

THE FLORIDA STATE UNIVERSITY
COLLEGE OF COMMUNICATION AND INFORMATION

CHAT REFERENCE AND LOCATION-BASED QUESTIONS:
A MULTI-METHOD EVALUATION OF A STATEWIDE
CHAT REFERENCE CONSORTIUM

By

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ABSTRACT

This dissertation addresses a lack of knowledge about chat reference and location-based questions and the implications of this lack of knowledge on chat reference consortia. Chat reference and location-based questions refers to the question-negotiation process in the chat mode of responding to users' location-based questions. In one statewide chat reference consortium, *Ask a Librarian*, users are able to pose questions to any information provider from 103 participating information agencies. In turn, any agency's information provider is able to respond to questions from any user. This situation creates a scenario whereby in order to respond to a location-based question, an information provider must determine the location or locations in the question to formulate a correct response. Additionally, because local information providers are closer in proximity and more familiar with a location or locations within his or her same county, he or she may provide a higher correct response fill rate to location-based questions than a non-local information providers. This study's methodology utilizes content analysis, quantitative analysis, focus groups, and unobtrusive testing to address research questions that explore the types of location-based questions, the question-negotiation process in the chat mode of responding to these questions, and the correct response fill rate of consortium information providers. Practical recommendations from this study include populating the consortium's knowledge base with local knowledge, especially information about participating information agencies. Findings indicate that chat consortia may overcome the potential weakness of location-based questions (i.e., referral, incorrect response) if participating information agencies improve their online dissemination of local knowledge related to frequently asked location-based questions.

CHAPTER 1

PROBLEM STATEMENT AND SIGNIFICANCE, STUDY'S PURPOSE, GOAL, AND OBJECTIVES, RESEARCH QUESTIONS, AND METHODOLOGY OVERVIEW

Problem statement and significance

The problem this study addresses is a lack of knowledge about chat reference and location-based questions and the implications of this lack of knowledge on chat reference consortia. Chat reference and location-based questions refer to the question-negotiation process in the chat mode of responding to users' location-based questions. Location-based questions include any question that concerns the attributes of a georeferenceable location or locations. Types of location-based questions may include directional or wayfinding questions (e.g., the question concerned the geospatial relation of locations, including waypoints and routes), and non-directional location-based questions (e.g., the question concerned with attributes of a location or locations, including a point of interest, such as a library and its circulation policies). Users faced with information gaps regarding a location or locations may query an information agency either face-to-face, on the phone, via e-mail, through chat, or by other means to obtain a correct response to their location-based questions.

Chat reference provides synchronous online communication between a user and an information provider via web-based chat reference software. In other words, chat reference permits real-time messaging between an information provider and user (Kawakimi, 2003; Radford, 2006). Chat reference serves as a similar venue to other modes of reference for question-negotiation between users and information providers. However, chat reference services differ from other modes of reference service in several ways—the creation of transaction artifacts, the potential for more rapid subject or location expert referrals than in other reference modes, and synchronous reference assistance regardless of distance between parties (Lankes, 2004a). The creation of transaction artifacts allows reference researchers to collect data from

reference transactions at levels of detail not possible with previous modes of synchronous reference and with anonymity for both the information provider and user (Lankes, 2004a).

The rapid emergence of chat reference service and its adoption among service providers did not simultaneously occur with increases in the evaluation of those chat reference services. In response to a lack of assessment, researchers developed measures and quality standards to enable chat reference service evaluation (McClure, Lankes, Gross, & Choltco-Devlin, 2002). In addition, researchers now encourage the study of reference services to move beyond individual case studies towards standards, practices, methodology, and findings that may advance the study of reference as a whole using chat reference research approaches (Lankes, 2004b; Pomerantz, 2005). Research on chat reference and location-based questions, utilizing an exploratory study approach influenced by existing chat reference research approaches and including underlying assumptions from relevant metatheories, may potentially provide new insights into the design, management, and evaluation of chat reference, especially chat reference consortia serving more diverse geographic areas than stand-alone chat services.

In a chat reference consortium, hereafter referred to as a chat consortium, a user may direct a question to any information provider in the chat consortium and any information provider in the consortium may respond to any user's question. This consortial condition potentially results in information providers responding to location-based questions that reference locations from a diverse geographic area. The geographic area referenced in the questions may fall outside the user's information agency's regular service area. Information providers may retrieve locations and attributes of locations contained in location-based questions through employing a variety of search strategies and by consulting a range of resources.

An information provider within the same county boundaries of at least one of the locations in a location-based question is considered to be local and an information provider outside the same county boundaries of all the locations in a location-based question is considered to be non-local. Although county boundaries may seem arbitrary, these boundaries have real world implications for governments to exercise control over others living within the boundaries, for example library users' service eligibility (Agnew, 2002). Previous researchers assumed that local information providers would have greater knowledge concerning the attributes of a location or locations within their same area than non-local information providers and that non-local

information providers would have difficulty locating that local knowledge, resulting in local information providers having a higher correct response fill rate than non-local information providers (Berry, Casado, & Dixon, 2003; Bishop & Torrence, 2007; Hyde & Tucker-Raymond, 2006; Kwon, 2007; Sears, 2001).

The possible implications stemming from a lack of knowledge about chat reference and location-based questions include unwarranted costs, increased search time for information providers and users, user dissatisfaction and increased complaints, lower chat consortia usage, reduction in chat consortia participating information agencies, administration and logistical problems, and incorrect responses. A greater understanding of chat reference and location-based questions could potentially improve the correct response fill rate to location-based questions in chat reference, generate more detailed research questions for further study, and explore the usefulness of the exploratory study approach.

The specifics of this study's purpose, goal, and objectives, research questions, a background of the statewide chat consortium studied, and this study's importance precede a review of existing chat reference research approaches, other underlying assumptions from relevant metatheories, and the exploratory study approach. Measuring chat reference and location-based questions, a methodology overview, the study's timeline, and a summary conclude Chapter 1.

Chapter 2 provides a literature review of reference service development and the emergence of chat reference and chat consortia, the evaluation of reference, challenges to georeferencing, and defining local knowledge. Chapter 3 provides an overview of the methodology created to explore location-based questions and chat reference. The appendices provide the data collection and data analysis protocols. Chapter 4 provides findings of all data collection efforts as they relate to this study's research questions. Chapter 5 provides an assessment of this study's assumptions, limitations, findings, methodology, and study approach, as well as recommendations and implications.

Study's purpose, goal, and objectives

The purpose of this exploratory study was to understand how information providers formulate responses to location-based questions and to determine the correct response fill rate to location-based questions in a statewide chat consortium. This research addresses the need for additional understanding of location-based questions. Existing literature discussed location-based questions as a potential challenge to chat consortia, due to the assumption that because a local information provider is closer in proximity and more familiar with the attributes of a location or locations near or within his or her information agency than a non-local information provider. The previous studies found varying percentages of location-based questions to total chat questions, ranging from 6.8% to 61%, and used differing qualifications for what constitutes a location-based question, from only those related to the library to an ill-defined surrounding geographic area (Berry, Casado, & Dixon, 2003; Bishop & Torrence, 2007; Hyde & Tucker-Raymond, 2006; Kwon, 2007; Sears, 2001). None of these previous studies, however, explored how information providers formulate responses to location-based questions or the correct response fill rate to location-based questions.

The goal of this study was to reduce a lack of understanding of chat reference and location-based questions in order to provide practical recommendations for how information providers at participating information agencies in chat consortia may mitigate the challenges of accurately responding to location-based questions. Objectives for this goal included:

1. Identify the types of location-based questions.
2. Explore how information providers formulate responses to location-based questions.
3. Evaluate the percentage of location-based question transcripts, in total and by type, of total question transcripts, the percentage of non-local information providers responding of location-based question transcripts to total location-based question transcripts responded to, and the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers.
4. Evaluate this study's assumptions.
5. Assess the usefulness of the exploratory study approach.
6. Provide practical recommendations to improve chat reference services.

The above objectives guided this study's research questions. Data collection and data analysis methodology developed for this study addressed these objectives. This exploratory study had no hypothesis, "a specified testable expectation about empirical reality that follows from a more general population" (Babbie, 2007, p. 44). Because only a few case studies have suggested that location-based questions in chat consortia constitute a possible weakness, and limited knowledge related to this topic beyond varying percentages of location-based questions of total chat questions exists in the literature, this exploratory study did not lend itself to stated hypotheses (Creswell, 2005). Instead, this exploratory study used the following research questions to address the study's objectives.

Research questions

This study's research questions addressed this study's objectives. Data collection and data analysis methodology developed to respond to the research questions and reduce a lack of knowledge about chat reference and location-based questions. The specific guiding questions are:

1. What are the types of location-based questions?
2. How do information providers negotiate location-based questions and formulate responses?
3. What is the percentage of location-based question transcripts, in total and by type, of total question transcripts?
4. What is the percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to?
5. What is the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers?

This study's research questions guided the development of this study's data collection and data analysis. Table 1.1 presents the relationship between the research questions of this study, methodology that addressed this study's research questions, and this study's objectives.

Table 1.1. Relationship between research questions, methodology, and the study objectives.

Research Questions	Research Methodology	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6
1. What are the types of location-based questions?	<i>Content analysis</i> <i>Focus groups</i>	X			X	X	X
2. How do information providers negotiate location-based questions and formulate responses?	<i>Content analysis</i> <i>Quantitative analysis</i> <i>Focus groups</i> <i>Unobtrusive testing</i>		X		X	X	X
3. What is the percentage of location-based question transcripts, in total and by type, of total question transcripts?	<i>Content analysis</i> <i>Quantitative analysis</i>				X	X	X
4. What is the percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to?	<i>Content analysis</i> <i>Quantitative analysis</i> <i>Unobtrusive testing</i>				X	X	X
5. What is the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers?	<i>Unobtrusive testing</i>				X	X	X

Background of the Florida Electronic Library’s Ask a Librarian

The background of the statewide chat consortium studied augments this study’s purpose, goal, objectives, importance, and potential benefits. The background includes a discussion of the consortium’s current chat software, but begins with a brief history of the consortium and chat reference service in Florida.

In 2002, the State Library and Archives of Florida, the College Center for Library Automation (CCLA), and the Tampa Bay Library Consortium (TBLC), received a federal Library Services and Technology Act (LSTA) grant to launch a pilot project of the State Library and Archives of Florida through the Florida Department of State to develop a statewide chat consortium (Sachs, 2004). Prior to the 2002 LSTA grant, many Florida public and university libraries had experimented with chat reference services, for example, multi-user object oriented environment (MOO) and NetAgent at University of Florida; ConferenceRoom Professional and

RightNow at University of South Florida; LiveHelper at University of Central Florida; 24/7 Reference at Florida International University and Broward Public Library; Real Live Helper and RealTimeAide at Gulf Coast Community College; LivePerson at St. Petersburg Community College; and Human Click at Largo Public Library (Colvin, 2003).

In 1997, the Florida Distance Learning Library Initiative (DLLI) funded the Florida Distance Learning Reference and Referral Center (RRC), an e-mail reference service to serve all 73 regionally accredited Florida colleges and universities (Bishop & Torrence, 2007). In 1999, the RRC began offering chat reference services; however, funding ended and the RRC closed in December of 2001. These library and legislative events created a group of academic and public libraries with expertise in operating a chat reference service and a pool of users expecting chat reference service.

In July of 2003, the Florida Electronic Library's (FEL) statewide chat reference service named *Ask a Librarian* launched using Docutek software by Sirsi Dynix. This service extended chat reference to all Florida residents. In the first full 12 month funding year of service, October 2003 to September 2004, the service received 8,942 questions and included 76 participating information agencies (Sachs, 2004). Participating information agencies refers to any information agency responsible for the operations of the *Ask a Librarian* service. During the most recent funding year, 2008-2009, the service received \$305,912 in funding. During that same time, the service received 38,365 questions. Therefore, the cost per question for that time, excluding all other operating costs for each agency (e.g., staffing), was nearly \$8. This cost reinforces the importance of correct responses. In October of 2008, the service included 100 participating information agencies—48 public library branches and systems, 29 public and private university and college libraries, 20 community college libraries, 1 school district, 1 museum, the State Library and Archives of Florida and the Florida Virtual School (*Ask a Librarian* Advisory, 2008). Data collected for content analysis from October and November 2008 of the service reflects this 2008 consortial composition. Data collected during unobtrusive testing, September and October 2009, included three additional participating public library systems that joined the consortium in 2009. Four more agencies joined in late October of 2009, after unobtrusive testing, with one more agency planning to join in November. The steady growth of this service, to 107

participating information agencies is depicted in Figure 1.1, and indicates the benefits of a chat consortium featured in Chapter 2.

Figure 1.1, created by this researcher based on statistics provided by the chat consortium manager of *Ask a Librarian* from 2003 to 2008, illustrates the increases in both the number of participating information agencies (i.e., the libraries, museum, and school district staffing the service) and questions received per participating information agency (D. Sachs-Silveira, personal communications, September 30, 2008, and October 26, 2009).

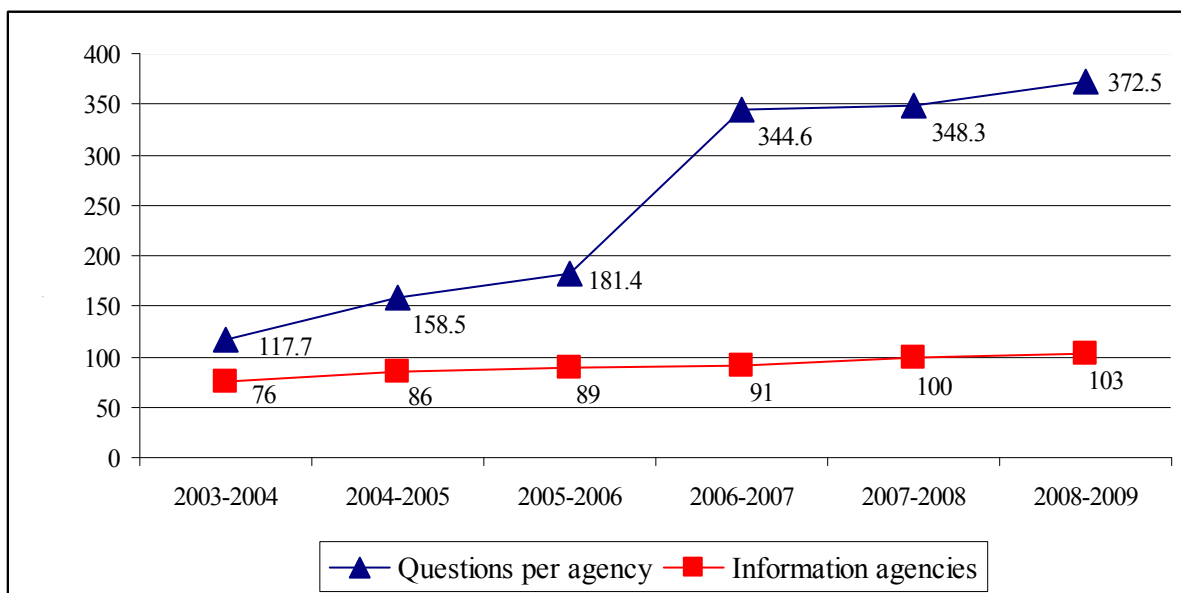


Figure 1.1. *Ask a Librarian* 2003-2008 number of participating information agencies and number of total questions received per participating information agency.

Reasons for the increase in questions may include the increase in number of participating information agencies and related increases in both website access points to the service and the throng of potential users. Other reasons may include an increased demand by Florida residents for responses to questions in a real-time messaging mode, an increase in Florida’s population, and the marketing efforts of *Ask a Librarian*, which include an annual student video contest to develop commercials for *Ask a Librarian*, numerous *Ask a Librarian* print and electronic promotional materials, and tchotchkes (D. Sachs-Silveira, personal communications, September

30, 2008). Reasons for the increase in participating information agencies may be due to the benefits of joining a chat consortium, which include increased hours of operation, centralized software purchasing and maintenance, the potential for more rapid subject or location expert referrals than in other reference modes, and the cost savings related to all three. Cost savings may be especially relevant as libraries have faced recent fiscal cuts at the state and local levels; for example, State funding for public libraries in Florida decreased 23.40 percent in 2009 (Kawakami, 2003; State Aid, 2008). The imminent threat of removal of all State Aid for public libraries continues to loom as “the Florida House and Senate adopted positions eliminating all funding for Florida’s State Aid to Public Libraries” (State Aid, 2010, para. 1). These fiscal realities, along with other benefits earlier enumerated, may be some of the reasons for the recent increase of participating information agencies to 107 (D. Sachs-Silveira, personal communications, October 26, 2009).

On October 1, 2008, *Ask a Librarian* implemented the software InstantService, as their new backend for the service (D. Sachs-Silveira, personal communication, September 30, 2008). The discussion of the new software includes features relevant to this study. The relevant features include the software’s triaging, the software’s data collection of questions and transcripts, and the software tool, knowledge base (KB), which provides participating information agencies the ability to share frequently asked questions (FAQs) about themselves with others staffing the service.

InstantService’s triaging reflects the assumption that local information providers retain knowledge concerning the attributes of a location or locations within their information agency by queuing user questions to an information provider where the user posted his or her question. If an information provider at the information agency is unavailable, rather than triaging to another information provider in geographic proximity to the information agency where the user posted his or her question, the user’s question queues to a similar information agency. For example, the software directs a community college student’s question to any available community college’s information provider if the student’s local community college information provider is unable to respond. Finally, if no local or similar institution’s information providers respond to the user’s question, the next available information provider from anywhere in the statewide chat consortium responds. Figure 1.2 illustrates the software’s triaging.

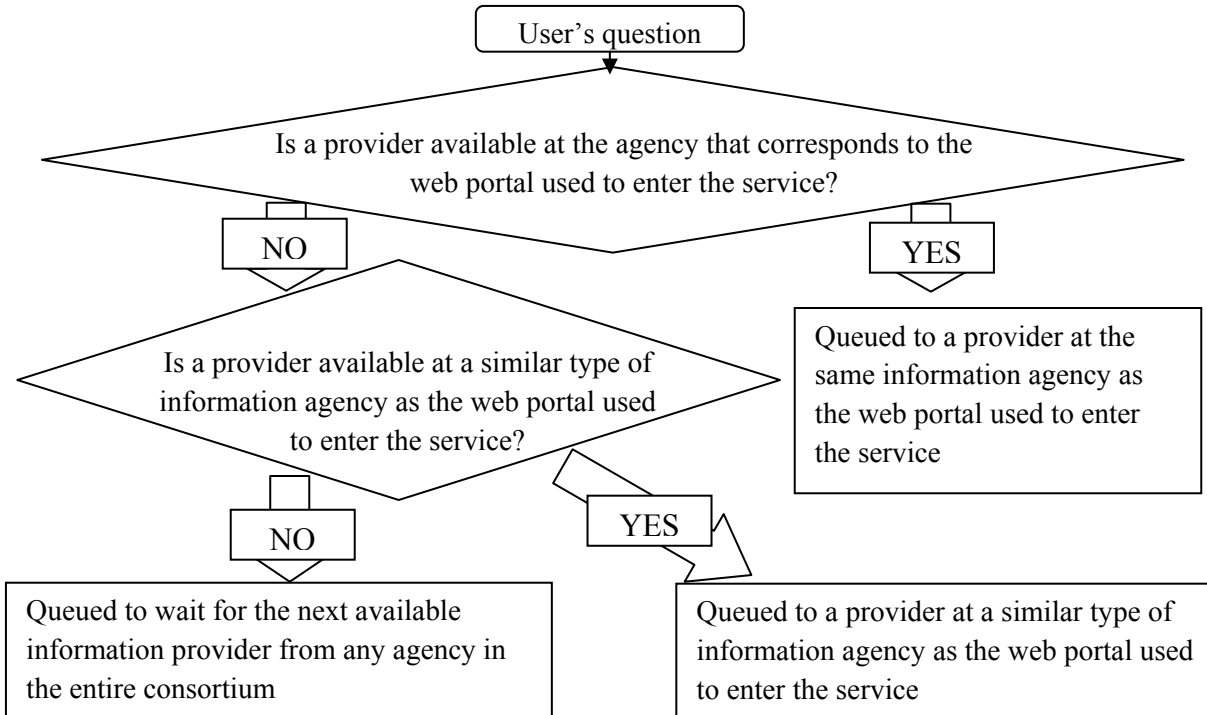


Figure 1.2. InstantService's triaging.

The service does not actively keep statistics on the number of questions queued to local information providers, similar institution information providers, or any other information provider (D. Sachs-Silveira, personal communication, September 30, 2008). A user may also enter through the service's home page and those users are sent to the next available information provider from any agency in the consortium.

The chat consortium manager of *Ask a Librarian* does collect total transactions received each month and discards the chat transcripts at the end of each month to protect the privacy of the service's users. For this exploratory study, the chat consortium manager made an exception and saved two months of chat transcripts—October and November 2008. The potential variables collected by the InstantService software for each chat transaction of the *Ask a Librarian* service include: customer ID, incident number, customer name (i.e. screen name), email address, Internet Protocol address, question, zip code, patron type, entry point, browser operating system, IP address (different format), and the chat transcript. The chat transcript data includes the

information provider, user (screen name), and the text entered by both participants, as well as the date and time of each sent message, and the log in and log off times for the chat transaction.

The user optionally populates the screen name, zip code, question, email address, and patron type fields. Therefore, not all chat transcripts contain all data variables. The user may present their question later in the transaction, if not in the question field. The chat transcripts identify the information provider by screen name and from this data, the information provider's location may be determined either by self-disclosure in the chat transcript, as per *Ask a Librarian* training, or if necessary using the chat consortium manager's master list of information providers, which contains the screen names and employing participating information agency for each information provider.

