about a minute longer. Reference transactions with incomplete interviews took nearly eight minutes longer to complete than those with complete interviews.[22]

NC*KNOWS* AND THE COLLABORATIVE VIRTUAL REFERENCE PILOT PROJECT

The North Carolina State Library started NC*knows* (www.ncknows.org), a statewide collaborative chat reference service, as part of its Collaborative Virtual Reference Pilot Project. Planning began in 2001, when the Library Services and Technology Act Advisory Board learned that several libraries in the state were interested in virtual reference service. Since the most successful digital reference services nationally were collaborative models, the LSTA offered grant money for a statewide pilot project instead of giving money to individual libraries to develop their own virtual reference services. A collaborative model made it possible for even small libraries to participate.

The NC*knows* service was launched in February 2004 and completed its pilot phase in June 2005. Twenty-one libraries now donate reference services to the program. They include public, academic, and government libraries. Their librarians staff the service 63 hours a week, and the software vendor, 24/7, provides staffing for the remaining 105 hours a week. Eventually, NC*knows* will create consortia agreements with other libraries nationwide so that staffing is shared.

The service requests that users submit their name, e-mail address, and zip code, although users may remain anonymous. Those who submit an e-mail address can receive answers later if librarians cannot answer their questions while chatting. Some questions are forwarded to other NC*knows* librarians, while others are forwarded to outside libraries or institutions.

RESEARCH METHOD

When NC*knows* librarians cannot answer questions while chatting, they code the transcripts for e-mail response. The unfinished transactions from January to February 2005 were categorized by question type, reference interview completeness, and reasons for ending the session. The results were then analyzed to find ways to reduce the number of answers that must be sent to users by e-mail.

Classification of Causes of Questions

Lipow included a worksheet in *The Virtual Reference Librarian's Handbook* for classifying questions received by the reference desk, listing eleven categories for possible causes of questions. Lipow's categories 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.'[23]

For this study, two terms were merged together because they had similar meanings, and four new categories were created in place of the "other" category. "Technology assistance" and "equipment/facilities" covered the same questions, as users submitted questions about library equipment/facilities when they had problems using library log-in pages, databases, or remote access. Questions about library services or collections fit "other library services" and "known item request" better, and were coded into these categories. The "out-of-scope" category was omitted because librarians determined which questions were out-of-scope, as was the "directional" category because it overlapped other categories.

The four categories added were "factual," "genealogical," "unknown item request," and "reader's advisory." The first was for simple fact-based questions concerning 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 that sought for subject advice questions.

"Genealogical" requests generally required different sources and search strategies than "factual" or "subject advice" questions, and users making genealogical requests often wanted a lot of information about the topic. For example, one user asked for information about his father's high school and wanted any available documents about the school.

The category "unknown item request" was developed because sometimes users wanted items that they were not sure existed. Users generally had an idea of how they wanted the information packaged (as a book, journal, photograph, and so forth). For example, one user requested "a source for medical office layout and design."

A final category, "reader's advisory," was developed because sometimes users sought reading materials about given subjects. Although their questions were often as broad as "subject advice" questions, users were more interested in suggestions for reading or further learning than they were in topic development assistance from librarians. One user asked the librarian to "recommend a good self help audio tape," and another requested "the most recommendable source of parenting styles." Many transcripts fit and were coded into multiple categories. These categories are described in table 1.

Question Completeness Categories

Ward's reference interview completeness criteria were altered to fit the NC*knows* service. The adequate instruction definition was expanded, as librarians could only use informational sources available to users. Therefore guiding users to appropriate databases was modified to suggesting or guiding users to appropriate sources. Giving users keywords or subject headings to search under was modified to suggesting keywords or subject headings to search with, and explaining how to enter search terms was modified to explaining how to find information in suggested sources.

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 the user found sources appropriate for the topic? (*follow-up*)

Coding Criteria for Reference Interview Completeness

- Complete (C): All four criteria fulfilled.
- Mostly complete (MC): Patron 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): Patron was immediately asked to come in to library (or call/e-mail).