The methodology of this exploratory study used the variable of the question field; the communication within the chat transcript; and the information provider's place of employment to determine whether a question was location-based or not, to determine the location or locations in location-based questions, and to find the information provider's location. The entry point variable may indicate users' local information agencies, but does not necessarily indicate the locations in their location-based questions (e.g., a user may access the service through one library's web portal, but have questions concerning another library) (D. Sachs-Silveira, personal communication, December 1, 2008).

A transcript exported as a hypertext media file from InstantService software contained the communication within the transcript and the information provider variables needed for this study, but did not include the original question field. To obtain the question field for content analysis, the researcher had to conduct a separate export of a tab-delimited file that contained the question field and a customer ID to link each question with the corresponding transcript. The researcher copied and pasted the transcript from the hypertext media file into a Microsoft Word document for analysis, then copied and pasted the question field from the tab-delimited file into the customer ID field of the Microsoft Word document. An example transcript from this study used in content analysis, created from these two exports is provided in Figure 1.3, with user screen name and information provider anonymized. This transcript includes all variables required for this study's content analysis—a question field, communication within the chat transcript, and

the information provider's place of employment, which is either disclosed within the transcript or determined by a list of all providers.

CustomerID:	65605729 User: Does the library have newspaper obituaries from 1982?
Department:	Collaborative Desk
CSR Name:	Information Provider (Participating Agency) [IP Screen name]
Transcript:	<p>Log Started Wed Oct 08 11:47:20 PDT 2008</p> <p>[11:47:38] You have been connected to IP Screen name.</p> <p>[11:47:46] IP Screen name: Greetings. My name is IP Screen name and I will be working with you today. Please give me a few seconds to review your request.</p> <p>[11:49:36] IP Screen name: I see you are in Broward county. I used to live in Pembroke Pines. Are you interested in an Obituary from the Broward County area?</p> <p>[11:49:57] User: Yes, I'm looking for my great-grandmother's obit</p> <p>[11:50:03] User: she died 2 March 1982</p> <p>[11:50:27] User: in Broward County - I suspect Hollywood</p> <p>[11:51:54] IP Screen name: Please give me a few minutes to review the libraries databases.</p> <p>[...]</p> <p>[11:58:16] IP Screen name: You may want to call first to see if they have March 1982 of the Sun Sentinel on microfiche</p> <p>[11:58:24] IP Screen name: You are very welcome!</p> <p>[11:58:26] User: ok I will call</p> <p>[11:58:30] User: have a good day</p> <p>[11:58:33] User: bye</p> <p>[11:58:34] IP Screen name: It has been my pleasure to assist you today. I hope I have been able to help you. Have a great day!</p> <p>[--- end of transcript as seen by customer ---]</p> <p>[11:58:46] The customer has ended the chat session.</p> <p>[11:58:46] User has left the session.</p> <p>[11:59:29] IP Screen name has left the session.</p> <p>Log Ended Wed Oct 08 11:59:29 PDT 2008</p>

Figure 1.3. Sample InstantService chat transcript.

Another feature of the software relevant to this study's recommendations is the knowledge base (KB) that allows participating information providers to populate a database with FAQs. For example, the FAQs could include links to circulation policies or text explaining other

issues specific to any participating information agency. The benefit of this feature is that it may provide a resource with quick responses for non-local information providers to cut and paste directly from a provider's console while staffing the chat reference service. A weakness of this feature is encouraging participating agencies to populate the KB. Some information providers do not populate the KB. Also, maintaining the KB with up-to-date data is an ongoing issue. Information providers believe the FAQ data on their websites adequately provides that data for users and non-local information providers (D. Sachs-Silveira, personal communications, October 26, 2009). Figure 1.4 illustrates the KB within the information provider's console. Sample fields in the entry in Figure 1.4 include links to information including the library website's homepage, physical location, contact information, online public access catalog (OPAC), circulation policies, printing policy, password problems, dummy login information, local genealogy resources, and so forth, with the flexibility to add a field related to anything the information agency wishes to include.

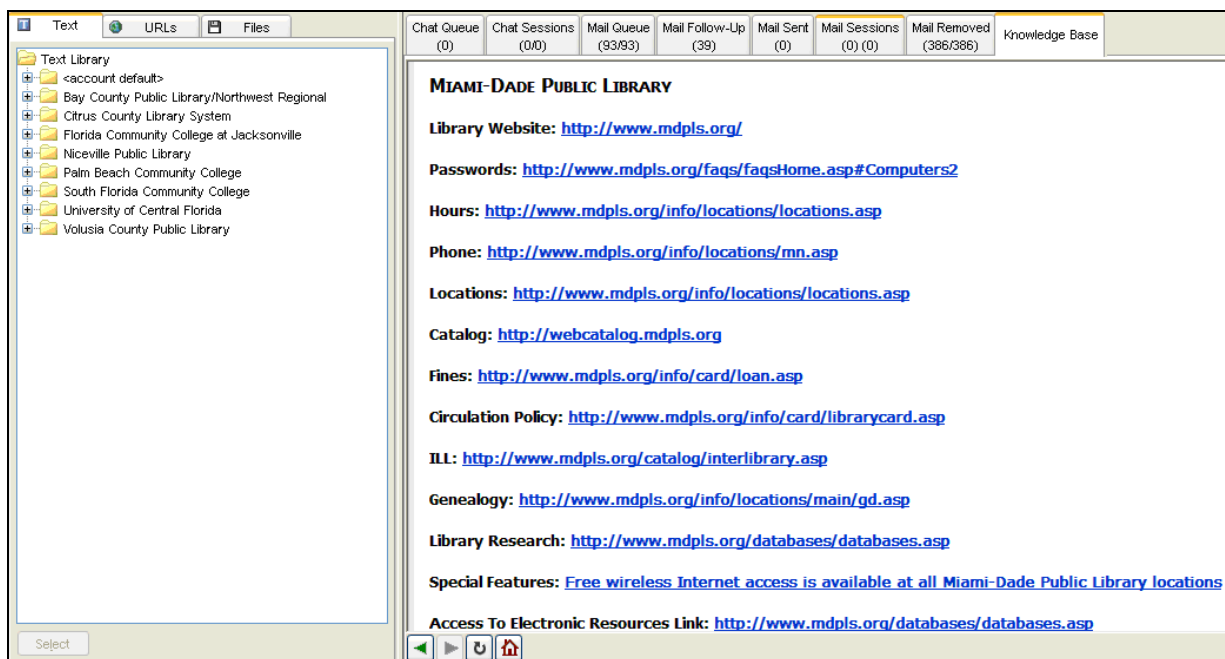


Figure 1.4. Sample entry in InstantService's knowledge base.

Study's importance

This research is important in that it builds upon existing literature and contributes findings, practical recommendations, and implications that may allow for a higher quality of service in chat consortia in overcoming the weakness of location-based questions. Also the addition of the revised study approach to research chat reference and location-based questions reflects the importance of this study. The increases in both chat reference questions and participating information agencies in FEL's *Ask a Librarian* fall beyond the scope of this study. However, the growth of this statewide chat consortium, as well as similar growth in several other regional and national chat consortia, serves to reinforce the importance of reducing a lack of knowledge about chat reference and location-based questions because as more information agencies join consortia, each consortium serves an increasingly diverse geographic area (Nilsen & Ross, 2006; Sloan, 2004).

For chat consortia managers, participating information agency administrators, information providers, and users of regional and national chat consortia services, a better understanding of chat reference and location-based questions and their implications could potentially help information providers negotiate location-based questions and improve the correct response fill rate to location-based questions in chat consortia. A higher quality of service in chat consortia could also result from the study of how location matters in reference services across diverse geographic areas.

In addition, the study's importance includes the development of a revised study approach discussed in Chapter 5. The revised study approach may help chat reference researchers to incorporate location into digital reference research. To address this study's purpose, goal, and objectives in a systematic way, the following discussion explores existing digital reference research approaches and how they influenced the research reported here.

Existing approaches to digital reference research

To encourage systematic use of evaluation approaches and promote the progress of digital reference research, which includes any digital form of question-negotiation, and services

beyond the research offered in case studies, Lankes (2004b) and Pomerantz (2005) develop approaches to guide digital reference research and for describing the chat reference process. These approaches give digital reference research a framework to organize methodology and findings as the quantity and quality of digital reference research increases. Lankes (2004b) combines question components and assumptions into an approach that allows different communities to view digital reference through different lenses. Lankes' (2004b) metaphor approach differs from Pomerantz's (2005) process model approach, in that the metaphor approach allows methodology, systems, research questions, models, and studies to be derived and compared without considering the exact steps in the reference service process.

Lankes (2004b) builds his metaphor on two assumptions—the necessity of human expertise and information systems and that digital reference provides a unique set of inquiries. Lankes justifies the first assumption by invoking the concept of tacit knowledge held by humans and validates the second assumption by providing examples of digital reference's uniqueness compared to other reference services—this study's exploratory and revised study approaches adopt both assumptions. In addition, Lankes' metaphor approach builds upon question components, which include human expertise, efficiency and effectiveness, information systems, and questions and responses. Lankes' question components of overall digital reference research guide researchers and allow them to explore combinations of question components to address new research questions.

For this study's purpose, goal, and objectives, the question components of the chat reference and location-based questions include the efficiency and effectiveness of responding to location-based questions (e.g., correct response fill rate), the expertise required to locate correct responses to location-based questions (e.g., knowledge of the location or locations and their attributes and how to locate that knowledge), the information systems involved in the question-negotiation process (e.g., resources consulted), the types of location-based questions (e.g. non-directional, library), and the types of responses (e.g., correct response). These question components influence the exploratory and revised study approaches in terms of data collection and data analysis to address this study's research questions. Figure 1.5 displays Lankes' approach.

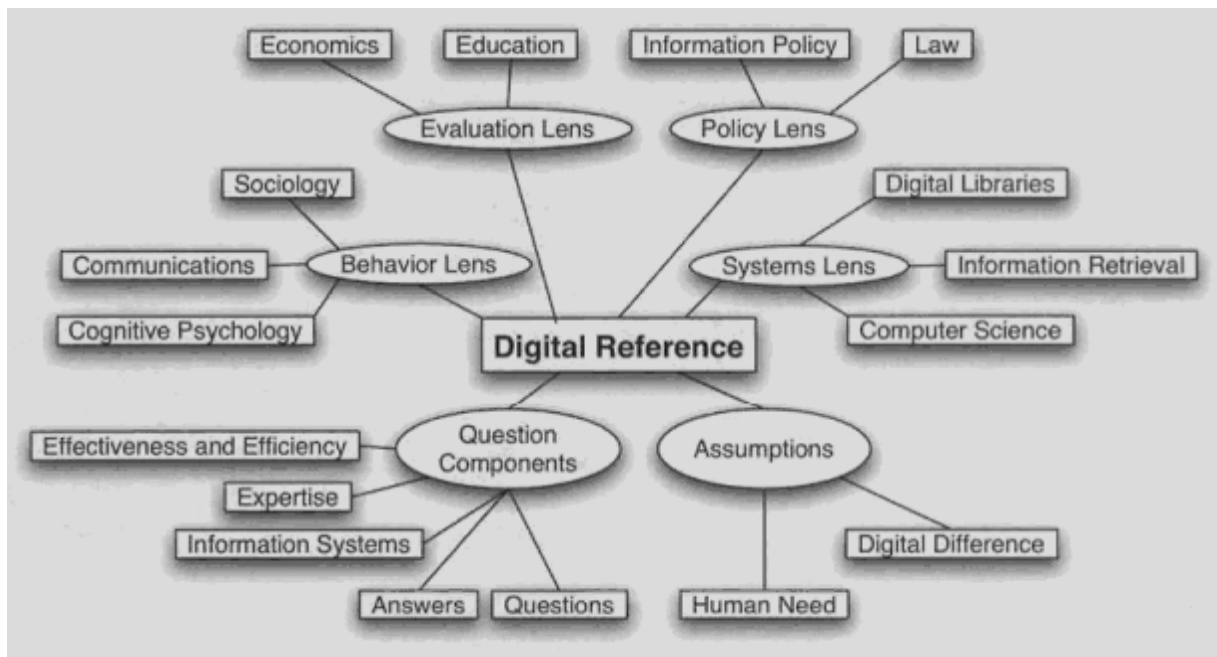


Figure 1.5. Lankes' general digital reference approach (Lankes, 2004b, p. 309).

Pomerantz (2005) points to limitations in Lankes' approach for the practical implementation of day-to-day reference operations. As a result, Pomerantz creates an approach focused on the process of chat reference. This approach details the processes of chat reference, including the user's choice and use of chat, queuing, the reference transaction, and the archiving of chat transcripts. Each step in the process allows for different types of research to improve the effectiveness and efficiency of the chat service. In that respect, Pomerantz's approach places Lankes' question components into various steps in the chat reference process (2004b).

Pomerantz's (2005) approach includes question submission, expert selection, question-negotiation, searching resources, and archiving. The process starts with question submission, at which time the user decides to use the service, submits a question or questions, and waits in a queue. Next, during expert selection, an information provider selects a user's request from the queue based on his or her ability to provide a correct response or refers the request to another, more appropriate expert. In this study's software, the expert selection occurs without information provider input, as the question is first triaged to the local information provider corresponding to the web portal used to enter the service, then a similar institution information provider, and finally any available information provider. After expert selection, question-negotiation and

searching resources occurs. Question-negotiation includes the request and response portion of the chat transaction, while searching resources includes the steps the information provider takes to formulate a response to a user’s request. After the chat transaction concludes, archiving occurs if the chat reference service chooses to do so. Archiving chat transcripts may be done for other purposes, such as evaluation. Figure 1.6 summarizes Pomerantz’s process approach, whereby the process begins with the user’s question submission and ends with archiving of transcripts.

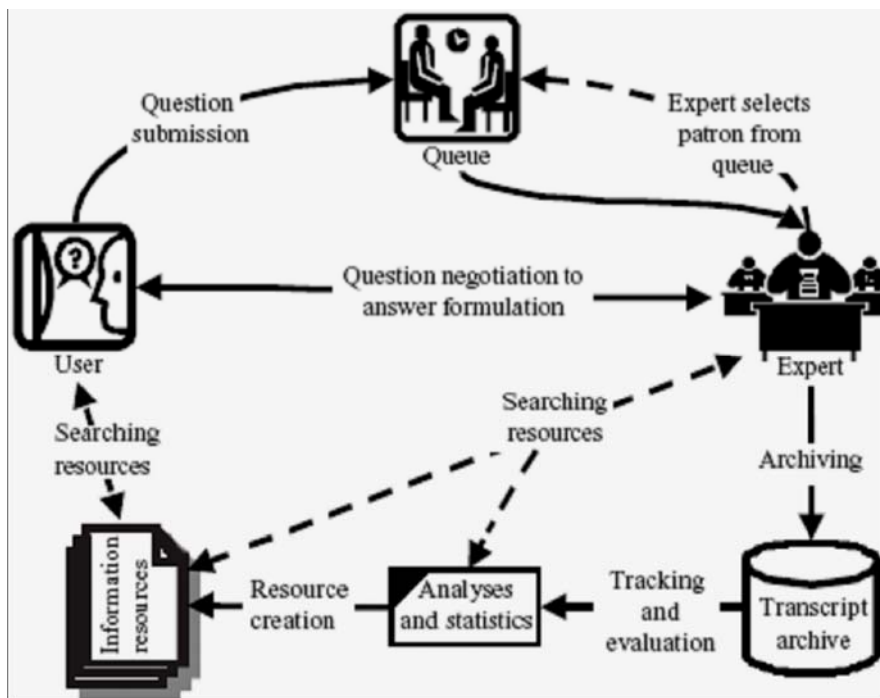


Figure 1.6. Pomerantz’s process approach of chat-based virtual reference (Pomerantz, 2005, p. 1299).

Pomerantz’s approach is beneficial as it allows researchers to parse out the technical components of the chat reference transaction in order to improve the service. Issues related to chat reference and location-based questions could occur in all steps; therefore, the exploratory study approach utilizes Pomerantz’s approach to identify key variables where geospatial data (i.e., geography) may occur in the chat reference process relating to the information provider (i.e., expert), the user, and the user’s question (Mon, Bishop, McClure, McGilvray, Most, Milas, & Snead, 2007).

Due to this study's definition of a location-based question as any question that concerns the attributes of a georeferenceable location or locations, this exploratory study focuses on georeferencing the location or locations in location-based questions. In addition, this exploratory study requires georeferencing the information providers' locations to determine whether they are local or non-local to the location or locations in a location-based question. Therefore, this study only requires georeferencing of the user's question and the information provider's location although other key variables in Pomerantz's approach contain geospatial data.

Georeferencing means "relating information to a geographic location," or in other words, the process of indexing information to actual spaces on Earth (Hill, 2006, p. 1). This study's chat consortium's software collects the locations explicitly mentioned in a location-based question (question or chat transaction) and the locations of information providers. In this exploratory study, the researcher assumed that information providers in this chat consortium negotiate questions either inside their information agencies' structures or at locations within the same political boundaries as their information agencies' structures. Each chat transcript contains data on the responding information provider, from which the researcher may infer each information provider's location based on their employing participating information agency's physical address. For the georeferenceable location or locations in location-based questions, the researcher may determine their geospatial data as the information describing the location and attributes of things inside the location-based questions (Wade & Sommer, 2006.). The term geospatial data limits location-based questions to earthbound locations and excludes locations inside virtual worlds and the remainder of space beyond Earth. Locations may be georeferenced as single points (e.g., latitude and longitude of a library), by polygons (e.g., the bounding coordinates of a county boundary), or lines (e.g., road or river).

Other relevant underlying assumptions

Other relevant underlying assumptions implicit in the exploratory and revised study approaches, but not integrated explicitly, include Tobler's First Law of Geography (TFL) and Dervin's Sense-Making (Dervin, 1983; Tobler, 1970). Relating the assumptions derived from

TFL and Sense-Making to the exploratory and revised study approaches requires the exploration of their definitions as they relate to chat reference and location-based questions.

In the publication, *A Computer Movie Simulating Urban Growth in the Detroit Region*, Tobler invoked the First Law of Geography: “everything is related to everything else, but near things are more related than distant things” (1970, p. 236). For analysis in this study, this assumption will be separated into its two components—“everything is related to everything else” and “near things are more related than distant things.” The assumption that everything is related to everything is an ongoing philosophical debate (Sui, 2004). One view of geographers is that “seemingly small, insignificant actions of a single person may have ripple effects and chain reactions that produce dramatically different outcomes,” which exemplifies the assumption that everything is related to everything, for example, the metaphor of the butterfly effect (Phillips, 2004, p. 291).

Although the exploratory and revised study approaches adopt both components of TFL’s assumption, the second component more directly influences the study approaches. In Geographic Information Science, the second portion of TFL, “near things are more related than distant things,” is useful because many processes build on the assumption that one can by “inferring complete surfaces from a finite set of distributed measurements succeed in providing reasonably useful estimates” to accurately describe an area (Goodchild, 2004, p. 301). The simplest example of the second component of TFL in action is predicting the weather in one space and time by taking measurements in spaces and times around that space. Using interpolation techniques, researchers take samples and estimate the distribution from those samples across continuous space where it is costly or impossible to collect data (e.g., ocean temperatures).

For this study, the researcher views the law as useful because of the study’s assumption that local information providers retain knowledge concerning the attributes of a location or locations near or within their information agency that non-local information providers lack. Therefore, with location-based questions, a local information provider may generate a response based on knowledge concerning the attributes of a location or locations near or within their information agency at a higher correct response fill rate than a non-local information provider. A correct response to the location-based question “Where is the bathroom?” requires that the information provider know the location and its attributes.

In face-to-face reference services, information providers assume the location in location-based questions and may not need to ask location-clarifying questions. For example, the directional location-based question “Where is the bathroom?” does not require the face-to-face information provider to ask the clarifying question “Do you mean the nearest bathroom to where we are located right now?” Still another example, the non-directional location-based question “How long may I check out DVDs?” does not require the face-to-face information provider to ask the clarifying question “Do you mean in the library that we are in now?” The information provider and user both assume that the location-based question concerns the location or locations they both currently occupy.

In chat reference, however, information providers and users do not necessarily have knowledge of the other’s location or the location or locations in the users’ location-based question. The information provider may not have access to the geographic context of the location or locations in the user’s location-based question until after question-negotiation begins. This exploratory study assumed local information providers have local knowledge concerning the attributes of a location or locations near or within their information agency, which non-local information providers lack or would have difficulty locating. For this study, the TFL assumption as adopted suggests that local information providers have more knowledge to accurately respond to location-based questions within their same county than non-local information providers because the idea that “near things are more related than distant things” extends to local knowledge of information providers (Tobler, 1970, p. 236).

This distortion of TFL’s second component begins to resemble some aspects of Dervin’s Sense-Making. Sense-Making provides a metaphor for the human cognitive process that occurs when faced with an information gap. The Sense-Making metaphor of a human’s cognitive process includes where a person has been (e.g., experiences), where the person is (e.g. his or her current information gap), and where a person is going (e.g., consequences) (Dervin, 1983). The philosophical assumptions underlying the Sense-Making model include (Dervin, Foreman, & Lauterbach, 2003):

1. Both humans and reality are sometimes orderly and sometimes chaotic;
2. There is a human need to create meaning, and knowledge is something that always is sought in mediation and contest; and

3. There are human differences in experience and observation.

Although these three assumptions will not appear explicitly in the exploratory or revised study approaches, the approaches adopt these assumptions as they relate to location-based questions and the question-negotiation of those questions in chat reference. Location-based questions or location-based information gaps require knowledge related to the location or locations in a user's location-based question in order to provide a correct response. The question-negotiation process to reach a correct response to a location-based question most likely includes discovering the location or locations, which is the geographic context of the question. Determining the location or locations required to bridge the information gap of the user may require the information provider to learn where the user has come from (e.g., a library's website), his or her current direction (e.g., posting a question to *Ask a Librarian*), and where the user intends to go (e.g., locating his or her local library's hours of operation). These Sense-Making assumptions and locations in the cognitive process and other assumptions derived from TFL influence the exploratory and revised study approaches, but do not appear explicitly.