Development of Response Categories

Three categories, described in table 2, emerged to explain why certain questions were not answered during the chat sessions. First, librarians needed or wanted more time or resources to find answers. Second, users or librarians disconnected before the chats were completed, whether intentionally or not. Third, librarians felt that some questions needed to be referred to other librarians.

The first category was created for when librarians received the users' questions and conducted reference interviews to clarify what users wanted. Five subcategories define the reasons given for needing more time: (1) librarians were already busy assisting other users, (2) librarians wanted more time to research questions, (3) librarians needed more time to consult references not readily available, or (4) technical difficulties kept librarians from accessing databases or Web sites needed to provide answers to users. A fifth subcategory was created for when librarians gave no reason for needing more time.

The second category emerged for transactions that were severed due to technological reasons before librarians could provide answers to users' questions. While chatting, the users or librarians experienced technical difficulties that severed the connection, or users disconnected from the service before receiving full answers. Four subcategories were created for disconnections that occurred before answers were provided: (1) librarians were disconnected before providing answers, (2) users were disconnected from the service or vanished before receiving answers from librarians, (3) users logged off intentionally before receiving answers, or (4) users requested that librarians send answers by e-mail.

The final category was created because users' questions could not be answered adequately by responding librarians. Three subcategories were created for questions referred to other information professionals: (1) the questions addressed library-specific policies or collections, (2) the responding librarians felt that questions could be better answered by another NC*knows* librarian, because that librarian would have more knowledge, or (3) librarians felt that someone outside

of the NC*knows* service would be more qualified. In the third subcategory, users were responsible for contacting the person or place that librarians had suggested.

The coding categories were modified during coding to reflect the content of the chat transactions.[24] Each reference transaction was coded according to the types of question(s) asked, and transactions were categorized by how well they met the reference interview completeness criteria. Finally, transactions were coded according to reasons given by librarians for coding the transactions as "e-mail response." Because users may have asked multiple questions falling into several question categories, multiple coding was allowed for the causes of questions. 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 e-mail, however, so multiple coding for responses was allowed.

From January to February 2005, 210 transactions were answered by e-mail after the chat sessions ended.

DATA ANALYSIS

Taxonomy and the Causes of Questions

The transactions were coded into ten of the eleven categories for causes of questions received at the reference desk. Fifteen transcripts fit two categories simultaneously, and three other transcripts fit three categories. "Subject advice" was the most common category with fifty incidences, followed by "factual" with forty, and "unknown item request" with thirty-eight incidences. "Technology assistance" had thirty incidences, "known

Table 1. 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.	
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?
Unknown item request	User requests specific type of item but user is not sure that it exists.	Do you have any photos of the old theater in Greensboro? I want a book about repairing antique tractors.

Table 2. Reasons for Coding as E-mail Response

Librarian asks for more time	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	Librarian's connection is severed.
	User connection is severed or user disappears for reasons unknown.
	User logs off of the service intentionally.
	User requests e-mail response.
Referral	Librarian forwards policy or library-specific question to specific library for answer.
	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 NC***knows*** network.

item request" had twenty-eight, and "class assignment" had twenty-two incidences. The last four categories were "other library services" and "genealogical questions" with six incidences each, five incidences in "reader's advisory" and two incidences in "searched in vain on shelves." There were no incidences of complaints. Despite this, it is possible that unfinished transactions could contain complaints.

Reference Interview Completeness

Only 3 of 210 transactions had complete reference interviews, whereas 112 reference interviews were incomplete. Only 8 interviews were mostly complete, whereas 18 were still mostly incomplete. Librarians referred 69 questions to other librarians.

In one of the transactions that had a mostly complete reference interview, the librarian ended the session because the user did not respond to several messages. Before ending the session, the librarian suggested book titles and sent some links to the user. The user only replied to the librarian's first message, after which the librarian sent five additional 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 preventing 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 only 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 e-mailed 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.

The reference interviews for sixty-eight of eighty-two transactions ending by librarians' requests were incomplete, and six more were mostly incomplete. One transcript had a mostly complete interview, and the final seven questions were referred to other NC*knows* librarians. Figure 1 shows the proportion of each completeness category for the 210 transactions.

Motivations for Ending the Chat Transaction Early

Only factors affecting whether questions were answered while librarians and users chatted were counted as influencing how librarians coded users' questions for later response. Forty sessions ended for multiple reasons, thus affecting overall percentages. Librarians' messages may have influenced users' actions, such as whether to log off, after receiving a message suggesting that an answer be sent later.

Librarian asks for more time. Figure 2 shows the reasons librarians gave for ending sessions. Eighty-five sessions ended partly because librarians asked for more time to answer users' questions. In fifty-six sessions (27 percent of the time), this occurred because librarians were already busy assisting other users. In fifty-three of those, the librarians mentioned being busy in the greeting. In the other three, the librarians waited until midway through the chat to mention that they were assisting other users.

The second most common reason for librarians to request more time was that they wanted to research users' questions. This occurred seventeen times (in 8 percent of 210 transactions). Although only one librarian also mentioned a need to assist others, two librarians mentioned time as a constraint, and one user said that time was limited. Thus librarians' desire to spend more time researching and composing answers could have been influenced by them assisting other users at the time, even if librarians did not explicitly mention it.

In four transactions (2 percent), librarians needed sources not available then. In two transcripts, they did not mention the sources required, but print sources were mentioned in the other two. None of the librarians mentioned needing electronic resources not regularly available to them. Seven transactions (3 percent) ended in part because librarians could not access library catalogs, databases, or Web sites at the time. In only one transaction did the librarian not give a reason for sending a later response.

Connection is severed. Figure 3 shows the reasons why chat sessions were disconnected. Fifty-two of 210 transactions (25 percent) ended at least in part because users stopped replying to librarians' messages. Some users were likely disconnected unintentionally during 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 librarians decided that users were no longer available online. In fourteen of those transactions, users disappeared after receiving messages from librarians mentioning waits.

In forty-one of 210 transactions (20 percent),

Figure 1. Reference Interview Completeness by Transactions

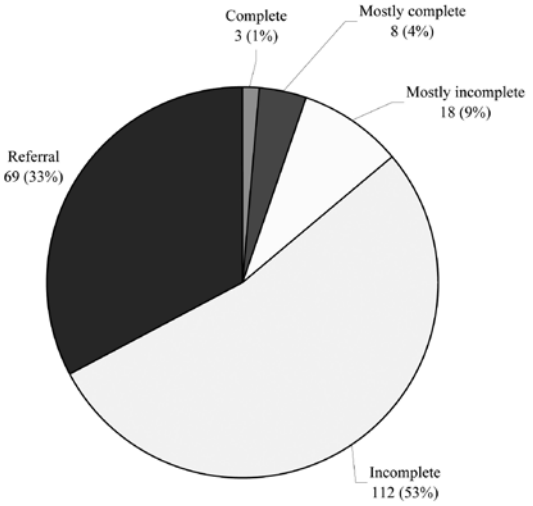
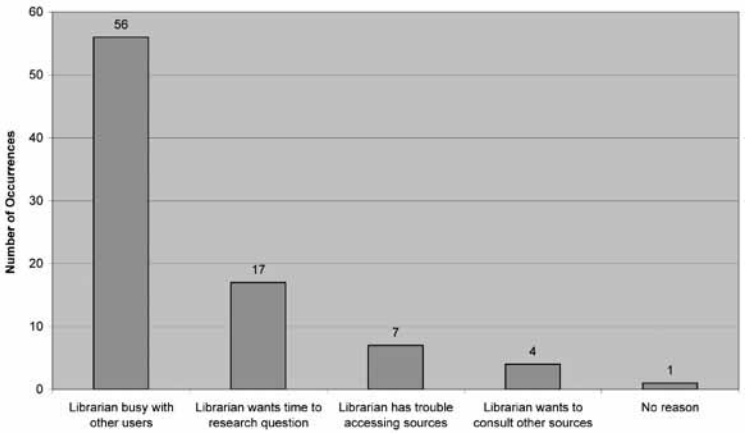