From a review of the library and information studies literature, no existing theories, models, or conceptual frameworks provided an ideal approach to this exploratory study (Case, 2007; Fisher, Erdelez, & McKechnie, 2005; Raber, 2003). The lack of an approach that incorporates location is, in part, the reason that this study is designed to be exploratory. The exploratory study approach used is based on existing digital reference approaches and underlying assumptions from relevant metatheories. The revised exploratory study approach discussed in Chapter 5 builds on these same existing digital reference approaches and underlying assumptions from relevant metatheories.

Exploratory study approach

Influenced by existing digital reference research approaches by Lankes (2004b), Pomerantz (2005), and underlying assumptions from relevant metatheories, the exploratory study approach adopts the five explicit assumptions below (Dervin, 2003; Tobler, 1970):

1. Everything is related.
2. Near things are more related than distant things.

3. Both humans and reality are sometimes orderly and sometimes chaotic.
4. There is a human need to create meaning, and knowledge is something that always is sought in mediation and contest.
5. There are human differences in experience and observation.

A summarization of these five assumptions for this study reads—for a location-based question, an information provider must determine the location or locations in the question to formulate a correct response, and because a local information provider is closer in proximity and more familiar to a location or locations within his or her same county, a local information provider provides a higher correct response fill rate to location-based questions than non-local information providers. Table 1.2 below depicts this study's variables' definitions and their relationships. Three of the variables, numbered in Table 1.2, result from Reference and User Services Association (RUSA) published guidelines for Behavioral Performance of Reference and Information Service Providers for use in training, development, and evaluation of reference services (Reference and User, 2004). The remaining variables, although defined elsewhere in the literature, are used somewhat differently in this study. Therefore, this exploratory study provided its own definitions of variables in Table 1.2.

Table 1.2.: Definitions and relationships of this study's variables.

Variable	Property of variable	Relationships
User	asks a question to <i>Ask a Librarian</i>	seeks a correct response from an information provider to his or her question, he or she lies outside the scope of this study
Other questions	do not concern the attributes of a georeferenceable location or locations	a user asks, an information provider responds, they lie outside the scope of this study
Location-based questions	concern the attributes of a georeferenceable location or locations	a user asks, an information provider responds, the question concern the attributes of a location or locations, the question has a correct response; an input to question-negotiation in this study required to provide a correct response
Location or locations	explicitly mentioned in a question and georeferenceable to a latitude and longitude, a line, or bounding coordinates on Earth	
Local information provider	information provider within the same county as any location in a location-based question	seeks a correct response to a user's location-based question
Non-local information provider	information provider not within the same county as any locations in a location-based question	seeks a correct response to a user's location-based question
Clarifying questions	3.8: Uses closed and/or clarifying questions to refine the search query (Reference, 2004).	used by information providers to negotiate questions; a potential input to question-negotiation in this study
Resources	4.9: Offers detailed search paths (including complete URLs), and names of resources used to find the answer so that patrons can learn to answer similar questions on their own (Reference, 2004).	used by information providers to negotiate questions; a potential input to question-negotiation in this study
Correct response (complete and incomplete)	the correct response to a location-based question (determined to be representative of the typical questions in chat reference by a panel of peer chat reference information providers) a complete response also contains a resource, usually an URL to the source of the response(s) and an incomplete correct response does not	sought by users and information providers to location-based questions: a potential output of question-negotiation in this study
Incorrect response	the incorrect response to a location-based question (determined to be representative of the typical questions in chat reference by a panel of peer chat reference information providers)	not sought after by users and information providers to location-based questions; a potential output of question-negotiation in this study
Non-response	No response from the information provider for technical or other reasons	a potential output of question-negotiation in this study
Referral	5.7: Refers the patrons to other institutions when the query cannot be answered to the satisfaction of the patron (Reference, 2004).	An option for information providers; a potential output of question-negotiation in this study

A graphic representation of the exploratory study approach appears in Figure 1.7.

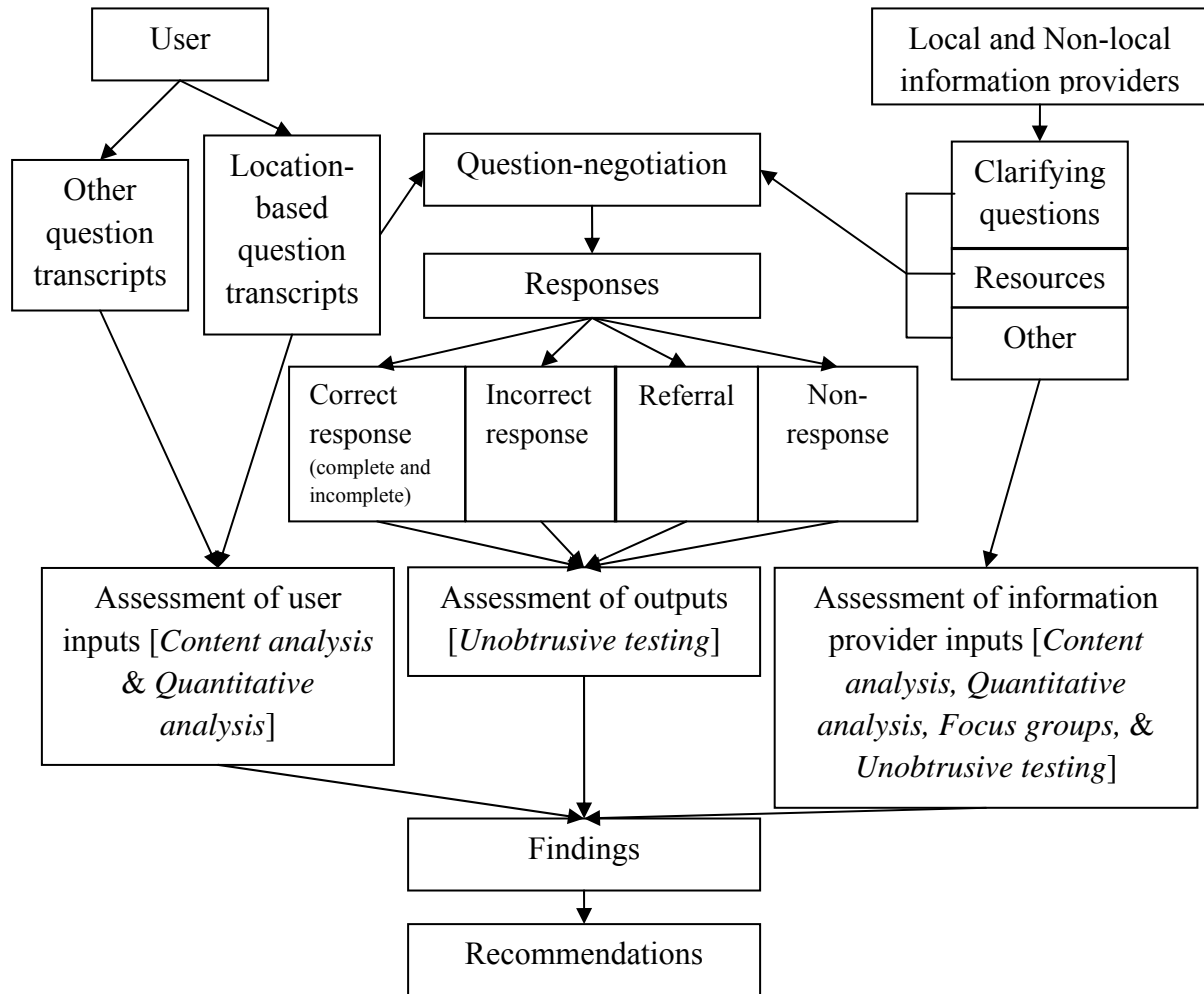


Figure 1.7. Exploratory study approach.

Figure 1.7 begins with users' and information providers' question-negotiation elements, which are inputs in the exploratory study approach. The user seeks a correct response from an information provider to his or her submitted question and the information provider seeks a correct response to a user's question in order to provide a response. The user inputs questions to the service, which may be location-based questions or other questions. The information provider, either local or non-local to the location or locations in a user's location-based question, inputs

clarifying questions, and resources used to formulate a response. After question-negotiation between the user and information provider, one of five potential responses to a user's location-based question occurs and the different responses are incorporated as outputs into this approach. The five potential responses to location-based questions include a correct and complete response, a correct and incomplete response, an incorrect response, a referral, or a non-response.

Assessment occurs of the user inputs, the information provider inputs, and the question-negotiation outputs. The assessment of the user inputs includes identifying both other and location-based question transcripts. The researcher uses other question transcripts to evaluate the percentage of location-based question transcripts, in total and by type, of total question transcripts. In the assessment of user inputs, the researcher uses location-based question transcripts to identify the types of location-based questions. The assessment of the user inputs occurs in content analysis and quantitative analysis.

To assess the information provider inputs, the researcher determines how information providers formulate responses to location-based questions introduced by aforementioned input transcripts. To evaluate the percentage of location-based question transcripts responded to by non-local information providers compared to total location-based question transcripts responded to, assessment of information provider inputs is required to determine the number of local information providers. The assessment of the information provider inputs occurs via content analysis, quantitative analysis, focus groups, and unobtrusive testing. The assessment of the question-negotiation outputs includes analysis of the correct response fill rate of information providers' responses to location-based questions, in total and by type, for both local and non-local information providers.

After the assessments of user inputs, information provider inputs, and question-negotiation outputs, the approach leads to findings. The findings influence the study's outcomes, which include the following—a revised study approach, a discussion to address the study's assumptions, and a set of practical recommendations and implications to help mitigate the potential weakness of location-based questions for chat consortium managers, participating information agency administrators, information providers, users of chat reference, and chat software developers, as well as new research questions for researchers, discussed in Chapter 5.

Assessment results, recommendations, and implications will help to address this study's purpose, goal, and objectives.

Measuring chat reference and location-based questions

Possible means of measuring chat reference and location-based questions include identifying the types of location-based questions, exploring how information providers formulate responses to location-based questions, evaluating the percentage of location-based question transcripts, in total and by type, of total question transcripts, and the percentage of non-local information providers responding to location-based question transcripts compared to total location-based question transcripts responded to, and the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers. Data collection and data analysis of content analysis, focus groups, and unobtrusive testing qualitatively informs the study regarding:

- Types of location-based questions, and
- How information providers formulate responses to location-based questions.

Measures of percentage and accuracy from quantitative analysis and unobtrusive testing provide quantitative data on:

- The percentage of location-based question transcripts of total question transcripts, in total and by type,
- The percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to, and
- The correct response fill rate of information providers' responses to location-based questions, in total and by type, for both local and non-local information providers.

The four research methods used in this exploratory study provide two perspectives on chat reference and location-based questions:

1. Information providers.
2. A proxy user.

This study employs data collection and data analysis to provide quantitative and qualitative data from both perspectives.

Methodology overview

The study includes four methods to explore chat reference and location-based questions—content analysis, quantitative analysis, focus groups, and unobtrusive testing. The four methods provide the potential perspectives of both information providers and a proxy user on chat reference and location-based questions.

1. Content analysis – “the study of recorded human communications” (Babbie, 2007, p. 320). In this study, content analysis provided the qualitative data used to determine the types of location-based questions and how information providers formulate responses to location-based questions. Findings from the content analysis influenced the questions used in the focus groups and unobtrusive testing, as well as this study’s recommendations.
2. Quantitative analysis – “techniques by which researchers convert data to a numerical form” (Babbie, 2007, p. 405). Quantitative analysis provided quantitative measures: the percentages of location-based question transcripts, in total and by type, in a chat consortium of total question transcripts and the location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to. Findings were used to develop the questions used in the focus groups and unobtrusive testing, as well as this study’s recommendations.
3. Focus groups – “people are brought together in a room to engage in a guided discussion on some topic” (Babbie, 2007, p. 308). “Typically such a discussion starts broadly and then narrows to focus more specifically on the topic being studied” (Matthews, 2007, p. 54). Focus groups provided qualitative measures of the types of location-based questions and how information providers formulate responses to location-based questions. Findings from focus groups were used to develop questions used in unobtrusive testing as well as this study’s recommendations.

4. Unobtrusive testing – “the administration by proxies of predetermined questions derived from actual reference questions and approved by a panel of information providers as typical and reasonable questions with fixed correct responses to information providers unaware of the testing” (Matthews, 2007, p. 171). Unobtrusive testing provided quantitative measures from a proxy user’s perspective, on the accuracy of responses to location-based questions, in total and by type, for both local and non-local information providers and the location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to. In addition, the unobtrusive testing provided qualitative data on how information providers formulate responses to location-based questions.

Unobtrusive testing findings were used to develop this study’s recommendations.

Recommendations to chat consortium managers, participating information agency administrators, information providers, and users of chat reference, as well as chat software developers and researchers, follow findings in this study. Details about the methodology can be found in Chapter 3.

Study’s timeline

Study procedures included planning and instrument development, data collection, and data analysis. Step 1 was the planning and instrument development of this study, including scheduling, creating and pre-testing protocols for content analysis and quantitative analysis with chat reference experts. Florida State University’s College of Communication and Information employed at the time of the study, at least five faculty members with scholarly publications related to chat reference, including Gary Burnett, Melissa Gross, Michelle Kazmer, Charles R. McClure, and Lorri Mon (Gross, 2002; Kazmer, Burnett, & Dickey, 2007; McClure, Lankes, Gross, & Choltco-Devlin, 2002; Mon, 2006). For this study, the researcher considered one chat reference scholarly publication and a Doctorate of Philosophy adequate qualifications to analyze this study’s data collection and data analysis protocols. During Step 1, the researcher passed the prospectus defense and submitted an IRB application for this study based on preliminary versions of the data collection instruments.

Step 2 initiated data collection and data analysis, which began with content analysis of chat transcripts. Content analysis included a review of chat transcripts from the two months collected from *Ask a Librarian*, October 2008 and November 2008. For privacy purposes, *Ask a Librarian* did not retain chat reference chat transcripts prior to October 2008. Step 2 continued with categorizing the types of location-based questions and ascertaining how information providers formulate responses to location-based questions. After content analysis, quantitative analysis of the content analysis findings provided quantitative data for the calculations of percentages of location-based question transcripts of total question transcripts, in total and by type, and location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to.

Step 2 continued with focus groups. The researcher did not modify the Step 1 focus group protocol based on content analysis and quantitative analysis findings, as the broad questions still were applicable for the exploratory study. The researcher conducted and recorded the pre-scheduled focus groups from Step 1 in Step 2. Content analysis of the recordings of focus groups illuminated trends from the perspective of information providers on the types of location-based questions and how information providers formulate responses to location-based questions, which are discussed in Chapter 4. Data analysis of focus groups influenced the final data collection method—unobtrusive testing.

Step 2 concluded with unobtrusive testing. Unobtrusive testing included developing and pre-testing typical and reasonable location-based questions derived from content analysis and quantitative analysis with a panel of *Ask a Librarian* information providers to ensure their representativeness of typical chat reference questions. Unobtrusive testing also included administering unobtrusive testing questions to a random sample of participating information agencies' information providers in *Ask a Librarian* at selected times, and saving the chat transcripts for data analysis. Unobtrusive testing concluded with calculating the correct response fill rate of location-based questions, in total and by type, as well as analyzing testing transcripts for trends in how information providers formulate responses to location-based questions.

Step 3 included the remaining data analysis and preparation of this dissertation. The data analysis included providing practical recommendations based on the methodology to improve information providers' ability to correctly respond to location-based questions and to reduce

barriers to participating information agencies in chat consortia in locating other participating information agencies' local knowledge. In addition, further data analysis provided recommendations to help chat software developers and chat consortia managers mitigate some of the challenges and provided researchers with future research questions to explore chat reference and location-based questions. Table 1.3 describes this study's timeline.

Table 1.3: Study's timeline.

Study's Timeline		
Step 1: Planning and instrument development (Month 1-2)	Step 2: Data collection and data analysis (Months 3 – 7)	Step 3: Further data analysis and dissertation preparation (Months 8 – 9)
Successfully defended prospectus (1)	Data collection of chat transcripts; Cleaned data and removed unusable transcripts (3)	Completed any necessary further data analysis of the four methods (8)
Submitted IRB application (1)	Conducted content analysis and quantitative analysis of usable chat transcripts (3 - 4)	Determined findings for research questions based on this multi-method approach and wrote findings, recommendations, future research, and conclusion sections of dissertation (8-9)
Pre-tested all study protocols with chat reference experts (2)	Conducted focus group data collection and data analysis; Developed unobtrusive testing questions and consulted a panel of information providers to ensure the questions are typical and reasonable (5 - 6)	Successfully defended dissertation (in Spring 2010)
Scheduled data collection of chat transcripts and focus groups (2)	Conducted unobtrusive testing data collection and data analysis (7)	Completed all required College of Communication and Information and Florida State University paperwork (in Spring 2010)

Study's benefits

The purpose of this exploratory study was to understand how information providers formulate responses to location-based questions and to determine the correct response fill rate to location-based questions in a statewide chat consortium. To meet this purpose, the goal and objectives of this study influenced its research questions. Methodology to address these research questions and to increase the understanding of chat reference and location-based questions led to

practical recommendations and implications for information providers related to mitigating the challenges of accurately responding to location-based questions.

Benefits from this study's findings and recommendations inform participating information agencies in chat consortia, those information agencies' administrators and information providers, as well as chat software developers, chat consortium managers, and researchers about chat reference and location-based questions to potentially improve chat reference services for users. The types of location-based questions illuminate typical questions and allow information providers to potentially create knowledge bases for all information providers in a chat consortia to more accurately respond to location-based questions, improve training for chat consortia information providers, or highlight common information gaps where information agencies' local knowledge could be made more easily available to both participating information providers and users (e.g., including more information on a website or populating a knowledge base). In addition, by determining how information providers formulate responses to location-based questions, this study provides data on how some provide correct responses and how other information providers run into difficulties when responding to location-based questions. With the increase in participating information agencies in chat consortia and chat reference questions, this study's recommendations may benefit a large number of stakeholders, including all users of and information providers in several chat consortia.

This exploratory study calculated the percentages of location-based question transcripts, in total and by type, of total question transcripts, and location-based question transcripts responded to by non-local information providers compared to total location-based question transcripts responded to, in total and by type, as well as the correct response fill rate for location-based questions, in total and by type, for both local and non-local information providers. These calculations provided data to explain how frequently these questions were asked in this chat consortium and provided data that supports the assumption that non-local information providers cannot provide as accurate of responses to location-based questions as local information providers.

Location-based questions may benefit from modifications to chat reference software that would automatically assist the information provider in a reference transaction by queuing URLs related to locations mentioned in a question (e.g., the nearest library system's landing page, or

local government's landing pages, and so forth) to save time determining the location or locations in location-based questions and without browsing through a knowledge base feature. Still, chat consortia managers may be more inclined to populate local knowledge bases or create other resources of frequently asked location-based questions by users and responded to by information providers in their consortia. Information agencies could employ Web 2.0 technologies to update and highlight information on participating agencies' websites based on the types of location-based questions asked to reduce challenges in locating local knowledge for information providers and users.

An improved understanding of chat reference and location-based questions may improve this chat reference statewide consortium's ability to provide correct responses to location-based questions. Findings from this exploratory study influenced the modifications to the exploratory study approach and those changes are discussed in the revised study approach section of Chapter 5. This revised study approach provides new ways of analyzing the question-negotiation process between information providers and users in a virtual synchronous environment. The revised study approach may assist all reference researchers by including location in future studies. Analyzing location-based questions in chat may have ramifications beyond reference's chat mode and lead to future research that assists in reducing location-based questions through geographic intelligence built into information systems (Cascio, Paffendorf, & Smart, 2007).

Summary

Chapter 1 addressed the specifics of this exploratory study's purpose, goal, and objectives, which influenced this study's research questions. A background of the statewide chat consortium studied included a brief history of the consortium as well as a discussion of the consortium's current chat software. In addition, to address this study's purpose, goal, and objectives in a systematic way, Chapter 1 explored existing approaches to guide digital reference research and to describe the chat reference process, and some underlying assumptions from relevant metatheories, and included the exploratory study approach. Chapter 1 concluded with a discussion of measuring chat reference and location-based questions, a methodology overview, and the study's timeline and benefits.

CHAPTER 2

LITERATURE REVIEW

Introduction

The creation, adoption, and redefinition of some information providers' service roles resulting from e-services, e-resources, and mobile devices frees those information providers and their information agency users from the precondition of being proximally affixed to location-bound technologies and/or constrained by operational hours in their search for information (McClure & Jaeger, 2009; Morville, 2006). These technological changes also broaden the geography from which both possible users (with questions) and potential information providers (to offer responses) may originate. The benefit of anyplace, anywhere, anytime services reduces the importance of the distance between user and information provider for service provision. However, the locations of the user, information provider, and in the user's question in the chat reference mode may remain pertinent for the formulation of correct responses despite the reduced relevance of distance for those utilizing chat software (Mon, Bishop, McClure, McGilvray, Most, Milas, & Snead, 2009; Wang, Lai, & Sui, 2003).

The phrase "chat reference and location-based questions" refers to the question-negotiation process in the chat reference mode of responding to users' location-based questions. Location-based questions include any question that concerns the attributes of georeferenceable location or locations. The researcher assumed that local information providers retain knowledge concerning the attributes of a location or locations within the same county as their affiliated information agency that non-local information providers lack and, therefore, local information providers may have a higher correct response fill rate to location-based questions than non-local information providers.

Information services have extended beyond library walls for over 75 years with plain old telephone services (POTS) and, for an indeterminable time before POTS, with other forms of communication that enabled the transcendence of time and space for information to reach persons that could not access it otherwise, for example cuneiform tablets (Kern, 2004). Yet, the

synchronicity functionalities of real-time chat reference, for example page pushing, co-browsing, and so forth, which may function regardless of the location of the user or information provider, make chat reference unique from all previous reference modes and present researchers with challenges in the evaluation of chat reference (Kawakimi, 2004; Radford, 2006).