Figure 2. Reasons Why Librarians Ended Sessions



evidence suggests that users intentionally logged off the service before receiving complete answers. No reason could be found to explain why the users logged off in twenty-two transactions, although librarians asked to send e-mail responses in seven of those sessions, so users may have disconnected as a result of the librarians' requests. These sessions were coded as user disconnecting in addition to librarian asking for more time because users disconnected instead of leaving further information about their topics that librarians could have used to answer users' questions. In six of the transactions, users logged off because they thought they had received an answer or thought they would not receive an answer. Ten users ended sessions because they ran out of time to chat with librarians, and two logged off because they thought the submission of their questions and e-mail address was what the 'chat' entailed. Finally, one user logged off upon learning that the librarian was not from her local library, and one user logged off because he thought that no one was there. Figure 4 shows the reasons why users intentionally disconnected.

Referral to other libraries or librarians. Thirty-two transactions, or 15 percent, involved questions that the librarians felt would be better answered by librarians at users' home libraries. Twenty-seven questions were referred by responding librarians to others within the NC*knows* service. Twelve questions were referred to librarians outside the service.

Thirteen questions concerned users' local libraries, including questions about books, journals, and databases. Four questions concerned holds, fines, or renewals, and eight questions concerned library hours, policies, or services. In seven transactions, users needed technical assistance accessing catalogs or databases. These referrals to specific libraries are shown in Figure 5.

In thirty-three transactions, librarians referred users' question to another librarian because the questions required further research. Twenty-two of these were referred to users' home libraries. The librarians' stated reasons for referring questions to users' home libraries involved those librarians having more precise knowledge and resources needed to answer those questions. Librarians referred users to other subject librarians if questions were too difficult or complex for the responding librarians to answer well.

Time and question incompletion. Figure 6 shows the number of transactions per hour that ended before users' questions were answered. Although time was not always a contributing factor, it does show a steep rise in the number of questions that could not be answered from 7 to 8 p.m. This rise may be explained, however, by a rise in the number of questions submitted in the evenings.

Many of the fifty-six transactions that ended prematurely because librarians were too busy assisting other users occurred at certain times. Twenty-two (39 percent) occurred between 7 and 8 p.m., and seventeen of those twenty-two (27 percent) occurred on Tuesdays, Wednesdays, or Thursdays. This was the most common time for librarians to end sessions to assist other users.

Thirty-four (61 percent) of the questions answered later because the librarian was too busy, occurred between 5 and 9 p.m., with questions dwindling off before and after that period. A small surge occurred between 3 and 4 p.m. as well, as six (11 percent) occurred during that hour. Similar surges happened from 5 to 7 a.m. and 9 to 11 a.m., as 9 percent of the questions that needed later response because librarians were too busy to assist these users occurred during each time period.

Figure 3. Reasons Why Chat Sessions Were Disconnected

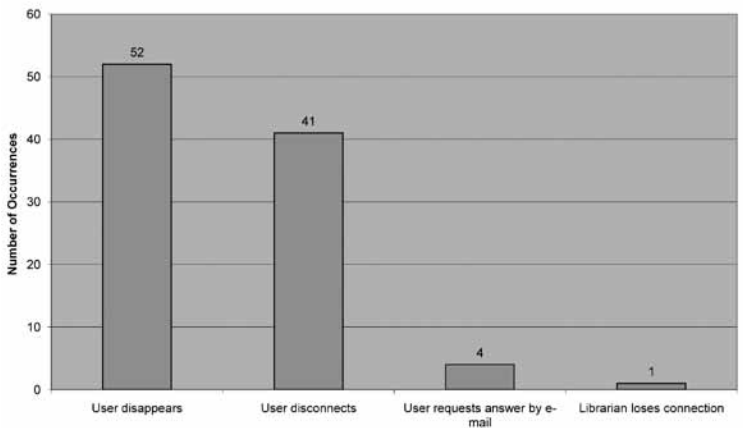
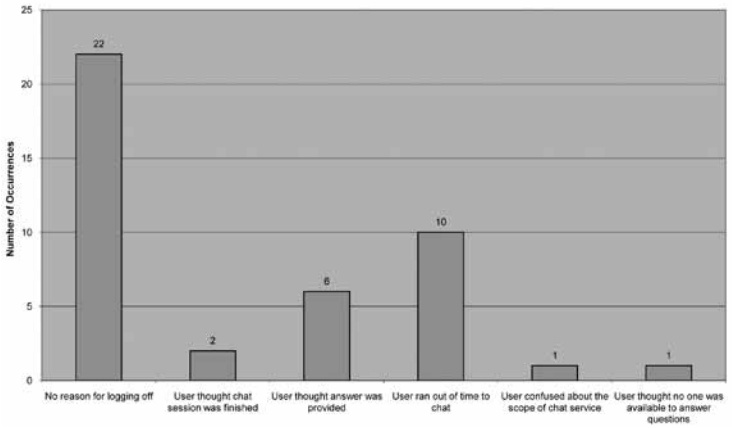


Figure 4. Reasons Why Users Intentionally Disconnected



Librarians mentioned time as a constraint in sixty-one transactions (29 percent of the time). A common opening script used by librarians during busy periods was the following:

> 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 like this at the beginning of forty-four transactions. In seventeen, librarians mentioned time factors later on during transactions, generally when ending sessions. Users mentioned time as a constraint in seven of the transactions. In those transactions, users needed to log off because they had no more time to chat with librarians. In one transcript, the user mentioned early on in the chat that his time was limited, but the others only mentioned time constraints when logging off.

DISCUSSION

Can't Chat Right Now, Can I Get Back to You Later?

Librarians were often unable to conduct reference interviews when assisting multiple users. Complete interviews may have helped them answer questions faster by clarifying what users wanted. In some cases, librarians may have been able to provide answers immediately. In others, librarians might have gathered enough information to send users responses later.

Many reference interviews ended because users logged off or disappeared before librarians could finish the interviews, or because librarians began sessions by offering to answer questions at a later time. In other cases, librarians referred users to librarians outside of the NC*knows* network before doing reference interviews, and thus could not conduct reference interviews later.

Hello, Is Anybody There?

Netscape 7.x and Mozilla 5.x browsers do not work with the NC*knows* service. According to one librarian, users "connect—but then they will get our messages and we won't get theirs."[25] This understandably caused librarians to log off after sending several messages to unresponsive users. Many transactions coded as users disappearing may have ended because their browsers did not work with the NC*knows* interface.

Users may accidentally disconnect by selecting the "end call" button instead of the "send" button, since the buttons are located near each other on the page. Conversely, users may have thought chats were over but did not end sessions by selecting the "end call" button. Without messages appearing in transcripts stating that users had disconnected, it could not be assumed that users had logged off.

Users often could not tell that they were actually chatting with someone, and they may have given up, assuming that no one was there. One librarian wrote that he was experiencing a busy time, and asked if the user would like an answer e-mailed later. The user submitted three replies before disappearing:

User: Yesterday I hear the same thing and

Figure 5. Causes of Library-Specific Referrals

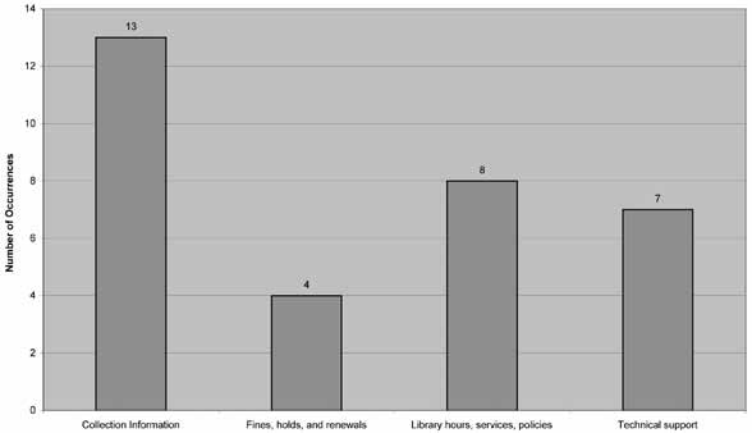
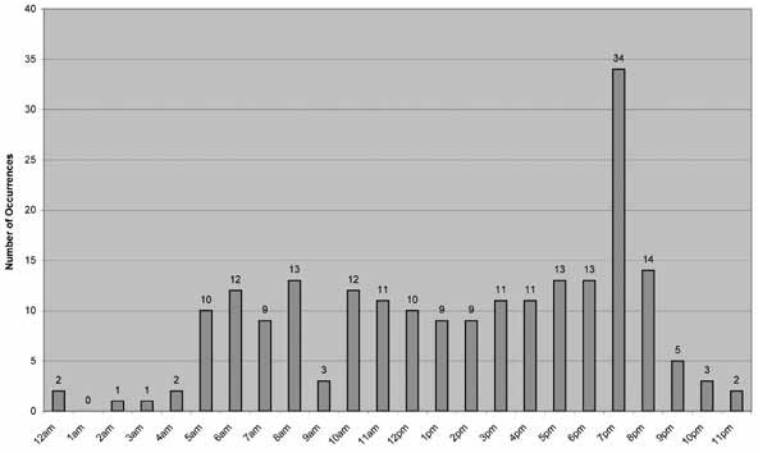