This chapter includes a literature review of topics relevant to this exploratory study's purpose, goal, objectives, and research questions as they inform data collection and data analysis. Topics that frame a study of chat reference and location-based questions include these selected subjects:

- Reference service development and the emergence of chat reference and chat consortia.
- Evaluation of reference.
- Challenges to georeferencing.
- Defining local knowledge.

The literature review begins with a section on the development of reference services leading toward the emergence of chat reference and chat consortia. The following section also explores some of the strengths and weaknesses of chat consortia. This study's literature review will conclude with a summary.

Reference services development and the emergence of chat reference and chat consortia

Reference work began in libraries in the late nineteenth and early twentieth centuries as the result of several factors, including an increase in the number and variety of information resources available, an increase in the difficulty in using those resources, and users finding that the increase in number and complexity of those resources required expert assistance to locate information (Janes, 2003). A paper delivered at the 37th meeting of the American Library Association defined reference as “the service rendered by a librarian in aid of some sort of study” (Bishop, 1915, p. 134). Librarians have likened the skills used in responding to reference queries to “detective work” (Walford, 1978, p. 89). In order to provide a more formal presentation of reference skills, RUSA published guidelines in 1996 for Behavioral Performance of Reference and Information Service Providers for use in training, development, and evaluation of reference services (American Library Association, 1996). Because the 1996 guidelines focused on face-to-

face reference and the use of other reference modes increased over time, RUSA revised the guidelines to include other reference modes (Reference and User, 2004). The five sections of the guidelines—approachability, interest, listening/inquiring, searching, and follow-up—supply information providers with common sense recommendations on successfully responding to user queries. A recent study, however, found that information providers rarely adhere to the guidelines in chat reference practice (Shachaf & Horowitz, 2008).

Almost concurrently with the creation and revision of the RUSA Behavioral Performance of Reference and Information Service Providers guidelines, the number of library face-to-face reference questions declined despite an increasing user population—a survey of ARL libraries found a 34% decrease in reference questions from 1991 to 2004 (Matthews, 2007; Ronan & Turner, 2002). Some speculated that the reason for the decline was the Internet and the ability of users to find adequate responses to their questions without expert assistance (Ronan & Turner, 2002). These speculators reasoned that the Internet contained a large amount of relatively quick and easily accessible online resources, and as more potential users gained access to the Internet, users had less need for expert assistance. Because face-to-face reference questions declined with increased access to the Internet, some information providers predicted an end to reference services (Coffman & Arret, 2004a; Watstein & Bell, 2008).

In response to these environmental changes and a fear that reference services would become obsolete due to the Internet and its relatively quick and easy accessible online resources, information providers expanded reference collections to contain more electronic resources and developed several service roles related to providing assistance utilizing the Internet, including the “Anyplace Anywhere Anytime Individualized Information Provider” (McClure & Jaeger, 2009, p. 51). Digital reference services often include both real-time interactions between information providers and users, as in chat reference, and asynchronous forms of interactions, where a user posits a request and waits for a response, as in e-mail reference. Unlike chat reference’s synchronous nature, e-mail does not allow information providers to perform a typical reference interview (Coffman, 2001). A typical reference interview helps the information provider clarify a question and reduces the likelihood of providing inappropriate information in response to the user’s original, often-ambiguous query (Taylor, 1968).

Due to these challenges associated with the lag in communication in e-mail reference, information providers sought a technology that would allow information providers to reach online users in their environment and synchronously perform the typical reference interview. The solution for many information providers was call center software, which was developed as an online customer service tool and could be adapted for chat reference services (Kawakami, 2003). Due to customers' dial-up online connections at that time, customers were not able to use their phone for assistance while simultaneously being online (Coffman & Arret, 2004a). With a few modifications, information providers employed the call center software to offer chat reference and more information providers began offering reference service in the chat mode.

As of the most recent survey on the adoption of chat reference in academic libraries, 67 ARL libraries offered some form of chat reference service (Ronan & Turner, 2002). Additionally, an estimated 3,000 to 4,000 total libraries in the United States offered some variety of chat reference service in 2004 (Coffman & Arret, 2004b). In order to expand the chat reference services both in level of expertise and hours open, as well as to reduce operational costs, some reference departments at a variety of information agencies combined their resources and services in chat consortia.

Hirko and Ross (2004) stressed the benefits of expanded service hours for remote reference services that result from forming chat consortia—the alternative schedules of potential users, users' need for assistance after information agency hours, and restrictions limiting their ability to reach “brick and mortar” information agencies (p. 32). Combined coverage from several information agencies' information providers in a chat consortium often provides chat reference help 24 hours a day, seven days a week, for all participating information agencies' users. A consortium also allows information providers to pool a variety of subject expertise (Ronan & Turner, 2002). Beyond chat consortia strengths, other chat reference strengths include the functionality of chat software technologies, such as co-browsing, and the creation of reference artifacts for evaluation (Ronan & Turner, 2002). Other chat consortium benefits include a reduction of costs associated with centralized software management, troubleshooting, scheduling, and training (Kawakami, 2003).

Potential weaknesses related to chat consortia include quality control, a wider range of potential questions from a more diverse clientele, and an indeterminate number of location-based

questions with varying levels of accuracy in response (Berry, Casado, & Dixon, 2004; Kwon, 2007; Pomerantz, Luo, & McClure, 2006; Sears, 2001). The benefits, especially cost savings, of a chat consortium for participating information agencies may be more easily quantifiable and key to information agencies' choice to join chat consortia. The growth of this exploratory study's statewide chat consortium, as well as similar growth in several other regional and national chat consortia reinforce the argument that chat consortia benefits currently outweigh potential chat consortia weaknesses for participating information agencies (Nilsen & Ross, 2006; Sloan, 2004). With several states making double-digit percentage cuts in library funding, and with more cuts pending, the benefit of cost cutting related to joining chat consortia trumps any consideration or study of chat consortia's potential weaknesses (American Library Association, 2009). Due to the numerous chat consortia benefits and the as yet unexplored chat consortia weaknesses, decision-makers may overlook or disregard any unstudied potential weaknesses of chat consortia.

This section provided a brief history of the development of reference services leading toward the emergence of chat reference and chat consortia, as well as some strengths and weaknesses of chat consortia. This history helps justify the importance of this exploratory study's goal of reducing a lack of knowledge of chat reference and location-based questions, as it potentially affects several stakeholders, including the users and information providers in chat consortia, chat consortia managers, participating information agency administrators, chat software developers, and researchers. Although chat reference allows information providers to reach users in their online environment regardless of distance and at a reduced cost in chat consortia, location-based questions continue to be an unexplored potential weakness of chat consortia as they relate to the accuracy of responses from non-local information providers to the location or locations in users' location-based questions. Any attempt to reduce this lack of knowledge and mitigate this potential weakness may improve chat consortia services.

Evaluation of reference

The process of reference evaluation began prior to the emergence of the chat reference and chat consortia. In the study of the question-negotiation process to resolve users' information needs, researchers have employed descriptive analyses, obtrusive methods, unobtrusive methods,

observation, conjoint analyses, and cost-benefit analyses (Matthews, 2007). Whitlach (2001) divided chat reference evaluation into four categories:

- Economic (e.g., cost-benefit analysis),
- Service process (e.g., user satisfaction),
- Resources (e.g., operations management), and
- Service outcomes (e.g., accuracy of responses).

This literature review section will focus on response accuracy evaluations prior to chat, which influence this study's final method of unobtrusive testing. Other reference research, not directly related to response accuracy, but relevant to the first three study methods—content analysis, quantitative analysis, and focus groups—follows the unobtrusive testing discussion. The section also includes a section on previous studies related to chat reference and location-based questions.

Unobtrusive testing

Researchers have used unobtrusive testing in reference evaluation since the 1970s (Crowley, 1971). In unobtrusive testing, an unaware information provider responds to a proxy questioner. Hernon and McClure introduced the 55 percent rule, reinforced in 1980s by several similar studies (1986). The 55 percent rule suggests that a user asking a practitioner a certified, typical reference question has a 55 percent chance of receiving a correct and complete response, that is a correct answer with an authoritative source(s) provided and not referred (Matthews, 2007). Unobtrusive testing involves the assessment of responses to a predetermined set of factual questions asked to information providers unaware that they are being evaluated (Hernon & McClure, 1986). Unobtrusive testing allows the researcher not only to assess the correct response fill rate, but the question-negotiation skills of the information provider responding to the question.

The 55 percent rule and unobtrusive testing studies have received some criticism stemming from the limitations of the method. These suggested limitations include intervening variables such as the attitudes of the proxy and information provider, sampling bias, difficult questions, obtrusive nature, and the questionable ethics of the approach (Bailey, 1987). Other researchers suggest that many questions do not have a single correct response (Saxton &

Richardson, 2002). Despite these limitations and concerns, unobtrusive testing provides researchers with one potential method of evaluating reference response accuracy from a proxy user's perspective. In chat reference, researchers may conduct unobtrusive testing without posing as a proxy and utilizing actual questions from real users (Pomerantz, Luo, & McClure, 2006). Due to the amount of unobtrusive testing in reference and the benefits of conducting the method in chat reference, this exploratory study employs unobtrusive testing to address the accuracy of local and non-local information providers' responses to location-based questions.

Focus groups

Focus groups provide researchers with a potential tool to gather the perspectives of information providers as they relate to chat reference and location-based questions. Focus group research involves interviewing persons in a group to gather attitudes and beliefs and to determine "how those beliefs influence behavior" (Matthews, 2007, p. 54). Usually researchers record, transcribe, and analyze focus groups to determine reoccurring themes (Matthews, 2007). In Library and Information Studies, researchers have used focus groups to gather the perceptions of current and potential users, information providers, and managers on a variety of information agencies' services and resources (Powell & Connaway, 2004). Although "the literature does not reflect this use of the method," focus groups may be used to "identify the information gathering patterns" of users and information providers (Powell & Connaway, 2004, p. 151). A recent chat study employed the focus group method to assess users' expectations of reference services (Naylor, Stoffel, & Van Der Lan, 2008). Focus groups provided this researcher with the ability to gather and assess the perspectives of information providers on chat reference and location-based questions.

Content analysis and quantitative analysis

In chat reference research, researchers extensively use content analysis and quantitative analysis to analyze the content of the question-negotiation process and calculate statistics on chat transcripts. Statistics derived from quantitative analysis of the content analysis of chat transcripts

include the total number of chat transcripts, the frequency of chat transcripts, chat transcript length, turns taken in a chat session, word count in a user's question and an information provider's response, and referral web page (Luo, 2008; McClure, Lankes, Gross, & Choltco-Devlin, 2002). Content analyses and quantitative analyses of chat transcripts may also include types of users' questions, quality of chat transcripts, interpersonal communication, responses, reference interviews, and broken chat transcripts (Luo, 2008). Only content analysis and quantitative analysis related to chat reference and location-based questions will be discussed in this literature review. The following section addresses the previous studies related to chat reference and location-based questions.

Studies of chat reference and location-based questions

All evaluation occurs in a political context with different, and often competing, stakeholder groups, and this claim holds true for the previous studies of chat reference and location-based questions (Pomerantz, 2007). Findings from studies addressing chat reference and location-based questions vary considerably on the percentage of location-based questions to the total number of chat reference questions responded to, due to the differing types of information agencies analyzed, varying definitions of location-based questions, and the politics surrounding all of the evaluations (Berry et al., 2003; Bishop & Torrence, 2006; Hyde & Tucker-Raymond, 2006; Kwon, 2007; Sears, 2001).

In three of these studies, stand-alone academic library chat services considered membership in chat consortia due to the consortial benefits enumerated previously in this literature review (Berry, Casado, & Dixon, 2003; Bishop & Torrence, 2006; Sears, 2001). For those three studies, each academic library's information providers feared the inability of non-local information providers to accurately respond to their users' location-based questions, as well as their own challenges in accurately responding to location-based questions from other information agencies' users. These three academic library studies defined location-based questions as any location closer to the information provider's location than the user's location (e.g., campus, library, and so forth). The studies assumed that users would ask location-based questions concerning a location or locations closer to their home institution. The studies'

percentages of location-based questions of total chat questions responded to by those academic libraries averaged 36 percent (Berry, Casado, & Dixon, 2003; Bishop & Torrence, 2006; Sears, 2001). Two of the five chat reference and location-based questions studies utilized the same definition of location-based questions and methodology, and were conducted in similarly sized academic libraries with independent chat services. The findings from both of these studies indicated that 23 percent of all chat reference questions were location-based questions (Berry, Casado, & Dixon, 2003; Bishop & Torrence, 2006). These two studies defined location-based questions as any question requiring on-site expertise from information providers close to that location to provide a correct response.

Two other studies, one of a regional public library consortium and one of a statewide multi-type library consortium, defined a location-based question as one referencing the library as the location and resulted in relatively small percentages of location-based questions, 6.8 percent and 11 percent, respectively (Hyde & Tucker-Raymond, 2006; Kwon, 2007). Based on these two studies, library location-based questions may emerge in this exploratory study's content analysis as a noteworthy type of location-based question. Unfortunately, none of these studies went beyond describing this potential weakness of chat consortia presented by location-based questions and the quantitative percentages of location-based questions of total chat reference questions.

In addition to the lack of a consistent or operationalized definition of location-based questions, none of the studies of chat reference and location-based questions addressed their assumption that local information providers retain knowledge concerning the attributes of a location or locations within their same library or surrounding geographic area that non-local information providers lack. This assumption hypothesizes that local information providers may have a higher correct response fill rate than non-local information providers. In addition to failing to measure this assumption, the previous studies also did not identify the types of location-based questions, explore how information providers formulate responses to location-based questions, or evaluate the percentage of non-local information providers responding to location-based questions compared to total location-based questions responded to. In all of the studies, the researchers only calculated the percentage of location-based questions of total chat questions and the discussion of location-based questions was accessory to each study's primary

purpose. This exploratory study will address the limitations of previous research and reduce the lack of knowledge related to chat reference and location-based questions resulting from and inform the literature.

Although not directly related to chat reference and location-based question studies, one multi-method statewide chat consortia evaluation provided recommendations and suggested improvements based upon exit surveys and interviews with users, which tangentially relate to the potential weakness of location-based questions (Pomerantz, Luo, & McClure, 2005). The findings indicated that users need a clear explanation of the chat consortium service, which would indicate when the information provider may not be from their local information agency and may not be familiar with their local agency's system, policies, resources, or services. To mitigate this user confusion, the study recommended that the service provide a clearer explanation of the nature of its staffing, assist information providers by queuing resources related to a user's local information agency, or create a centralized repository of information about all of the participating information agencies in the consortium. The users also called for local information providers to answer local questions when available and for the consortium to increase the availability of local information providers. These expressed user concerns and the recommendations and suggested improvements highlight more issues related to chat reference and location-based questions. However, only anecdotal data leads to that study's recommendations. This exploratory study may lead to actionable strategies to mitigate the potential weakness of location-based questions during the reference transaction not previously proposed. Since cost savings and other benefits of chat consortia will likely continue to outweigh any potential weaknesses, recommendations such as increasing the availability of local information providers and creating a centralized repository of information about all participating information agencies may not be viable cost cutting solutions.

Summary

This section explored the use of unobtrusive testing, such as in the 55 percent rule studies, as well as focus groups, content analysis, and quantitative analysis methods as they relate to chat research. In several chat reference and location-based question studies, researchers

used differing location-based question definitions or did not focus primarily on location-based questions. This section discussed previous methodology used in reference evaluation that relate to this exploratory study's methodology, as well as previous similar studies of chat reference and location-based questions that influence this exploratory study's purpose, goal, objectives, and research questions. Based on the brief review in this section, there is a clear need to explore location-based questions as a potential weakness of chat consortia further and the prior reference evaluation methodology discussed are suitable and appropriate to measure chat reference and location-based questions.

Challenges to georeferencing

This section of the literature review discusses the issues involved with georeferencing participating information agencies, the information providers that staff chat consortia, chat users, and the locations in their location-based questions. Although geospatial data could be collected or provided about the information provider, users, or geospatial data of questions for analysis, chat managers do not commonly collected geospatial data or employ geospatial data in streamlining the chat reference process (Ronan & Turner, 2002; Pomerantz, Mon, & McClure, 2008). For chat evaluation, some researchers recommend collecting certain geospatial data—user's city, county, and state, but in one study only 20 percent of chat services collected such data (Nicholson & Lankes, 2006). One obstacle in collecting geospatial data from users is the fact that users are less likely to ask a question if they are required to fill in numerous fields prior to or after a chat session (Pomerantz et al., 2008). A reason to collect geospatial data may be that users' locations often determine their eligibility to use a service, for example, a user's zip code must be within the information agency's service area to utilize a service. Still, other chat reference services may choose to respond to all inquiries regardless of where they originate (Kawakimi, 2003).

Challenges exist related to both the collection of user's zip codes and IP addresses. Zip codes are designed for efficient mail delivery and do not always spatially correlate with other data sets' sample areas. That is, a zip code may cross other political boundaries associated with library service areas (e.g., county boundaries), since zip code areas were designed for efficient

mail delivery regardless of other political boundaries. Therefore, using zip codes to determine eligibility may exclude some eligible users and vice versa. Also, users may easily provide falsified zip codes, but some researchers suggest users would not likely do so (Pomerantz, Luo, & McClure, 2005). An IP address may be linked back to a users' street address, however, individual users can utilize anonymizers to hide their location and some Internet Service Providers (ISPs) block accurate geocoding of their users' IP addresses (Kalnis, Ghinita, Mouratidis, & Papadias, 2007). In addition, some eligible users may access the service from outside their eligible service area, based on their current zip code or geocoded IP addresses although they are actually eligible for services, such as those traveling, or those who are distance students or part-time residents (Mon, Bishop, McClure, McGilvray, Most, Milas, & et al., 2009). Still, several statewide library services in Connecticut, New Jersey, and Kansas have implemented geolocation software, including Quova <<http://www.quova.com>>, Digital Envoy <<http://www.digitalenvoy.com>>, and NetGeo <<http://www.netgeo.com>>, to authenticate IP addresses of virtual users for eligibility (Mon, Bishop, McClure, McGilvray, Most, Milas, & et al., 2009). For this exploratory study, the locations of users are not needed, because only the locations in the users' location-based questions are relevant to the study and, for the reasons addressed above, the users' locations by either zip code or IP address do not necessarily relate to the location or locations in the users' questions.

Georeferencing information providers, users, and locations in location-based questions involves geocoding addresses for the three entities. Geocoding means determining the coordinates of geospatial data (e.g., physical address) with the use of pre-georeferenced geospatial data (e.g., a street layer or parcel layer) (Wade & Sommer, 2006). In other words, geocoding assigns coordinates to addresses based on their assumed location on a pre-georeferenced street or parcel layer (e.g., surveyors originally georeferenced the street or parcel layers with ground measurements). After geocoding geospatial data, geographic information systems can analyze data on information providers' locations and determine collocation of information providers' locations with any location or locations within a location-based question.

Challenges associated with collecting geospatial data on information providers and locations in location-based questions include determining where an information provider works and their information agency's street address, and the georeferenceable locations in users'

location-based questions. Limitations to geocoding exist (e.g., inaccurate or incomplete address data that does not provide a georeferenceable address). Geocoding at county level granularity, as this study did, however, mitigated most of these limitations, because each georeferenceable location needed to only fall within the county boundaries of its actual location for count level accuracy.

This section of the literature review discussed the challenges of geocoding in determining the collocation of information providers and locations in location-based questions and suggested using county level granularity for geocoding reduced potential errors. Georeferencing was necessary for this study's quantitative analysis to evaluate the percentage of location-based questions responded to by non-local information providers compared to total location-based questions responded to. For this study's unobtrusive testing, georeferencing also was used to determine whether information providers were local or non-local to the location or locations in proxy location-based questions. Other chat literature mentioned above explored how georeferencing could be used and had been used to evaluate services, which largely has focused on determining the location of users. This exploratory study's use of georeferencing focused on georeferencing location or locations in location-based questions and information providers. The section discussed how this was appropriate for the study and that county level granularity reduced errors related to georeferencing.

Defining local knowledge

A seminal anthropological work titled *Local Knowledge* defines local knowledge as knowledge that is “practical, collective and strongly rooted in a particular place” and that forms an “organized body of thought based on immediacy of experience” (Geertz, 1983, p. 75). Simply, local knowledge means “to-know-a-city-is-to-know-its-streets” (Geertz, 1983, p. 167). Although Geertz was studying religious laws and how they shifted as they moved across different established cultures and how they subsumed each culture's existing local knowledge reflected in cultural norms, the concept of local knowledge is relevant to the question of information providers' responses to location-based questions. For example, information providers staffing the chat consortium come from a variety of information agencies with

probable discrepancies in their local policies, such as return policies and leniency of enforcement. These discrepancies in local knowledge alter their responses.

This exploratory study assumed that local knowledge, also known as indigenous knowledge, is held by local information providers and makes them more accurate in their response to location-based questions about locations in their geographic region than non-local information providers. The knowledge that an indigenous (local) community accumulates over generations of living in a particular environment defines local knowledge. Knowledge related to technologies, skills, practices, and beliefs, which enable a community to establish a stable existence in their environment, comprise local knowledge (United Nations, 2008). The United Nations utilizes indigenous people's local knowledge to assist in nature conservation, disaster management, and to preserve traditional medical practices.

Other studies from Library and Information Studies have explored how indigenous peoples may be involved in creating ontologies for governmental databases and websites intended for their use, thus preserving, and integrating local knowledge into information systems (Boast, Bravo, & Srinivasan, 2007). Participating information agencies in chat consortia intend to share their individual local knowledge with non-local information providers and all users by disseminating local knowledge through web pages and other publications. Local knowledge concerning locations in users' location-based questions other than those related to participating information agencies, that is libraries, may rely on whether those locations' local knowledge is preserved, disseminated, accessible, and findable (e.g., the bank hours).