Figure 6. Times When Chat Transactions Ended Early



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?

Users often assumed they were chatting with local librarians. They asked questions like "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 she was not chatting with 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 users' heightened sense of urgency. One user entered "HELP ME!!!!!!!!!!!!!! with tutor.com." Another user submitted a question, written in lower case, but disconnected before receiving help. The user then resubmitted the question a few minutes later, written entirely in caps. The librarian asked the user to wait for assistance or try later, and the user disconnected again.

STUDY FINDINGS

The first goal of the NC*knows* virtual reference service should be to add more North Carolina librarians to the service, as they are only available sixty-three hours a week.[26] Librarians should also be trained to conduct reference interviews early on while chatting, as this has been shown to shorten the overall transaction length. This would not only increase the likelihood that users would receive the information they want, but it might also speed up completion rates, thereby lessening users' waits. This might reduce the number of users who disconnect before chatting with librarians.

More librarians chatting simultaneously would also reduce how many sessions end early, as librarians would feel less pressure to answer questions quickly simply because other users are waiting. It would also minimize referrals to other librarians or libraries, as there would be a greater chance that another librarian could assist with complex, subject-specific questions.

CONCLUSION

Insufficient time is the main reason that librarians are unable to answer users' questions while users are still online. Technological difficulties may also end some sessions prematurely, but the available data does not fully explain why some users disappear. They may be tired of waiting, not really need an answer, or be logging off accidentally. Without surveying users about their motivations for ending their chats and their expectations of the service, users' reasons for ending the session cannot be assumed.

Despite this, adding librarians, especially during the evening, would reduce the number of questions unanswered while users are still online. If librarians felt less pressure to assist waiting users, they could spend more time with current users. Librarians would have more time to conduct a complete reference interview, guaranteeing that they would understand users' questions. They could then show users how to find information, and they could check that the information presented met users' needs. More North Carolina librarians will participate once the pilot project ends in July 2005, and this may alleviate the pressures the librarians have faced. Referrals may also diminish once more librarians are available.

Although these results may speak to those who believe that chat reference is only appropriate for ready reference, it is too early to concede that. The reference interviews in this sample do not measure the quality of reference interviews conducted overall. More research should be done before the appropriateness of chat for research questions is accepted. Langdon Winner wrote, "technologies are not merely aids to human activity, but also powerful forces acting to reshape that activity and its meaning."[27] The chat medium may lead to a restructuring of the reference interview to take advantage of what the chat format offers. Librarians should approach reference formats openly, considering their costs and benefits. Chat reference services may reshape the way reference is provided; therefore, librarians should not reject a new technology simply because it does not operate under the same rules.

If librarians can maximize chat's benefits and minimize its limitations, it could match, if not surpass, desk reference in terms of usefulness to many users. Chat reference is still in its infancy and may need to evolve before it is accepted as an equal alternative to desk reference, but it does offer the immediate benefits of reaching new users and providing them assistance when navigating the Web and other electronic sources of information.