For this exploratory study, this section provided a definition of local knowledge as the knowledge related to technologies, skills, practices, and beliefs, which enable a community to establish a stable existence in their environment. Since this study explored location-based questions, recommendations may include considerations of whether to disseminate local knowledge or not, as well as how to disseminate and retrieve local knowledge to formulate accurate responses to location-based questions when information providers are non-local to the location or locations in users' location-based questions. The literature review provided an explanation of how local knowledge relates to chat consortia and this study. This study's methodology will address the assumptions presented here on local knowledge.

Summary

The literature review presented topics related to this study's purpose, importance, goal, objectives, research questions, and methodology. The key themes identified in the literature review include:

- The emergence of chat reference and chat consortia to reach users in their environment and share the costs and subject and local area expertise will continue to expand.
- Unexplored potential weaknesses of chat consortia, including location-based questions, need further investigation.
- Unobtrusive testing, focus groups, content analysis, and quantitative analysis as used in past reference evaluation are appropriate for this study.
- Findings from previous studies of chat reference and location-based questions indicated the potential weakness exists, but none addressed how to mitigate the weakness.
- Limitations to georeferencing determined what approaches could be used in this study to explore the relationship between the user's question and the information provider.
- Local knowledge may exist and assist information providers in responding to location-based questions; however, the concept has not been addressed in chat reference research.

These key themes provide background, benefits, and limitations to approaches that influenced the exploratory and revised study approaches and the methodology employed to address this study's purpose, goal, and objectives.

Chapter 3 presents the methodology of this study and begins with an overview of the research methodology selected for this study, the project timeline, and the tasks related to all data collection and data analysis used in this exploratory study's methodology. Following the overview, the chapter provides detailed descriptions of the methodology. The methodology include data collection and data analysis related to the four methods—content analysis, quantitative analysis, focus groups, and unobtrusive testing. Finally, the chapter concludes with sections on valid and reliable data, justification of the methodology, the relationship of the methodology to the exploratory study approach, assumptions and limitations of the methodology, and recommendations for mitigating those assumptions and limitations.

CHAPTER 3

METHODOLOGY

Methodology overview

This study included four methods to explore chat reference and location-based questions and the implications resulting from a lack of knowledge on this topic. The four methods included content analysis, quantitative analysis, focus groups, and unobtrusive testing. This exploratory study was iterative and, therefore, data analysis from each method informed subsequent methods' data collection. Findings from the methodology also influenced this study's recommendations. Results from this exploratory study provided a correct response fill rate of responses to location-based questions, in total and by type, for both local and non-local information providers, as well as an understanding of how information providers formulate responses to location-based questions. In addition, findings provided data indicating the prevalence of location-based question transcripts in relation to total question transcripts and the percentage of non-local information providers responding to location-based question transcripts in a statewide chat consortium.

The research design of this study included planning and instrument development (Step 1), data collection and data analysis (Step 2), and further data analysis and dissertation preparation (Step 3). Major tasks associated with each step appeared in Table 1.3 in Chapter 1. A more detailed timeline for the tasks in Step 2 appears below in Table 3.1. Step 2 tasks occurred in succession, as findings from prior methods' data analysis influenced the data collection for subsequent methods. Step 2 tasks related to content analysis and quantitative analysis of chat transcripts initiated data collection and data analysis. Step 2 continued data collection and data analysis with focus groups. Step 2 concluded data collection and data analysis with unobtrusive testing.

The timeline presents the schedule of tasks by month. Completion for the tasks in Step 2 took six months and started in month 3 of the study. Table 3.1 below depicts this study's schedule of data collection and data analysis tasks by research method.

Table 3.1: Scheduled tasks.

Months	Step 2 Tasks		
Month 3 (<i>Content analysis</i>)	1. Collected chat transcript data 2. Cleaned data and removed unusable transcripts	3. Used protocol to differentiate location-based question transcripts from non-location-based question transcripts	4. Categorized the types of location-based questions 5. Ascertained how non-local information providers negotiate location-based questions
Month 4 (<i>Quantitative analysis</i>)	6. Determined the locations in location-based questions 7. Georeferenced the locations in location-based questions and information providers	8. Calculated the percentage of location-based question transcripts, in total and by type, of total question transcripts	9. Calculated the percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to
Month 5 (<i>Focus groups</i>)	10. Conducted and recorded focus groups	11. Analyzed focus groups' recorded transcriptions	12. Wrote focus group findings
Months 6 — 7 (<i>Unobtrusive testing</i>)	13. Developed unobtrusive testing location-based questions from findings of content analysis, quantitative analysis, and focus groups 14. Ensured representativeness of the unobtrusive testing questions as typical chat reference questions with a panel of <i>Ask a Librarian</i> information providers	16. Conducted unobtrusive testing to a random sample of participating information agencies in <i>Ask a Librarian</i> at selected times and securely saved chat transcripts	17. Calculated correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers 18. Ascertained how information providers negotiate unobtrusive testing location-based questions

Study's purpose, goal, objectives, and research questions

The purpose of this exploratory study was to understand how information providers formulate responses to location-based questions and the correct response fill rate to location-based questions in a statewide chat consortium. The goal of this exploratory study was to reduce a lack of understanding of chat reference and location-based questions in order to provide practical recommendations on how information providers at participating information agencies in

chat consortia might mitigate the challenges of accurately responding to location-based questions. Objectives for this goal included:

1. Identify the types of location-based questions.
2. Explore how information providers formulate responses to location-based questions.
3. Evaluate the percentage of location-based question transcripts, in total and by type, of total question transcripts, the percentage of non-local information providers responding to location-based question transcripts of total location-based question transcripts responded to, and the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers.
4. Evaluate this study's assumptions.
5. Assess the usefulness of the exploratory study approach.
6. Provide practical recommendations to improve chat reference services.

The above objectives guided this exploratory study's research questions. Methodology developed for this exploratory study addressed these objectives.

To meet this exploratory study's purpose, goal, and objectives, this study utilized the following research questions:

1. What are the types of location-based questions?
2. How do information providers negotiate location-based questions and formulate responses?
3. What is the percentage of location-based question transcripts, in total and by type, of total question transcripts?
4. What is the percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to?
5. What is the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers?

These research questions directed the development of the data collection and data analysis in this exploratory study.

Relationship of research questions to methodology

Table 3.2 illustrates the relationship between this study’s research questions and the proposed methodology.

Table 3.2: Relationship of research questions to methodology.

Research Question	<i>Content analysis</i>	<i>Quantitative analysis</i>	<i>Focus groups</i>	<i>Unobtrusive testing</i>
1. What are the types of location-based questions?	Yes		Yes	
2. How do information providers negotiate location-based questions and formulate responses?	Yes	Yes	Yes	Yes
3. What is the percentage of location-based question transcripts, in total and by type, of total question transcripts?		Yes		
4. What is the percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to?	Yes	Yes		Yes
5. What is the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers?				Yes

The content analysis addressed research questions one and two by providing qualitative data related to the type of location-based questions and the question-negotiation process of information providers for location-based questions. The focus groups addressed the types of location-based questions and the question-negotiation process of information providers for location-based questions by providing qualitative data. The quantitative analysis addressed the percentage of location-based question transcripts of total question transcripts and the percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to by providing quantitative data. The unobtrusive testing addressed the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers by providing quantitative data and the

location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to. In addition, the unobtrusive testing provided qualitative data to address the question-negotiation process of information providers for location-based questions.

Relationship of study objectives to methodology

Table 3.3 illustrates the relationship of the methodology to this study’s objectives, which the researcher designed to meet the study’s goal.

Table 3.3: Relationship of methodology to study objectives.

Method	Objective
<i>Content analysis</i> and <i>Focus groups</i>	1. Identify the types of location-based questions.
<i>Content analysis</i> , <i>Quantitative analysis</i> , <i>Focus groups</i> , and <i>Unobtrusive testing</i>	2. Explore how information providers formulate responses to location-based questions.
<i>Content analysis</i> , <i>Quantitative analysis</i> , and <i>Unobtrusive testing</i>	3. Evaluate the percentage of location-based question transcripts, in total and by type, of total question transcripts, the percentage of non-local information providers responding to location-based question transcripts of total location-based question transcripts responded to, and the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers.
All methodology	4. Evaluate this study’s assumptions. 5. Assess the usefulness of the exploratory study approach. 6. Provide practical recommendations to improve chat reference services.

Units of analysis

This exploratory study’s purpose was to understand how information providers formulate responses to location-based questions and to calculate the correct response fill rate to location-based questions in a statewide chat consortium. “The level of social life on which a research

question is focused” is the unit of analysis (Schutt, 2006, p. 178). The units of analysis for this study are the Florida’s *Ask a Librarian* chat transcripts used in content analysis, quantitative analysis, and unobtrusive testing and the transcripts of focus groups. The chat transcripts served as surrogates to infer the motives of the information providers’ and users’ actions. The transcripts of the focus groups served as surrogates to infer the meaning of information providers’ comments. The *Explanation of study’s methodology and instruments* section presents a justification of this study’s methodology.

Explanation of study’s methodology and instruments

This exploratory study attempted to determine how information providers formulate responses to location-based questions and to calculate the correct response fill rate to location-based questions in a statewide chat consortium. Methodology created for this research included content analysis, quantitative analysis, focus groups, and unobtrusive testing. The researcher conducted all data collection and data analysis for this study. The collection, secure storage, and analysis of chat transcripts and recordings from focus groups occurred utilizing the following software Environmental Systems Research Institute (ESRI) ArcGIS 9.3 and Microsoft Word and Excel.

Other qualitative software, QSR NVivo 7, was unable to sufficiently open and remain operational with more than 7,000 plus tables of chat transcripts, even when utilized only with 100 transcripts. Therefore, the researcher utilized a combination of Microsoft Word and Excel to perform similar tasks to other qualitative software, such as to descriptively code, by identifying information and creating classifications that described cases and attributes in this study, and to analytically code, by interpreting the meaning of the data descriptively coded and refining the cases’ and attributes’ classifications (Qualitative, 2006). The methodology required the researcher to copy the chat transcripts and transcribed recordings of content analysis, focus groups, and unobtrusive testing into Microsoft Word to conduct data analysis.

ArcGIS 9.3, a geographic information system for visualizing, managing, creating, and analyzing geospatial data, allowed the researcher to collect and analyze geospatial data as well as to author maps (Environmental, 2008). For this exploratory study, ArcGIS 9.3 allowed the

researcher to enter the geospatial data from content analysis into a database for quantitative analysis, which included georeferencing the locations in location-based questions and information providers, as well as determining the collocation of information providers with any locations in location-based questions. In addition, Microsoft Excel allowed the researcher to create and format spreadsheets used in unobtrusive testing as well as to generate a random order of times and information providers to proxy with unobtrusive testing location-based questions (Microsoft, 2007). *Ask a Librarian* software collected chat transcripts in compatible formats to all of these software.

This section details the software necessary and steps that were taken to execute this study's methodology. For an example of this study's methodology protocols, see Appendix A.

Content analysis

Content analysis is “the study of recorded human communications” (Babbie, 2007, p. 320). This exploratory study's content analysis included reviewing chat transcripts to provide qualitative data to address the research questions related to the types of location-based questions and the question-negotiation process of information providers for location-based questions. These location-based question types were used to derive the questions for the study's unobtrusive testing and influenced this study's recommendations. In addition, the content analysis provided the qualitative data to ascertain how information providers negotiate location-based questions. The researcher acquired the following example chat transcripts from a FEL *Ask a Librarian* evaluation study performed at the Information Use Management and Policy Institute in 2007 (Mon et al., 2007). The two example chat transcripts provide an illustration of typical and reasonable chat transcripts. One identifies a location-based question and the other is considered an “other” question. The examples illustrate how the researcher gathered data from chat transcripts for content analysis.

Table 3.4: Example chat transcripts for content analysis.

Example Chat Transcript 1	
<i>Information provider:</i>	Hello, Welcome to Ask a Librarian! Please wait a moment while I read your question...
<i>User:</i>	if i have a fine how much of it do i have to pay at one time?
<i>Information provider:</i>	How much you need to pay is up to the library you borrowed it from. Some libraries require you pay it off at one time; others allow you to pay it off on an installment basis. Where did you check out the item?
<i>User:</i>	westgate library on paula drive
<i>Information provider:</i>	Since West Gate is part of the Tampa-Hillsborough system, you will need to call their number, so they can look up your record and give you that information. Would you like me to give you the number?
<i>User:</i>	yes
<i>Information provider:</i>	Okay, hold on a minute

Example Chat Transcript 2	
<i>Information provider:</i>	Hello, Welcome to Ask a Librarian! Please wait a moment while I read your question...
<i>User:</i>	how do get a E-mail address starte.
<i>Information provider:</i>	Email addresses are often offered by Internet Service Providers. Do you have internt at home
<i>User:</i>	no I'd don't mus you own a computer, with that services to have one
<i>Information provider:</i>	There are various free email services available. Do you know of one that you would like to use (perhaps one that your acquaintances use)? Yahoo? Gmail? Hotmail?
<i>User:</i>	all those places have free e-mail address? If so thank you! for all your help.
<i>Information provider:</i>	http://mail.yahoo.com/ http://www.hotmail.com/

Steps for planning and conducting content analysis follow.

Steps for content analysis

1. Obtained October 2008 and November 2008 chat transcripts from *Ask a Librarian*, cleaned data, and removed unusable transcripts. In addition, chat transcripts and questions were copied into Word for coding.
2. Used prospectus protocol, in a pilot study of a 10 percent sample of the transcripts to differentiate location-based question transcripts from other question transcripts, to

- determine the types of location-based questions, and to determine the following elements from the RUSA *Guidelines for Behavioral Performance of Reference and Information Service Providers*—3.8 (i.e., Clarifying questions), 4.9 (i.e., Resources used), and 5.7 (i.e., Referral) (Reference, 2004). These elements were chosen because the researcher believed them to be the most relevant to chat reference and location-based questions and they could be operationalized.
3. With chat reference experts, discussed pilot study findings and refined protocol for differentiating location-based question transcripts from other question transcripts, for determining the types of location-based questions, and for determining the following elements from the RUSA *Guidelines for Behavioral Performance of Reference and Information Service Providers*—3.8 (i.e., Clarifying questions), 4.9 (i.e., Resources used), and 5.7 (i.e., Referral) (Reference, 2004).
 4. Conducted content analysis on the two months of transcripts with refined protocol found in Appendix A.
 5. Categorized the types of location-based questions within the location-based question transcript, from those that emerged from the pilot study data and a few altered types, new types, and subtypes that emerged in the remaining 90 percent of transcripts.
 6. Used protocol to identify RUSA guideline elements: 3.8, 4.9, and 5.7 (Reference, 2004). Protocol found in Appendix A.
 7. Categorized the types of 3.8, 4.9, and 5.7 RUSA guideline element combinations that emerged from the data (e.g., immediate referral was when a referral occurred without the use of clarifying questions or resources).

Steps to plan and conduct content analysis reflect the variables of content analysis. Appendix A provides the protocol related to this method.

Content analysis variables

Table 3.5 illustrates measures and definitions of the measures related to content analysis for differentiating location-based question transcripts from other question transcripts and for determining the types of location-based questions within the location-based transcripts. The

researcher relied on RUSA guideline elements to guide content analysis. Definitions of the RUSA guideline elements are provided in Table 3.6.

Table 3.5: Content analysis variables and definitions of variables for location-based questions and types.

What are the Variables?	<ol style="list-style-type: none"> 1. Location-based question or other question 2. Type of location-based question
Definition of Variables	<ol style="list-style-type: none"> 1. Location-based question: concerns the attributes of a georeferenceable location or locations 2. Type of location-based question: types emerged from the data (e.g., library)
Example of the Variables	<ol style="list-style-type: none"> 1. <u>Example chat transcript 1</u> is a location-based question because the question concerns attributes of West Gate Library, which may be georeferenced in Hillsborough County. <u>Example chat transcript 2</u> is an other question because the question does not concern the attributes of any georeferenceable location. 2. <u>Example chat transcript 1</u> is a location-based question, which concerns a library, therefore the type of location-based question is <i>non-directional</i> and also falls within the <i>attribute of geography</i> type, <i>library</i>.

Table 3.6: Content analysis variables and definitions of variables for information providers' question-negotiation techniques.

What are the Variables?	Information providers' question-negotiation techniques, including RUSA guideline elements 3.8, 4.9, and 5.7
Definition of Variables	<ol style="list-style-type: none"> 3.8: Uses closed and/or clarifying questions to refine the search query; 4.9: Offers detailed search paths (including complete URLs), and names of resources used to find the answer, so that patrons can learn to answer similar questions on their own; 5.7: Refers the patrons to other institutions when the query cannot be answered to the satisfaction of the patron (Reference, 2004). RUSA guidelines include other sources as referrals, but this study does not in order to make 4.9 and 5.7 mutually exclusive.
Example of the Variable	<p><u>Example chat transcript 1</u> includes a 3.8: <i>Where did you check out the item?</i></p> <p><u>Example chat transcript 1</u> does not include a 4.9., the resources the information provider consulted to formulate a response. Other transcripts included URLs and other resources used by the information provider.</p> <p><u>Example chat transcript 1</u> includes a 5.7.: <i>Would you like me to give you the number?</i> The offer of the library's phone number results in the referral of the question to the local library, which is another institution.</p>

These example elements of 3.8, 4.9, and 5.7 from the RUSA guidelines provided a guide to classifying the types of techniques that emerged in this portion of the content analysis. Other techniques that emerged from the data included combinations of clarifying questions, utilizing resources, and referrals.

Selection of content analysis population

This study used all chat transcripts occurring during two months of *Ask a Librarian* service for content analysis. The current chat consortium manager informed the researcher that 7,021 chat transcripts occurred in October and November 2008, respectively 3,906 and 3,115 in each month (D. Sachs-Silveira, personal communication, December 1, 2008). The chat consortium usually deletes transcripts at the end of each month to protect users' privacy; however, the chat consortium manager made an exception for this study (D. Sachs-Silveira, personal communication, September 30, 2008). Content analysis steps included removing unusable chat transcripts and copying usable chat transcripts into Microsoft Word. Unusable transcripts included transcripts used for system tests, trainings, or information provider-to-information provider communications (Pomerantz, Luo, & McClure, 2006).

After the removal of unusable transcripts and copying usable transcripts into Microsoft Word, the remaining question transcripts provided the data for coding the types of location-based question transcripts and ascertaining how information providers negotiate location-based questions. The various RUSA guideline elements served as a guide for exploring the question-negotiation process. Previous location-based question studies discussed in Chapter 2 indicated a percentage of location-based question transcripts of the total number of chat question transcripts would be between 6.8 percent and 61 percent, with an average percentage from five location-based question studies of 20.5 percent (Berry, Casado, & Dixon, 2003; Bishop & Torrence, 2006; Hyde & Tucker-Raymond, 2006; Kwon, 2007; Sears, 2001). In these other location-based question studies, intervening variables existed and included different sizes and types of user populations, varying types of information agencies and information providers, researchers' motives, and others. These intervening variables limited this researcher's ability to conduct a meaningful meta-analysis of results to predict the number of location-based questions in this study. For this exploratory study, the researcher estimated a population of location-based

questions between 1,400 and 2,800 chat transcripts, or 20 to 40 percent of the total question transcripts available in the two months of usable data. Figure 3.1 depicts the study's population.

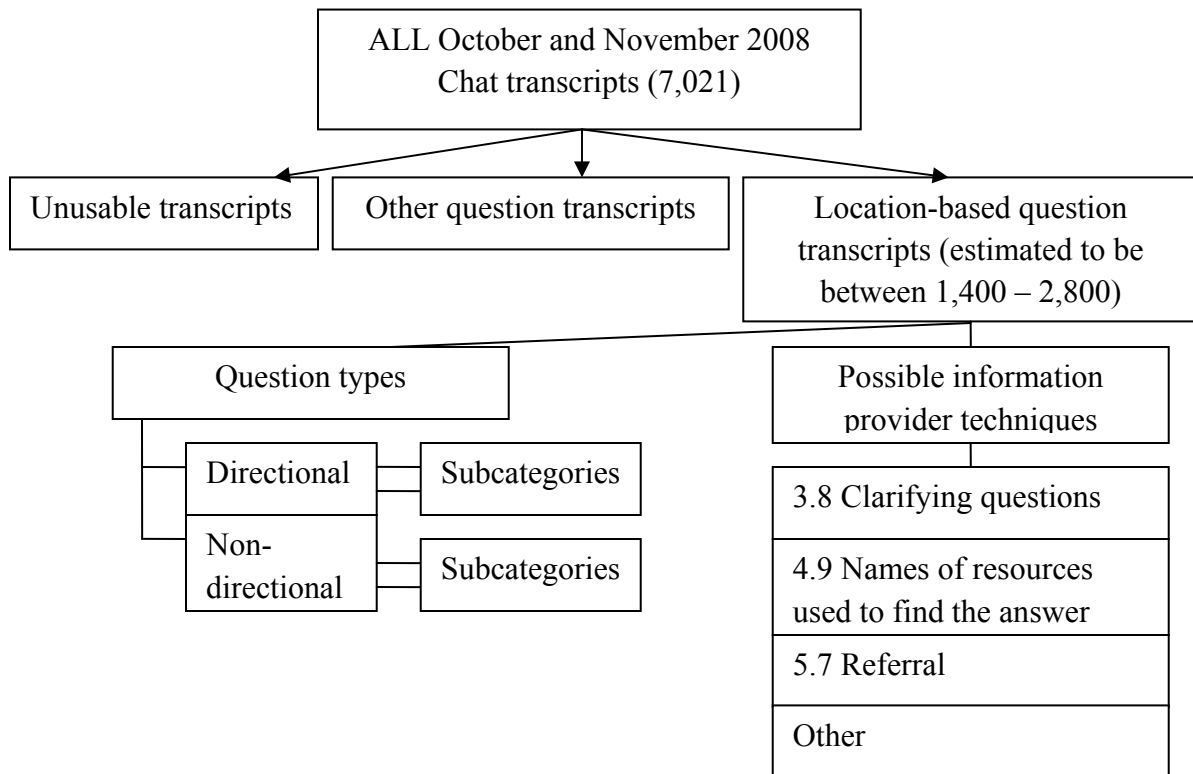


Figure 3.1. Content analysis process and population.

Test data collection instrument

The researcher used the prospectus protocol in a pilot study within a 10 percent sample of the transcripts to differentiate location-based question transcripts from other question transcripts, to determine the types of location-based question transcripts, and location-based questions within them, and to determine the following elements from the RUSA *Guidelines for Behavioral Performance of Reference and Information Service Providers*—3.8 (i.e., Clarifying questions), 4.9 (i.e., Resources used), and 5.7 (i.e., Referral) (Reference, 2004). Four chat reference experts discussed pilot study findings and the validity of the protocol, and the researcher refined the protocol for the variables in this exploratory study.

The researcher conducted all content analysis for consistency. The researcher used Microsoft Word and Excel to create chat transcripts from the *Ask a Librarian* InstantService

exports to administer the protocol. To address issues related to intrarater reliability, the researcher coded 30 randomly selected transcripts using the protocol from content analysis twice, allowing one month to pass between coding, in order to ensure intrarater reliability over time. An acceptable Cohen's kappa was 80 percent and the researcher obtained .860.

Cohen's kappa measures the agreement between two raters who each classify N items into C mutually exclusive categories. The equation is $\kappa = \frac{\Pr(a) - \Pr(e)}{1 - \Pr(e)}$, where $\Pr(a)$ is the relative observed agreement among raters, and $\Pr(e)$ is the hypothetical probability of chance agreement, using the observed data to calculate the probabilities of each observer randomly saying each category. (Cohen's kappa, 2009)

To address interrater reliability, the researcher recruited and trained three external coders for nearly two hours and had them code 30 randomly selected transcripts using protocol from content analysis and a codebook for question types. Coded material was compared across coders to ensure interrater reliability. An acceptable Krippendorff's alpha was 80 percent and the researcher obtained .8108. Krippendorff's alpha is a statistical measure that "generalizes across scales of measurement; can be used with any number of observers, with or without missing data; and it satisfies all of the important criteria for a good measure of reliability"(Hayes & Krippendorff, 2007, p. 78).

Quantitative analysis

Quantitative analyses are "techniques by which researchers convert data to a numerical form" (Babbie, 2007, p. 405). Quantitative analysis provided quantitative measures to address the percentage of location-based question transcripts, in total and by type, of total question transcripts, and the percentage of non-local information providers responding to location-based question transcripts of total location-based question transcripts responded to. Data analysis findings influenced the questions used in unobtrusive testing and this study's recommendations. Converting findings from content analysis to numerical counts allowed for the calculation of the percentage of location-based question transcripts, in total and by type, of total question transcripts. With further data collection by utilizing georeferencing the addresses of the

information providers and the locations in location-based questions to counties, the quantitative analysis allowed for the calculation of the percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to. The researcher acquired the following example chat transcripts from a FEL *Ask a Librarian* evaluation study performed at the Information Use Management and Policy Institute in 2007 (Mon et al., 2007). The two example chat transcripts provide an illustration of typical and reasonable chat transcripts. One identifies a location-based question and one an other question. Table 3.7 provides examples to illustrate how the researcher gathered data from chat transcripts for quantitative analysis.

Table 3.7: Example chat transcripts for quantitative analysis.

Example Chat Transcript 1	
<i>Information provider:</i>	Hello, Welcome to Ask a Librarian! Please wait a moment while I read your question...
<i>User:</i>	if i have a fine how much of it do i have to pay at one time?
<i>Information provider:</i>	How much you need to pay is up to the library you borrowed it from. Some libraries require you pay it off at one time; others allow you to pay it off on an installment basis. Where did you check out the item?
<i>User:</i>	westgate library on paula drive
<i>Information provider:</i>	Since West Gate is part of the Tampa-Hillsborough system, you will need to call their number, so they can look up your record and give you that information. Would you like me to give you the number?
<i>User:</i>	yes
<i>Information provider:</i>	Okay, hold on a minute
Example Chat Transcript 2	
<i>Information provider:</i>	Hello, Welcome to Ask a Librarian! Please wait a moment while I read your question...
<i>User:</i>	how do get a E-mail address starte.
<i>Information provider:</i>	Email addresses are often offered by Internet Service Providers. Do you have internt at home
<i>User:</i>	no I'd don't mus you own a computer, with that services to have one
<i>Information provider:</i>	There are various free email services available. Do you know of one that you would like to use (perhaps one that your acquaintances use)? Yahoo? Gmail? Hotmail?
<i>User:</i>	all those places have free e-mail address? If so thank you! for all your help.

Steps for planning and conducting quantitative analysis follow.

Steps for quantitative analysis

1. Counted content analysis findings for the number of location-based question transcripts, in total and by type, as well as location-based questions within the transcripts, and total question transcripts.
2. Calculated the percentage of location-based question transcripts, in total and by type, of total question transcripts.
3. Geocoded addresses of information providers and locations in users' location-based questions utilizing ArcGIS 9.3.
4. Determined collocation of information providers and locations in location-based questions utilizing ArcGIS 9.3.
5. Calculated the percentage of non-local information providers responding to location-based question transcripts of total location-based question transcripts responded to.

Steps to plan and conduct quantitative analysis reflect the measures of quantitative analysis.

Appendix A provides the protocol related to this step.

Quantitative analysis measures

Table 3.8 illustrates measures and definitions of the measures related to quantitative analysis for counting location-based question transcripts, in total and by type, as well as the location-based questions within the transcripts.

Table 3.8: Quantitative analysis measures and definitions of measures for counts of the number of location-based question transcripts, in total and by type, as well as location-based questions within the transcripts, and total question transcripts.

Measures	<p>1.Count of location-based question transcripts, in total and by type, as well as location-based questions within the transcripts.</p> <p>2.Count of total question transcripts.</p>
Definition of Measure	<p>1.Count of location-based question transcripts, in total and by type, are those questions determined to be location-based questions from content analysis and their type. Type definitions are discussed in the findings. In the example chat session 1, the location-based question is counted as an <i>attribute of geography, library</i> question. In some instances, transcripts contained more than one location-based question and also were counted.</p> <p><u>Example chat session 1</u> is a location-based question and would count as one location-based question; it would also count as an <i>attribute of geography, library—circulation policies--fines</i> question type.</p> <p>2.Count of total question transcripts included all usable transcripts during the two months. <u>Example chat sessions 1 and 2</u> include one question transcript for each. <u>Example chat session 2</u> is an other question and would not count as a location-based question transcript.</p>

Table 3.9 depicts the quantitative analysis goals, measures, and definitions of measures for counts of the number of non-local and total information providers.

Table 3.9: Quantitative analysis measures and definitions of measures for collocation counts and number of total information providers and non-local information providers responding to location-based question transcripts.

Measures	<ol style="list-style-type: none"> 1.Count of non-local information providers responding to location-based question transcripts. 2.Count of total information providers responding to location-based question transcripts.
Definition of Measure	<ol style="list-style-type: none"> 1.If the information provider’s address and the locations in the location-based question transcript do not collocate, then the information provider is a non-local information provider for that location-based question transcript.
	<p>Assuming the information provider from <u>Example chat session 1</u> was not in Hillsborough County and knowing that West Gate Library is in Hillsborough County, then the information provider was a non-local information provider as well as one of the total number of information providers responding to the location-based question transcripts.</p>
	<ol style="list-style-type: none"> 2.If the information provider’s address and any of the user’s locations in their location-based question transcript collocate, then the information provider is a local information provider and is not counted as a non-local information provider.
	<p>Assuming the information provider from <u>Example chat session 1</u> was in Hillsborough County and knowing that West Gate Library is in Hillsborough County, then the information provider was a local information provider and would not count as a non-local information provider. The information provider would count, however, toward the total number of information providers responding to location-based question transcripts.</p>

Each location-based question identified in content analysis counted as one location-based question. If multiple location-based questions occurred in a transcript, each one was counted. For the collocation portion of quantitative analysis, the researcher verified the addresses of information providers and locations in location-based question transcripts. To assist in determining the location of the information provider, some transcripts contained self-disclosure of the information provider’s location. In fact, *Ask a Librarian* trainers instruct information providers to introduce themselves by name and information agency (D. Sachs-Silveira, personal communication, September 30, 2008). For locations in location-based question transcripts, the researcher determined the addresses by conducting a Google Maps search of each location in the location-based question transcript. For example, in example chat transcript 1 the information provider’s address is unknown and the user’s location of interest is West Gate Library. For the information provider’s location, the researcher would need to look up the work place of the information provider in a look-up table of screen names, since the example lacks self-disclosure. The researcher would then determine West Gate Library’s address through Google Maps and

compare the locations to determine if the information provider was local or non-local to the user's location-based question.

Through content analysis, the researcher knew the population of usable transcripts and those transcripts containing location-based questions. By copying the content analysis findings into ArcGIS 9.3 and geocoding the locations within location-based question transcripts and information providers' locations, the researcher counted the number of location-based question transcripts, in total and by type, and also determined the collocation of information providers and locations in the location-based question transcripts. The example chat transcript 1 would count as one for total location-based question transcripts and one for the type: attribute of geography—library—circulation policies—fines.

Selection of quantitative analysis population

This study used all 7,021 chat transcripts occurring during the two months of *Ask a Librarian* service for content analysis (D. Sachs-Silveira, personal communication, December 1, 2008). For this exploratory study, the researcher estimated a population of location-based question transcripts between 1,400 and 2,800 chat transcripts, or between 20 to 40 percent of total transcripts available in the two months of usable data. Content analysis findings determined the population used for quantitative analysis to actually be 3,306 or 50 percent. The data from content analysis enabled the researcher to calculate the percentage of location-based question transcripts, in total and by type, of total question transcripts, as well as counts for location-based question types, and to calculate the percentage of non-local information providers responding to location-based question transcripts of total location-based question transcripts responded to.

Test data collection instrument

In a 10 percent pilot study, the researcher used the prospectus protocol and ArcGIS 9.3 to administer geocoding of the addresses of locations in location-based question transcripts and a look-up database of information providers' counties, in order to determine the possible collocation of those georeferenced locations. The researcher utilized ArcGIS 9.3 data management to perform counts of location-based question transcripts, in total and by type, and counts of non-local information providers and total information providers responding to location-

based question transcripts. Four chat reference experts discussed pilot study findings and the validity of the protocol, but the researcher did not have to refine the protocol for the variables related to quantitative analysis. However, it was determined collocation at the county level only required geocoding the locations to the county level.

Focus groups

In a focus group “people are brought together in a room to engage in a guided discussion of some topic” (Babbie, 2007, p. 308). “Typically such a discussion starts broadly and then narrows to focus more specifically on the topic being studied” (Matthews, 2007, p. 54). This study’s focus groups included a purposive and convenience sample of information providers that staff Florida’s *Ask a Librarian* service. The focus group protocol included open-ended questions so that participants could provide the information provider’s perspective on chat reference and location-based questions. This method addressed the types of location-based questions and the question-negotiation process of information providers for location-based questions by providing qualitative data from the information provider’s perspective. Steps for planning and conducting the focus groups follow.

Steps for focus groups

1. Developed focus group questions and protocol. These questions derived from this study’s research questions and were influenced by the findings of content analysis and quantitative analysis.
2. Conducted and recorded three focus groups in chat sessions.
3. Categorized the types of location-based questions that emerged from the data.
4. Categorized the types of 3.8, 4.9, and 5.7 RUSA guideline elements, and others issues and techniques discussed by focus group participants.

Steps to plan and conduct focus groups reflected the variables of focus groups. Appendix A provides the protocol related to this step.

Focus group variables

Table 3.10 illustrates an overview of the variables and the definitions of the variables related to focus groups.

Table 3.10: Focus groups variables and definitions of variables.

What are the Variables?	1. Types of location-based questions. 2. Information providers' question-negotiation techniques, which include RUSA guideline elements 3.8, 4.9, 5.7, and other issues and techniques discussed by focus group participants.
Definition of the Variables	1. Types of location-based question (e.g., library). 2. Information providers' question-negotiation techniques included: 3.8: Uses closed and/or clarifying questions to refine the search query; 4.9: Offers detailed search paths (including complete URLs), and names of resources used to find the answer, so that patrons can learn to answer similar questions on their own; 5.7: Refers the patrons to other institutions when the query cannot be answered to the satisfaction of the patron (Reference, 2004); Others: particular issues and techniques discussed by focus group participants.

Selection of sample

A purposive sample was used to select participants for this study's focus groups (Schutt, 2006). A purposive sample is a sample in which "each sample element is selected for a purpose, usually because of the unique position of the sample elements" (Schutt, 2006, p. 155). The researcher conducted three chat session focus groups, one hour each with four, five, and eight *Ask a Librarian* information providers that volunteered. The information providers' positions allowed them the ability to offer experiences related to chat reference and location-based questions in this chat consortium from the information provider's perspective (Matthews, 2007). Computer mediated focus groups retain the benefits and limitations of face-to-face focus groups. Computer mediated focus groups remove the need for transcription, remove all communication outside of text, and do not require the participants and researcher to meet face-to-face.

After consultation with the chat consortium manager and considering the economic conditions of Florida librarians, the benefit of reducing travel costs led to the decision to conduct the focus groups in chat sessions (Walston & Lissitz, 2000). It was unlikely participants would

have travelled to attend face-to-face focus groups, because no *Ask a Librarian* events except trainings were scheduled during the time of the study. Those participants attending trainings would not be suitable for the focus groups, because they had not staffed the service.

The study's sampling also employed convenience sampling, as any representative sample of information providers would be impossible given the time and fiscal restraints of this study and the potential availability of participants (Schutt, 2006). Conducting three focus groups, at three different times, was an attempt to gain the information provider's perspective from different individuals participating in the chat consortium, while remaining within the time and fiscal restraints of this study's researcher and participants. Seventeen participants represented 12 counties. The participants represented five of the state's six multi-type library cooperative, which are consortia representing large regions of the state.

Test data collection instrument

The researcher conducted all focus groups for consistency in data collection. The researcher analyzed all focus groups results for trends that emerged from the responses.

Unobtrusive testing

Matthews (2007) defines unobtrusive testing as “the administration by proxies of predetermined questions, derived from actual reference questions and approved by a panel of information providers as typical and reasonable questions with fixed correct responses, to information providers unaware of the testing” (p. 171). Unobtrusive testing provided quantitative measures from one user's perspective, by calculating the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers. In addition, the unobtrusive testing provided qualitative data to address the question-negotiation process of information providers for location-based questions.

As discussed in Chapter 2, unobtrusive testing studies and the 55 percent rule have received some criticism stemming from limitations of the method and intervening variables, including potential sampling bias, attitudes of proxies and information providers, as well as difficult questions, and the questionable ethics of the approach (Bailey, 1987). This exploratory

study attempted to mitigate some of the limitations of unobtrusive testing by using questions derived from actual location-based questions from this study's content analysis, by ensuring representativeness of the unobtrusive testing questions as typical chat reference questions with a panel of *Ask a Librarian* information providers, and by performing random samplings of participating agencies' web portals and times. In addition, chat reference removes non-verbal cues that could affect the question-negotiation process.

Previous correct response fill rate studies required a citation for a complete and correct response (Hernon & McClure, 1986). This study also assessed the correct response fill rate based on completeness and correctness; however, a complete response included RUSA guideline element 4.9., which offers detailed search paths (including complete URLs), and names of resources used to find the answer, so that patrons can learn to answer similar questions on their own. Correct responses were determined immediately after administration of unobtrusive testing questions through official public and private organization websites, telephone calls, and other print and electronic reference resources as necessary. Correct and complete responses were determined immediately after administration of unobtrusive testing questions through official public and private organization websites, telephone calls, and other print and electronic reference resources as necessary. The researcher acquired the following example chat transcript from a FEL *Ask a Librarian* evaluation study performed at the Information Use Management and Policy Institute in 2007 (Mon et al., 2007). The example chat transcript provides an illustration of a typical and reasonable chat transcript. This example identifies a location-based question. The example illustrates how the researcher gathered data from a chat transcript for unobtrusive testing.

Table 3.11: Example chat transcript for unobtrusive testing.

Example Chat Transcript 1

<i>Information provider:</i>	Hello, Welcome to Ask a Librarian! Please wait a moment while I read your question...
<i>User:</i>	if i have a fine how much of it do i have to pay at one time?
<i>Information provider:</i>	How much you need to pay is up to the library you borrowed it from. Some libraries require you pay it off at one time; others allow you to pay it off on an installment basis. Where did you check out the item?
<i>User:</i>	westgate library on paula drive
<i>Information provider:</i>	Since West Gate is part of the Tampa-Hillsborough system, you will need to call their number, so they can look up your record and give you that information. Would you like me to give you the number?
<i>User:</i>	yes
<i>Information provider:</i>	Okay, hold on a minute

Steps for planning and conducting the unobtrusive testing follow.

Steps for unobtrusive testing

1. Developed four questions for most types of location-based question and eight questions for the three most asked question types from content analysis. The three most asked question types from content analysis were library location-based questions—circulation policies (897), find a physical item (705), and log-in (517).
2. Asked a panel of five information providers that staff the service whether the derived questions were representative of typical and reasonable questions. If a question was deemed typical and reasonable by four of the five information providers on the panel of the service’s advisory committee, then the question was used in unobtrusive testing. This resulted in 162 unobtrusive testing questions, comprised of asking six questions from the three most asked question types and three questions from the other types, all three times each.
3. Assigned unobtrusive testing location-based questions to participating information agencies’ web portals at randomly selected times, by creating three spreadsheets—unobtrusive testing questions, hours of the service over a two week period, and web portals of participating agencies—then generating a random number for each

question, hour, and web portal and sorting them in order to pair a question with a time and information agency.

4. Conducted unobtrusive testing by asking questions and taking steps to limit interpersonal communication beyond the question and response.
5. Copied chat transcripts' text and pasted them into Word.
6. Geocoded addresses of locations in location-based questions utilizing ArcGIS 9.3.
7. Looked up information providers' counties.
8. Determined collocation of information providers and locations in location-based questions utilizing ArcGIS 9.3.
9. Calculated correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers.
7. Used protocol to identify RUSA guideline elements: 3.8, 4.9, and 5.7 (Reference, 2004). Protocol found in Appendix A.
8. Categorized the types of 3.8, 4.9, and 5.7 RUSA guideline elements.

Steps to plan and conduct unobtrusive testing reflected the measures and variables of unobtrusive testing. Appendix A provides the protocol related to this step.

Unobtrusive testing measures and variables

Table 3.12 illustrates an overview of measures and definitions of those measures.

Table 3.12: Unobtrusive testing measures and definitions of measures.

Measures	1. Correct response fill rate
Definition of Measure	1. Correct response fill rate was the percentage of location-based questions that received a complete and correct response, that was correct and with a citation.
	<u>Example chat session 1</u> a correct response would be contingent on the user's materials and the length of time overdue. Therefore, the referral of the information provider does not count as a correct response. The local or non-local information provider would be contingent on the geocoding of the addresses of the locations in each location-based question and determining their collocation with information providers' counties from a look-up database. With that data, the researcher would calculate the correct response fill rate of location-based questions for both local and non-local information providers.

Table 3.13 illustrates an overview of variables and definitions of those variables.

Table 3.13: Unobtrusive testing variable and definitions of variables.

What are the Variables?	Information providers' question-negotiation techniques, including RUSA guideline elements 3.8, 4.9, and 5.7
Definition of Variables	3.8: Uses closed and/or clarifying questions to refine the search query; 4.9: Offers detailed search paths (including complete URLs), and names of resources used to find the answer, so that patrons can learn to answer similar questions on their own; 5.7: Refers users to other institutions when the query cannot be answered to the satisfaction of the user (Reference, 2004).
Example of the Variable	<u>Example chat transcript 1</u> includes a 3.8: <i>Where did you check out the item?</i> <u>Example chat transcript 1</u> does not include a 4.9., the resources the information provider consulted to formulate a response. Other transcripts may include URLs or search strategies used by the information provider. <u>Example chat transcript 1</u> includes a 5.7.: <i>Would you like me to give you the number?</i> The offer of the library's phone number results in the referral of the question to the library.

Selection of sample

For unobtrusive testing, the researcher used Microsoft Excel's Random Number Generator to produce a random ordering of participating information agencies' web portals, with location-based questions for unobtrusive testing, and with the 168 hours of operation of the service for a two week period. One location-based question was asked within each hour of the service starting with the first hour, Monday at 10:00 a.m., until the 162 unobtrusive testing questions, derived from content analysis and deemed typical and reasonable by a panel of

information providers that staffed the service, were all asked. The researcher asked questions without disclosing a username, so that the default, Customer, appeared when the user did not select a username. However, the service began requiring a username the last two days of testing and first names of family and the supervisory committee members were used (e.g., Anna).

One-hundred and three participating information agencies existed at the time of this unobtrusive testing. The information agencies’ web portal spreadsheet included the names of the 103 information agencies, a URL to their individual web portals, and a random number generated from Microsoft Excel’s Random Number Generator to randomly order the agencies. The URL to an information agency’s web portal is where users click to ask an information provider a question. The information agency’s URL was where the researcher entered the service during unobtrusive testing.

The hours of operation spreadsheet included the 168 hours of operation that the service was open over the two week period. The service was open Sunday through Thursday from 10 a.m. to midnight E.S.T. (i.e., 14 hours of operation for 5 days a week). The service was open Friday and Saturday from 10 a.m. to 5 p.m. E.S.T. (i.e., 7 hours of operation for 2 days). This equals 84 hours of operation each week, which equals 168 hours of operation over a two week period. Table 3.14 illustrates the hours of operation.