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References

1. David S. Carter, "Hurry Up and Wait: Observations and Tips About the Practice of Chat Reference," *The Reference Librarian* nos. 79/80 (2002/2003): 113–20; Susan McGlamery and Michael McClennen, "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.
2. Jeffrey Pomerantz and Charles McClure, "Evaluation of a Statewide Collaborative Chat-Based Reference Service: Approaches and Directions," in *Proceedings of the 67th Annual Meeting of the American Society for Information Science and* Technology, ed. Linda Schamber and Carol L. Barry (Medford. N.J.: Information Today, 2004), 102–09.
3. Roy Tennant, "Revisiting Digital Reference," *Library Journal* 128, no. 1 (2003): 38–39.
4. USC Annenberg School Center for the Digital Future, "*The Digital Future Report: Surveying the Digital Future, Year Four*," (Los Angeles: University of Southern California, 2004).
5. John W. Fritch and Scott B. Mandernack, "The Emerging Reference Paradigm: A Vision of Reference Services in a Complex Information Environment," *Library Trends* 50, no. 2 (Fall 2001): 300.
6. Brenda Bailey-Hainer, "Virtual Reference: Alive and Well,"*Library Journal* 130, no. 1 (January 2005): 46–47.
7. Ibid.
8. Steve Coffman, *Going Live: Starting and Running a Virtual Reference Service* (Chicago: American Library Association, 2003); Jeanne Crisp, *LSTA Statewide Leadership Project Plan for 2004-2005: Collaborative Virtual Reference Pilot Projec*t, http://ncknows.org/ncvrplan04-05.pdf (accessed April 4, 2006).
9. John Suler, "The Psychology of Cyberspace: Psychological Dynamics of Online Synchronous Conversations in Text-Driven Environments," http://users.rider.edu/~suler/psycyber/texttalk.html (accessed April 13, 2006)
10. Bill Katz, "Digital Reference: An Overview," *The Reference Librarian*, nos. 79/80 (2002/2003): 1–17.
11. Joseph Janes and C. Hill, "Finger on the Pulse: Librarians Describe Evolving Reference Practice in an Increasingly Digital World," *Reference & User Services Quarterly* 42, no. 1 (Fall 2002): 54–65.
12. Ibid.
13. Joseph Janes, "Digital Reference: Reference Librarians' Experiences and Attitudes," *Journal of the American Society for Information Science and Technology* 53, no. 7 (2002): 549–66.
14. Ibid.
15. Wendy Diamond and Barbara Pease, "Digital Reference: A Case Study of Question Types in an Academic Library," *Reference Services Review* 29, no. 3 (2001): 217.
16. Janes, "Digital Reference."
17. Katz, "Digital Reference," 3.
18. William A. Katz. *Introduction to Reference Work,* Vol. 2, *Reference Services and Reference Processes,* 8th ed. (Boston: McGraw-Hill, 2002): 129.
19. Matthew R. Marsteller and Danianne Mizzy, "Exploring the Synchronous Digital Reference Interaction for Query Types, Question Negotiation, and Patron Response," *Internet Reference Services Quarterly* 8, nos. 1/2 (2003): 159.
20. David Ward, "Measuring the Completeness of Reference Transactions in Online Chats: Results of an Unobtrusive Study," *Reference & User Services Quarterly* 44, no. 1 (Fall 2004): 45–56; Marsteller and Mizzy, "Exploring the Synchronous Digital."
21. Ward, "Measuring the Completeness."
22. Ibid.
23. Anne G. Lipow, *The Virtual Reference Librarian's Handbook* (Berkeley: Library Solutions Press, 2003; New York: Neal Schuman), 151.
24. Barney G. Glaser and Anselm L. Strauss, *The Discovery of Grounded Theory: Strategies for Qualitative Research* (Chicago: Aldine, 1967).
25. NC*knows* librarian, e-mail to the author, Mar. 15, 2005.
26. NC*knows* librarian, e-mail to the author, Aug. 9, 2005.
27. Langdon Winner, *The Whale and the Reactor: A Search for Limits in an Age of High Technology* (Chicago: University of Chicago Press, 1989), 6.