Table 3.14: *Ask a Librarian* weekly schedule.

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Opens	10:00 a.m.	10:00 a.m.	10:00 a.m.	10:00 a.m.	10:00 a.m.	10:00 a.m.	10:00 a.m.
Closes	Midnight	Midnight	Midnight	Midnight	5:00 pm	5:00 pm	Midnight
Hours	14	14	14	14	7	7	14

The hours of operation spreadsheet displayed two weeks of the chat consortium service in military time by day, with a row for each hour of operation and Monday being the first day of the service’s workweek. Therefore, 11200 represented Monday of the first week at noon and 81200 represented Monday of the second week at noon. The researcher used Microsoft Excel’s Random Number Generator to assign a random number to each hour of operation. The hours of operation spreadsheet included the time of each hour of operation of the service and a random number to

determine which web portal and what location-based question would be asked at that time. For example, 141500 was the time with the lowest random number, which ranked it number one. Therefore, Sunday at 3:00 p.m. the web portal with the lowest random number was queued to ask the first location-based question, determined by the location-based question spreadsheet results.

Again, for the location-based questions, the researcher used Microsoft Excel's Random Number Generator to produce a third spreadsheet with a random number assigned to each of the 162 location-based questions for unobtrusive testing. Twelve of the location-based question types for unobtrusive testing had three questions, of which each were asked three times, and the three most asked library location-based question types had six questions, of which each were asked three times. Therefore, the 54 location-based questions derived from content analysis and deemed typical and reasonable by four of the five information providers on the panel were asked.

Two major types of non-directional location-based questions emerged from the data, geography questions and attribute of geography questions. Geography location-based questions were about the location of a place (i.e., latitude and longitude) or concerned the physical relation of a location to another location. Geography questions occurred 25 times in content analysis out of 3,306 chat transcripts. Since this is a small percentage of all location-based questions asked, only three geography questions were asked, three times each. Attribute of geography questions concerned the attributes of a location other than the physical location of a place and comprised the majority of location-based questions. The researcher subdivided the attribute of geography questions into those concerning libraries, universities, and other locations. The study broke out library and university location-based questions because these categories lend themselves more to the provision of scripted responses, as they related to the institutions participating in the chat consortium, as opposed to the other attribute of geography questions.

Of the attribute of geography questions, 40 questions were university, 2,699 were library, and 659 concerned locations other than a library or university and were referred to as attributes of geography (other). Because university questions were a small percentage to all location-based questions, only three university questions were asked, three times each. Attribute of geography other than those related to universities or libraries were divided into those questions concerning statistics about a place and all other general information about a place. Three statistics and three about a place questions were asked, three times each. These questions were asked relatively less

than other question types for two reasons—(1) correct and complete responses to them are difficult to determine (e.g., what did merchants wear in Ancient Egypt?) and (2) responses to these types of questions are most likely found on websites not in the control of the institutions that staff this service. Therefore, this exploratory unobtrusive testing focused more closely on library questions.

Library questions comprised the largest number of location-based questions asked (i.e., 78.3 percent of location-based question transcripts). Therefore, the researcher divided this large type into several subcategories illustrated in Table 3.15.

Table 3.15: Counts and percentage of types of library location-based questions.

Types of library location-based questions	Counts	Percentage
<i>circulation policies</i>	897	33.2%
<i>find a physical item</i>	705	26.1%
<i>log-in</i>	517	19.2%
<i>library card</i>	220	8.2%
<i>library services</i>	152	5.6%
<i>hours</i>	61	2.3%
<i>problems</i>	45	1.6%
<i>employment</i>	39	1.4%
<i>library location</i>	20	0.7%
<i>staff contact information</i>	16	0.6%
<i>inside library location</i>	7	0.3%
<i>collection development</i>	7	0.3%
<i>other (occurred four or fewer times)</i>	13	0.6%
TOTAL library questions	2,699	100%

Further clarification of these terms may be found in Chapter 4. For the three most asked subtypes of library questions, of which all were found more than 500 times in content analysis, the researcher asked six location-based questions, three times each. For the other eight subtypes of library location-based questions, the researcher asked three location-based questions, three times each. The subcategory of problems was thrown out of unobtrusive testing because of the costs and inconvenience related to alerting an information agency to a false problem as well as the difficulty of simulating an actual problem.

The researcher used Microsoft Excel's Random Number Generator to produce a random number for each of the 162 location-based questions. The location-based question spreadsheet included three location-based questions of 12 types of location-based questions, with each of the 36 questions appearing three times each in the spreadsheet for a total of 108 questions. In addition, the spreadsheet included six questions of the three most asked subcategories of library location-based questions, with each of those 18 questions appearing three times in the spreadsheet for a total of 54 questions. The location-based question spreadsheet included the random number assigned to each of the 162 questions. This random number was used to determine at which hour of operation and through which web portal the location-based question would be asked.

By joining the results of the three spreadsheets in ascending order, the researcher had a schedule of which participating information agency's web portal to enter when and which location-based question to administer. The researcher sorted the location-based questions in chronological order by time to create a chronological schedule of testing. The researcher anticipated no question-negotiation transaction to take longer than an hour and none did. A few alterations needed to be made to several questions to reflect the location of the web portal where the question entered the service. For example, a library-circulation policies question was re-written to be from the library of the web portal and not the original library from the derived question.

Each of the 103 participating information agencies' web portals were asked at least one unobtrusive testing location-based question, because there were 162 questions. Therefore, the order for web portals was repeated once to ask each of the questions. During the two weeks of testing, three questions needed to be re-asked to the service, due to technical issues on the side of the provider or proxy user, or the service was not staffed with anyone during operating hours. These were added to the bottom of the schedule.

Pretest data collection instrument

To obtain the 162 questions for unobtrusive testing, a panel of information providers ensured the questions were representative of typical and reasonable questions. The panel of information providers reviewed 56 potential location-based questions (i.e., one more question of

each type of question to be asked than needed for unobtrusive testing). The panel of information providers consisted of the service's advisory committee. The chat reference manager determined these individuals were the best suited to review whether questions were typical and reasonable. The panel of providers were not told these questions would be used in unobtrusive testing of the service because they could potentially be asked these questions when staffing the service. Only five of the 56 potential location-based questions were found by more than one reviewer to be atypical and unreasonable. Forty-two of the questions received typical and reasonable scores from all five information providers and 30 of the questions received a single atypical and unreasonable vote from one the five reviewers. A common concern of three of the five reviewers was that even though all these questions are typical and reasonable, these types of questions usually end in referrals. However, they are questions asked to the service.

The five questions that were deemed atypical and unreasonable happened to be two of the four questions concerning collection development and two of the four questions concerning library services and one library employment question. For these question subtypes, this left only two of three collection development, library services, and employment questions to ask for unobtrusive testing. For collection development and library services, one of the two remaining typical and reasonable questions for those two subtypes was asked twice during unobtrusive testing, in order to ask three of those types of questions. For employment, the three remaining typical and reasonable questions were asked. For the remaining types, three of six questions deemed typical and reasonable were asked.

The researcher conducted all unobtrusive testing for consistency in data collection. A protocol for correct responses assisted in determining the correct response fill rate to location-based questions, in total and by type, for local and non-local information providers. To address issues related to intrarater reliability, the researcher coded 30 randomly selected transcripts using protocols from unobtrusive testing twice, allowing one month to pass between coding, in order to ensure intrarater reliability over time. An acceptable Cohen's kappa was 80 percent and the researcher obtained .933. To address interrater reliability the researcher recruited and trained for nearly two hours three external coders to code 30 randomly selected transcripts using protocols from unobtrusive testing. Coded material was compared across coders to ensure interrater reliability. An acceptable Krippendorff's alpha was 80 percent and the researcher obtained .8147.

Ensuring valid and reliable data

Validity is “the state that exists when statements or conclusions about empirical reality are correct” (Schutt, 2006, p. 19). This study addressed issues of validity in terms of the following criteria:

1. Internal validity – “refers to the truthfulness of an assertion that A causes B” (Schutt, 2006, p.21). This study addressed several types of internal validity, including face validity, content validity, and construct validity.

a) Face validity – is “the type of validity that exists when an inspection of items used to measure a concept suggests that they are appropriate ‘on their face’” (Schutt, 2006, p. 117). For this study’s face validity, four chat reference experts reviewed preliminary findings and protocols of a pilot study of content and quantitative analysis for face validity. A panel of information providers from the service’s advisory committee assisted in ensuring that unobtrusive testing questions were representative of typical and reasonable questions for face validity. In all methodologies, the researcher’s supervisory committee reviewed the study’s proposed protocols.

b) Content validity – is “the extent to which the questions on the instrument and the scores from these questions are representative of all the possible questions that a researcher could ask about the content or skills” (Creswell, 2005, p. 164). For content and quantitative analysis, four chat reference experts discussed pilot study findings and the validity of the protocol, the researcher refined protocols for the variables in this exploratory study. A panel of information providers assisted in ensuring the unobtrusive testing questions were representative of typical and reasonable questions. In all methodologies, the researcher’s supervisory committee reviewed this study’s proposed protocols.

c) Construct validity – is “the type of validity that is established by showing that a measure [variable] is related to other measures [variables] as specified in a theory” (Schutt, 2006, p.120). In this study, chat reference, location-based questions, locations, non-local and local information providers, the question-negotiation process, and the correct response fill rate were clearly defined, as well as their relationship to the

exploratory study approach. For content and quantitative analysis, four chat reference experts reviewed preliminary findings and protocols for construct validity. In all methodologies, the researchers' supervisory committee reviewed the study's proposed protocols.

Table 3.16 below summarizes some steps taken to ensure the internal validity of the methodology.

Table 3.16: Data collection instruments and internal validity.

Method	<i>Content analysis</i>	<i>Quantitative analysis</i>	<i>Focus groups</i>	<i>Unobtrusive testing</i>
Committee review of instruments	Face, Content, Construct	Face, Content, Construct	Face, Content, Construct	Face, Content, Construct
Panel review of questions	N/A	N/A	N/A	Face, Content
Expert review of preliminary findings	Content, Construct	N/A	N/A	N/A

2. External validity – “exists when findings about one group, population, or setting hold true for other groups, populations, or settings” (Schutt, 2006, p. 21). This study was an exploratory study. Therefore, the researcher did not generalize beyond the sample data to other persons, settings, or past or future situations (Creswell, 2005). In terms of selection, this study sampled two sequential months of chat transcripts from a statewide chat consortium. Participation was convenient to all individuals in the population regardless of race, geography, age, gender, or other demographic characteristics, which increased generalizability across users and information providers within the consortium. Because only two sequential months of data were used, however, findings were not generalized across time. The study would have to be replicated at different times of the year in order to determine whether or not special conditions (e.g., population shifts, academic calendars, and others) influenced findings from the sampled months. In terms of the setting, findings were not generalized beyond the *Ask a Librarian* service to other chat

consortia because other consortia staff their services differently and operate with different software that triages questions differently. The findings also were not generalized to stand-alone agency chat services or to other modes of digital reference. Therefore, for the purposes of this study, the researcher only generalized findings within the parameters of this exploratory study.

Reliability is when “scores from an instrument are stable and consistent” (Creswell, 2005, p. 162). This study addressed issues of reliability in terms of the following criteria:

1. Intrarater reliability is when a single observer’s or researcher’s codes are consistent at different points in time (Schutt, 2006). The researcher coded all data. The researcher also coded 30 randomly selected transcripts using protocols from content/quantitative analysis and unobtrusive testing twice, allowing one month to pass between coding, in order to ensure intrarater reliability over time. Acceptable Cohen’s kappas were obtained.
2. Interrater reliability is when more than one observer or researcher codes using the same instrument and their coding produces similar results (Schutt, 2006). The researcher recruited and trained three external coders to code 30 randomly selected transcripts using protocols from content/quantitative analysis and unobtrusive testing. Coded material was compared across coders to ensure interrater reliability. Acceptable Krippendorff’s alpha were obtained.

If any instruments would have been found not reliable, the instruments would have been revised and intrarater and interrater reliability testing would have been repeated.

Justification of the methodology

This study employed an iterative, multi-method approach to address a lack of knowledge about chat reference and location-based questions and this lack of knowledge’s implications on chat reference service. The methodology related to the purpose of this study, which was to understand how information providers formulate responses to location-based questions and the correct response fill rate of location-based questions in a statewide chat consortium. Findings of the methodology met the following objectives:

1. Identified the types of location-based questions.

2. Explored how information providers formulate responses to location-based questions.
3. Evaluated the percentage of location-based question transcripts, in total and by type, of total question transcripts, the percentage of non-local information providers responding to location-based question transcripts of total location-based question transcripts responded to, and the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers.
4. Evaluated this study's assumptions.
5. Assessed the usefulness of the exploratory study approach.
6. Provided practical recommendations to improve chat reference services.

The methodology addressed the goal of the study, which was to reduce a lack of understanding of chat reference and location-based questions in order to provide practical recommendations on how information providers at participating information agencies in chat consortia may mitigate the challenges of accurately responding to location-based questions.

Relation of the methodology to the exploratory study approach

This exploratory study's purpose was to understand how information providers formulate responses to location-based questions and the correct response fill rate of location-based questions in a statewide chat consortium. The exploratory study approach also intended to generate new research questions, discussed in Chapter 5. The methodology provided four methods to address this purpose from two perspectives and related back to the exploratory study approach illustrated in Chapter 1, Figure 1.7. Methods used in this study included:

1. *Content analysis* provided the qualitative data used to determine the types of location-based questions and how information providers formulate responses to location-based questions, which addressed research questions 1 and 2 and related to Lankes' (2004b) question components—questions, expertise, information systems, and responses. Finding from this method enabled the researcher to address research questions 3 and 4.
2. *Quantitative analysis* provided quantitative data related to the percentages of location-based question transcripts, in total and by type, of total question transcripts and the location-based question transcripts responded to by non-local information providers of

total location-based question transcripts responded to. In addition, quantitative analysis generated counts of information provider techniques found in content analysis. Findings from this method addressed research questions 2, 3, and 4 and related to Lankes' (2004b) question components—efficiency and effectiveness.

3. *Focus groups* provided qualitative data of the types of location-based questions and how information providers formulate responses to location-based questions, which addressed research questions 1 and 2 and related to Lankes' (2004b) question components—questions, expertise, information systems, and responses.
4. *Unobtrusive testing* provided quantitative data, from a proxy user's perspective, on the accuracy of responses to location-based questions, in total and by type, for both local and non-local information providers and the location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to. In addition, the unobtrusive testing provided qualitative data on how information providers formulate responses to location-based questions, which addressed research questions 2, 4, and 5 and related to Lankes' (2004b) question components—expertise, information systems, responses, and efficiency and effectiveness.

Findings justified parts of and called for the revision of parts of the exploratory study approach. Findings illuminated some gaps in the approach and called for the inclusion of other methods to explore chat reference and location-based questions.

Assumptions and limitations of the methodology

This study's methodology utilized multiple methods to understand how information providers formulate responses to location-based questions and the correct response fill rate of location-based questions in a statewide chat consortium. Assumptions of this exploratory study included:

1. Multiple methods provide a more comprehensive view of chat reference and location-based questions than any single method can have alone (Bertot, McClure, & Ryan, 2001).

2. Methodologies that take into account multiple perspectives (e.g., information providers and a proxy user) provide a more comprehensive understanding of chat reference and location-based questions.
3. Information providers in this chat consortium negotiate questions either inside the information agencies' structures or at locations within the same political boundaries as their information agencies' structures.
4. Local information providers have local knowledge concerning the attributes of a location or locations near or within their information agency, which non-local information providers lack or would have some difficulty locating.

Re-assessment of these assumptions occurred throughout this exploratory study. Further re-assessment is addressed in Chapter 5.

Limitations of the study include:

1. *Ask a Librarian*, for privacy purposes, did not retain chat transcripts prior to October 2008.
2. Chat reference software queuing determined the information provider reached for each question from content analysis and unobtrusive testing.
3. The ability to geocode locations in location-based questions to the county level was contingent on the accuracy of the geospatial data found in the chat transcripts.
4. Authentication of correct responses through official public and private organization websites, telephone calls, and other print and electronic reference resources as necessary helped to validate correct responses, but some errors may have remained due to the inability of the researcher to validate beyond the resources available. For example, the hours of operation of an information agency may have been included on a website, but the website may not have been kept up to date.
5. The researcher cannot easily record the actions taken by information providers or users that occurred outside of chat transcripts.
6. Content analysis, quantitative analysis, focus groups, and unobtrusive testing results are not generalizable beyond this exploratory study.

Re-assessment of these limitations occurred throughout this exploratory study. Further re-assessment is addressed in Chapter 5.

Mitigating assumptions and limitations of the methodology

This exploratory study's methodology utilized multiple methods to understand how information providers formulate responses to location-based questions and the correct response fill rate to location-based questions in a statewide chat consortium. However, the methodology contained limitations. Steps to mitigate assumptions and limitations of the study included:

1. The researcher did not generalize findings beyond this study's chat consortium.
2. In unobtrusive testing, the researcher took steps to limit interpersonal communication beyond the question and response.
3. The researcher took caution in geocoding the geospatial data of locations within location-based questions to the county level. County level granularity reduced geocoding errors.
4. The researcher addressed actions taken by information providers that occurred outside of chat transcripts with the focus group method.
5. The researcher took reasonable precautions in authenticating correct responses through official public and private organization websites, telephone calls, and other print and electronic reference resources when necessary to help validate correct responses immediately after unobtrusive testing.
6. The researcher consulted with four chat reference experts to review preliminary findings and protocols, after a 10 percent pilot study of content analysis. A panel of information providers, who staff the service, assisted in ensuring that the unobtrusive testing questions used were representative of typical and reasonable questions.

Re-assessment of mitigating the assumptions and limitations of this study occurred throughout this exploratory study. Further re-assessment is addressed in Chapter 5.

Summary of the methodology

The purpose of this study's methodology was to address a lack of knowledge about chat reference and location-based questions and this lack of knowledge's implications on chat reference service. The research design employed multiple methods to understand how information providers formulate responses to location-based questions and the correct response fill rate of location-based questions in a statewide chat consortium. In addition, the multiple methods produced data from which the findings provided a more comprehensive understanding of chat reference and location-based questions than any single method could have provided. This study's methodology utilized content analysis, quantitative analysis, focus groups, and unobtrusive testing. In addition, this study's methodology allowed the researcher to address this study's research questions and accomplish the goal and objectives of the study.

Methodologies of this exploratory study explored how information providers formulate responses to location-based questions and the correct response fill rate of location-based questions, in total and by type, for local and non-local information providers in a statewide chat consortium. Findings produced from this study's methodology provide practical recommendations to improve information providers' ability to provide correct responses to the different types of location-based questions and to reduce barriers to participating information agencies in chat consortia in locating other information agencies' location-based attributes. These findings also provide recommendations for chat software developers and chat consortia managers to mitigate some of the challenges associated with location-based questions by building geographic intelligence into the systems and creating features that allow users and information providers to disclose the locations that relate to formulating a correct response to location-based questions.

CHAPTER 4

FINDINGS

Introduction

The purpose of this exploratory study was to understand how information providers formulate responses to location-based questions and to determine the correct response fill rate to location-based questions in a statewide chat consortium. This research addressed the need for additional understanding of location-based questions in order to provide practical recommendations on how information providers at participating information agencies in chat consortia may mitigate the challenges of accurately responding to location-based questions. Objectives for that goal were to:

1. Identify the types of location-based questions.
2. Explore how information providers formulate responses to location-based questions.
3. Evaluate the percentage of location-based question transcripts, in total and by type, of total question transcripts, the percentage of non-local information providers responding to location-based questions of total location-based questions responded to, and the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers.
4. Evaluate this study's assumptions.
5. Assess the usefulness of the exploratory study approach.
6. Provide practical recommendations to improve chat reference services.

The above objectives guided this study's research questions. Chapter 4 reviews the findings of content analysis, quantitative analysis, focus groups, and unobtrusive testing that addressed this study's first three objectives and five research questions. The final three objectives, related to the assessment of this study's assumptions, limitations, findings, methodology, and study approach, as well as recommendations and implications are addressed in Chapter 5.

A review of this study's research questions

This study's research questions addressed its objectives. Data collection and data analysis developed to respond to the research questions reduced a lack of knowledge of chat reference and location-based questions.

1. What are the types of location-based questions?
2. How do information providers negotiate location-based questions and formulate responses?
3. What is the percentage of location-based question transcripts, in total and by type, of total transcripts?
4. What is the percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to?
5. What is the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers?

This study's research questions guided the development of this study's data collection and data analysis. Table 4.1 presents the relationship between the research questions of this study, methodology to address this study's research questions, and this study's objectives.

Table 4.1. Relations between research questions, methodology, and the study objectives.

Research Questions	Research Methodology	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6
1. What are the types of location-based questions?	<i>Content analysis</i> <i>Focus groups</i>	X			X	X	X
2. How do information providers negotiate location-based questions and formulate responses?	<i>Content analysis</i> <i>Quantitative analysis</i> <i>Focus groups</i> <i>Unobtrusive testing</i>		X		X	X	X
3. What is the percentage of location-based question transcripts, in total and by type, of total question transcripts?	<i>Content analysis</i> <i>Quantitative analysis</i>				X	X	X
4. What is the percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to?	<i>Content analysis</i> <i>Quantitative analysis</i> <i>Unobtrusive testing</i>				X	X	X
5. What is the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers?	<i>Unobtrusive testing</i>				X	X	X

Each of the following sections of Chapter 4 addresses one research question with findings from the methodology related to the corresponding research question.

Types of location-based questions (Research question 1)

Types of location-based questions found in this study included one directional or wayfinding question (i.e., the question concerned the geospatial relation of locations, which included waypoints and routes), and many non-directional location-based questions (i.e., the questions concerned attributes of a location or locations, which included a point of interest, such as a library, and its circulation policies). These findings include the types of location-based questions found via content analysis based on mutually exclusive categories of location-based questions and those question types mentioned during focus groups. Location-based questions include any question that concerns the attributes of a georeferenceable location or locations. The

following sections discuss findings from the two methods that relate to answering research question one.

Findings from content analysis

The types of location-based questions were all non-directional location-based questions except for one *directional* location-based question (e.g., how to get from Singapore to Hong Kong). The non-directional location-based questions were subdivided into two major types of location-based questions, *geography* questions and *attribute of geography* questions. Geography location-based questions are about the location of a place (i.e., latitude and longitude) or concern the physical relation of a location to another location, as long as that place is not a library (e.g., where is Darfur?). As quantitative analysis findings will discuss, the majority of non-directional location-based questions concerned an attribute of geography of the location in a question rather than the location of a place or the physical relation of a location to other locations. These questions were named attribute of geography questions and concerned the attributes of a location or locations other than the attribute of physical location.

The researcher subdivided the attribute of geography questions into those concerning libraries, universities, and other locations. The study breaks out *library* and *university* location-based questions because these categories may lend themselves more to the provision of scripted responses, as they relate to the institutions participating in the chat consortium, as opposed to the *other attribute of geography* questions. The library and university location-based questions concerned the attributes of a library or university. The other attribute of geography questions concerned the attributes of an assortment of other places, ranging from Ancient Rome to Yosemite National Park. Because the geography varied considerably, from a specific residence to the planet Earth, these questions were subdivided into those questions concerning general information *about a place* (e.g., historic research, consumer, and so forth) and *statistics* (e.g., demographics, climate, and so forth) related to a location. The types of location-based questions appear in Table 4.2.

Table 4.2: Types of location-based questions.

Types of location-based questions	Definition
<i>Geography</i>	Questions concerned the location of a place or concerned the physical relation of a location to another location, except if that location is a library or university.
<i>Attribute of geography</i> -Library -University -Attribute of geography (other)	Questions concerned attributes of geography of the location, other than the physical location or its relation to other locations. The study breaks out <i>library</i> and <i>university</i> location-based questions because these categories may lend themselves more to the provision of scripted responses, as they relate to the institutions participating in the chat consortium, as opposed to other <i>attribute of geography</i> questions.

The following sections discuss in detail the types and subtypes of location-based questions from the largest to the smallest percentages of total location-based questions, as determined by quantitative analysis.

Library questions

The majority of location-based question transcripts were *library* question transcripts, as will be discussed in quantitative analysis findings (i.e., 78.3 percent of all location-based question transcripts). The location that these location-based questions concerned was a library. Although a museum is an information agency in the chat consortium, no questions concerning museums were asked. Therefore, the word “library” was chosen to best represent all the questions from users concerning information agencies that comprise the chat consortium as opposed to information agency location-based questions. *Library* questions were divided into 20 types of library questions. The 12 most asked, from most to least frequency, were *circulation policies, find a physical item, log-in, library card, library services, hours, problems, employment, library location, staff contact information, inside library location, and collection development*. Eight other types all occurred five times or less. The eight least frequently asked types included questions such as the composition of a county library consortium, the beauty of a particular library’s librarians, the square footage of a library, library trespassing rules, Accelerated Reader points for a popular vampire novel at a library, one library’s furniture, one

library's budget, and a library opening. The 12 most frequently asked types are defined in Table 4.3.

Table 4.3: Types of library location-based questions.

Types of library location-based questions	Definition
<i>circulation policies</i>	Questions concerned circulation policies (e.g., check-out limit, fines, renewals, requests, placing a hold, and so forth).
<i>find a physical item</i>	Questions concerned locating either a specific physical item or a physical item at a particular library (e.g., book, article, DVD, image, course catalog, and so forth). Digital items do not retain a georeferencable location unto themselves. Therefore, websites and e-resources are not counted as location-based question transcripts or location-based questions.
<i>log-in</i>	Questions concerned logging in at a particular library's databases, catalog, or library account.
<i>library card</i>	Questions concerned library cards (e.g., obtaining a card, canceling a card, reactivating a card, lost cards, and anything related to the physical card).
<i>library services</i>	Questions concerned specific library services unrelated to other types (e.g., printing, copying and faxing services, education, and so forth).
<i>hours</i>	Questions concerned library hours of operation.
<i>problems</i>	Questions concerned users reporting problems at particular libraries unrelated to other categories (e.g., catalog, database, or website down, noisy library users, and so forth).
<i>employment</i>	Questions concerned employment at a particular library, including volunteering.
<i>library location</i>	Questions concerned the physical location of a particular library building.
<i>staff contact information</i>	Questions concerned contacting individual staff at a particular library.
<i>inside library location</i>	Questions concerned a physical location inside a particular library.
<i>collection development</i>	Questions concerned a library's collection development policies (e.g., why do you purchase some things and not others).

Different subjects of questions were broken into categories based upon the topics referenced in the questions to the service and not divided by the locations in the questions. Issues related to the types of information agency that were asked particular types of questions (i.e., public library vs. academic library) are beyond the scope of this study. Also, the distribution of locations in questions asked to the service are beyond the scope of this study (e.g., the number of

Florida questions by county or the like). Although it may be argued that many of the question types are library services, certain library services emerge as frequently asked location-based questions and warranted their own question type (e.g., find a physical item). Three of the types of *library* location-based questions—*circulation policies*, *find a physical item*, and *library services*—contained further subtypes of questions and those definitions are listed in Tables 4.4-4.6.

Table 4.4: Subtypes of library circulation policies location-based questions.

Subtypes of library circulation policies location-based questions	Definition
<i>renewal</i>	Questions concerned renewing physical items.
<i>delivery</i>	Questions concerned the delivery of physical items. Orange County Library System offers home delivery of physical items and nearly all delivery questions stem from their users or their former users expecting this service from other public libraries.
<i>place a hold</i>	Questions concerned placing a hold or cancelling a hold on a physical item.
<i>finer</i>	Questions concerned fines.
<i>returns</i>	Questions concerned returning physical items.
<i>borrowing privileges</i>	Questions concerned borrowing privileges (e.g., the maximum number of items a user may have checked out at one time, the time limit of check-out, and so forth).
<i>request</i>	Questions concerned requesting and cancelling the request of physical items.
<i>account</i>	Questions concerned a user's account, but not issues related to log-in or his or her physical library card (e.g., account history, change of address, and so forth).
<i>donations</i>	Questions concerned donating to the library (e.g., books, vinyl records, and so forth).
<i>reserve</i>	Questions concerned reserving or locating physical items that may be on reserve.
<i>lost or damaged</i>	Questions concerned lost or damaged physical items.

Library circulation policies questions were divided into seventeen subtypes of questions. The eleven most asked, from most to least frequency, were *renewal*, *delivery*, *place a hold*, *finer*, *returns*, *borrowing privileges*, *request*, *account*, *donations*, *reserves*, and *lost or damaged*. Seven other types all occurred four times or less. The six least frequently asked types included oddities

such as the cataloging scheme used by the library, what some library jargon terms mean, such as check shelves and non-circulating, online public access catalog (OPAC) functionality, receiving e-mail alerts for due dates, and how to suggest a purchase for the library.

The category of library *find a physical item* includes a variety of requests for particular physical items and did not include any digital items. Although digital items may have an associated information agency that retains a georeferencable location, determining physical locations of digital items is problematic because users may access them anytime anywhere, unlike physical items. In addition, information providers do not need to retain local knowledge to operate and locate digital items within e-resources because these skills are transferable from one information system to another. The subtypes of *find a physical item* questions reflect the 15 types of physical items requested. The nine most asked subtypes listed from most to least frequency were *find a book*, *find a video*, *find a journal article*, *find a newspaper article*, *find other media*, *find language software*, *find an audio book*, *find a dissertation or thesis*, *find a play*, and *find an image*. Six subtypes were asked four or fewer and included peculiar requests such as find a directory, find a magazine, find a government document, find a test, find a reading counts list, and find a strategic plan.

Table 4.5: Subtypes of library find a physical item location-based questions.

Subtypes of library find a physical item location-based questions	Definition
<i>find a book</i>	Questions concerned finding a book (in print and not an e-book).
<i>find a video</i>	Questions concerned finding a video in any physical format (e.g., DVD).
<i>find a journal article</i>	Questions concerned finding a journal article (in print and not available via an e-resource).
<i>find a newspaper article</i>	Questions concerned finding a newspaper article, including obituaries (in print and not available via an e-resource).
<i>find other media</i>	Questions concerned finding other media (e.g., music, realia, and so forth).
<i>find language CDs or software</i>	Questions concerned finding language software or CDs.
<i>find an audio book</i>	Questions concerned finding audio books (not digitally available).
<i>find a dissertation or thesis</i>	Questions concerned finding a dissertation or thesis (in print).
<i>find a play</i>	Questions concerned finding a play (in print).
<i>find an image</i>	Questions concerned finding an image (in print and not digitally available).

Library services questions included a variety of questions concerning specific library services unrelated to other library location-based question categories. The subtypes of *library services* questions reflected the twenty-four types of services. The eight most frequently asked subtypes listed from most to least frequency to smallest include *copy, print, and faxing services, education, voting, software, Internet access, computer access, room reservations, and e-resource access*. Sixteen subtypes were asked four or fewer times and included events (e.g., Hispanic heritage event or puppet show), purchasing books (e.g., book fairs), book or genealogy clubs, projectors, tours, bookmobile, rooms with law books, and whether the library had parking, microform readers, book recycling, translation services, or had a separate chat service just for one county, Dolly Parton Library program registration, or supplies for children to build a snowman out of snow, or allowed users to advertise at the library, was open to the public.

Table 4.6: Subtypes of library services location-based questions.

Subtypes of library services location-based questions	Definition
<i>copy, print, and faxing service</i>	Questions concerned the ability or not to copy, print, fax, or scan at a particular library as well as associated costs.
<i>education</i>	Questions concerned the library services related to education (e.g., tutoring, classes, exam proctoring, and so forth).
<i>voting</i>	Questions concerned whether or not voting occurs at the library or which library a user should go to in order to vote.
<i>software</i>	Questions concerned whether a particular library has software available, other than language software (e.g., Adobe, video editing software, Microsoft Office, SPSS, and so forth).
<i>Internet access</i>	Questions concerned whether a particular library offers Internet access, including wireless access.
<i>computer access</i>	Questions concerned whether a particular library offers access to computers, without specifically asking for Internet access or software.
<i>room reservations</i>	Questions concerned reserving a room for meeting or studying.
<i>e-resource access</i>	Questions concerned accessing e-resources (e.g., databases).

The implications of the types and subtypes of *library* location-based questions are discussed in Chapter 5. The following section provides a discussion of *attribute of geography* location-based questions.

Attribute of geography (other) questions

The *attribute of geography* questions concerned the attributes of an assortment of other locations, which are not libraries or universities. The *attribute of geography* questions concerning other locations comprised the second largest group of location-based question transcripts, as will be discussed in quantitative analysis findings (i.e., 19.9 percent of all location-based question transcripts). Because the locations varied considerably in these questions, from a specific residence to the planet Earth, the other *attribute of geography* questions were subdivided into those questions concerning general information *about a place* (e.g., historic research, consumer, and so forth) and *statistics* (e.g., demographics, climate, and so forth) related to a location. Questions related to finding a person, product, or service and questions concerning legal issues within certain boundaries are examples of *about a place* attribute of geography type location-based questions. Census variables and the percentage of cremated versus buried persons in Florida are some examples of *statistics* location-based questions. The types of *attribute of geography (other)* location-based questions are defined in Table 4.7.

Table 4.7: Types of attribute of geography (other) location-based questions.

Types of attribute of geography (other) location-based questions	Definition
<i>about a place</i>	Questions concerned general information about a location that is qualitative.
<i>statistics</i>	Questions concerned quantifiable aspects of a location.

Subtypes of these *attribute of geography (other)* type location-based questions emerged. Both of the types of *attribute of geography* location-based questions—*about a place* and *statistics*—contained further subtypes of questions and counts of the subtypes are listed in Tables 4.8 and 4.9.

About a place attribute of geography questions included a variety of questions concerning different locations. The subtypes of *about a place* attribute of geography questions, however, reflect the topics the questions concerned. The eight subtypes listed from most to least frequency

included *miscellaneous*, *historic research*, *legal*, *consumer*, *find a person*, *education*, *employment*, and *map*. The subtype of *miscellaneous*, under *about a place* attribute of geography questions, contained a great variety of questions concerning topics that did not fit in the other categories and pertained to general information about various places.

Table 4.8: Subtypes of about a place attribute of geography (other) location-based questions.

Subtypes of about a place attribute of geography (other) location-based questions	Definition
<i>miscellaneous</i>	Questions concerned miscellaneous qualitative attributes of locations that do not fit into other subtypes.
<i>historic research</i>	Questions concerned historic research (e.g., Ancient Rome).
<i>legal</i>	Questions concerned legal issues within certain boundaries (e.g., marriage annulment in Florida).
<i>consumer</i>	Questions concerned products and services.
<i>find a person</i>	Questions concerned finding a person, dead or alive.
<i>education</i>	Questions concerned education (e.g., the general education test, training not offered at a university or library, and so forth).
<i>employment</i>	Questions concerned gaining employment, not at a library or university.
<i>map</i>	Questions concerned obtaining a map of a location. Maps concern a location or locations, whether print or electronic; therefore, these questions are location-based questions despite often concerning an e-resource.

Statistics attribute of geography questions included a variety of questions concerning different locations. The subtypes of *statistics* attribute of geography questions reflected the six subtypes listed from most to least frequency included *demographics*, *monetary*, *election*, *miscellaneous*, *climate*, and *time*.

Table 4.9: Subtypes of statistics attribute of geography (other) location-based questions.

Subtypes of statistics attribute of geography (other) location-based questions	Definition
<i>demographics</i>	Questions concerned demographics, socio-economic indicators, and other quantitative data concerning society related to a location (e.g., crime statistics, ethnicity, and so forth).
<i>monetary</i>	Questions concerned fiscal matters related to a location (e.g., home costs, salaries, inflation rates, and so forth).
<i>election</i>	Questions concerned the quantifiable outcomes of elections and other quantifiable data related to elections in specific locations.
<i>miscellaneous</i>	Questions concerned miscellaneous quantitative attributes of locations that do not fit into other subtypes.
<i>climate</i>	Questions concerned quantifiable climate aspects of a location (e.g., annual rainfall).
<i>time</i>	Questions concerned quantifiable time aspects of a location (e.g., days it takes to mail something from Florida to California).

Eight *miscellaneous statistics* attribute of geography questions included questions concerning topics that did not fit into the other categories. These questions did not fit into the other subtypes and included requested counts for West Virginia coalmines, Orlando churches, U.S. waste water per day, driving age limit in Florida, ratio of cremated versus buried in Florida, number of planets in our solar system, dimensions of a temple in Greece, as well as which country has the most libraries.

The implications of the types and subtypes of attribute of geography location-based questions are discussed in Chapter 5. The following section provides a discussion of *university* location-based questions.

University questions

University location-based question transcripts comprised a small minority of total location-based question transcripts, as will be discussed in quantitative analysis findings (i.e., 1.2 percent of all location-based question transcripts). *University* questions were subdivided into seven types of questions, from most to least frequency, included *administration*, *grants*, *log-in*,

technology, hours, books, and employment. Table 4.10 provides definitions for the seven types of *university* location-based questions.

Table 4.10: Types of university location-based questions.

Types of university location-based questions	Definition
<i>administration</i>	Questions concerned aspects of university administration (e.g., registration, course offerings, loans, and so forth).
<i>grants</i>	Questions concerned research funding through the university or assistance with obtaining external funding.
<i>log-in</i>	Questions concerned logging into a particular university's system, not related to the library.
<i>technology</i>	Questions concerned locating software or other technology issues related to the university.
<i>hours</i>	Questions concerned university hours of operation.
<i>books</i>	Questions concerned locating books at the university, not at the library (e.g., required course textbooks available at a bookstore).
<i>employment</i>	Questions concerned employment at a particular university.

These types indicate the *university* questions asked to this study's service. The implications of the types of *university* location-based questions are discussed in Chapter 5. The following section provides a discussion of *geography* location-based questions.

Geography questions

Geography location-based questions comprised the least frequently asked type of total location-based question transcripts, as will be discussed in quantitative analysis findings (i.e., 0.8 percent of all location-based question transcripts). *Geography* questions were questions about the *site* (i.e., latitude and longitude) or *situation* (i.e., those that concerned the physical relation of a location to another location) and were divided into the following types—location of a place and physical relation of locations. Table 4.11 provides definitions for the *geography* location-based questions.

Table 4.11: Types of geography location-based questions.

Types of geography location-based questions	Definition
<i>site</i>	Questions concerned where something is (e.g., street address).
<i>situation</i>	Questions concerned where something is in relation of something else (i.e., what continent is Florida in?).

The *site* geography questions included places such as Africa, Finland, four specific location in Florida, Hawaii, New York, the U.S. military bases around the world, ancient Roman trading routes, and where Dr. Martin Luther King, Jr. was killed. The *situation* questions included five Florida locations in relation to other locations as well as the physical relation of three other locations outside of Florida—Mt. Rushmore and the town in which it resides, two other U.S. states relation to each other, and Norway and Spain.

The implications of the types of *geography* location-based questions are discussed in Chapter 5. The following section provides findings from the focus groups regarding the types of location-based questions.

Findings from focus groups

Findings from the three focus groups, which included four, five, and eight participants respectively, support the types of location-based questions discussed in the findings from content analysis. Each focus group was given the definition of location-based questions and asked “What types of location-based questions have you received?” Counts of participant responses that related to types identified in content analysis appear in Table 4.12. No participants mentioned questions received related to the *geography* or *university* type, but several *library* and *attribute of geography (other)* questions emerged. Only one participant out of 17 said he or she did not receive any location-based questions; however, that one participant did provide examples later in the focus group after hearing other participants discuss the issue.

Table 4.12: Types of location-based questions identified in focus groups.

Types of location-based questions	Count
<i>library-circulation policies</i>	19
<i>library-find a physical item</i>	9
<i>library-log-in</i>	7
<i>library-library location</i>	7
<i>library-library services</i>	3
<i>library-hours</i>	3
<i>library-delivery</i>	2
<i>library-problems</i>	2
<i>library-library card</i>	1
<i>library-inside library location</i>	1
<i>attribute of geography-consumer</i>	4
<i>attribute of geography-education</i>	2
<i>attribute of geography-historic research</i>	1
<i>attribute of geography-legal</i>	1

One participant commented that the “majority are circulation related” and this sentiment matched other findings in this study. Although information providers’ perceptions of the frequency of location-based questions was not asked, the counts of mentions may provide some insight into the information providers’ awareness of different types of location-based questions received. As Table 4.12 depicts, the majority of question types mentioned related to the attributes of the users’ libraries and the majority of library location-based questions related to circulation policies.

Focus group participants also mentioned *attribute of geography* location-based questions, but only *about a place* questions. The attribute of geography questions mentioned related to the types that emerged from content analysis—*consumer*, *education*, *historic research*, and *legal*. Although these types were mentioned less frequently, the information providers understood location-based questions included more than the user’s library and this frequency may indicate they receive fewer *attribute of geography* type location-based questions than *library* location-based questions.

Summary

The types of location-based questions that emerged from the data during content analysis and focus group methods include *library*, *attribute of geography (other)*, *university*, and *geography* location-based questions. The quantities of each of these question types are discussed further in the findings. The variety of types, especially those relating to specific library services and resources, speaks to the importance of this study and the potential for future research. Chapter 5 includes recommendations related to these types of location-based questions for information providers, chat consortium managers, participating information agency administrators, and chat software developers.

Negotiation of location-based questions and how information providers formulate responses (Research question 2)

This study's findings include the types of responses and negotiation response techniques found in transcripts from content analysis and unobtrusive testing and those similar types of strategies mentioned during focus groups. The negotiation of location-based questions and the formulation of responses to the questions that emerged from the data during content analysis, quantitative analysis, focus groups, and unobtrusive testing contained similarities. Four types of responses from the RUSA guidelines were found, including clarifying questions, resources, non-responses, and referrals, and combinations of those guideline elements (Reference and User, 2004). Discussion of the correctness or completeness of these responses only occurs in the findings section related to research question five, because the negotiation of questions and formulation of responses is a unique matter separate from the correctness or completeness of responses formulated.

Clarifying questions include the use of closed or open questions to refine a user's often-ambiguous query (Reference, 2004; Taylor, 1968). Operationalizing this definition for this study resulted in the inclusion of every question asked by an information provider occurring in a transcript, because all questions intend to clarify. Resources included offering detailed search paths (including URLs) and names of resources used to formulate the information provider's

response. Operationalizing this definition for this study resulted in the inclusion of every hyperlink or mention of a particular resources (e.g., WorldCat) by the information provider. A non-response included those transcripts without any response from the information provider. Referrals operationalized for this study resulted in the inclusion of any occurrence when the user was referred to another information provider or institution. Referring a user to a resource was not counted as a referral, as those were counted as resource elements. The following sections discuss findings from the four methods that relate to answering research question two.

Findings from content analysis

Content analysis included the search for the occurrence of four types of responses from the RUSA guidelines, which included clarifying questions, resources, non-responses, and referrals, and combinations of those guideline elements, as well as how they were used to formulate responses to location-based questions (Reference, 2004). The following findings discuss the occurrence of RUSA guideline elements and combinations of these elements in responses to location-based questions.

Clarifying questions occurred in 72.9 percent of location-based question transcripts. Clarifying questions were used by information providers to determine the location of the user's question, to determine what resources a user had already used, and to help the user with any other questions. Information providers often are not familiar with the locations of all libraries and municipalities within the state of Florida or across the globe and therefore must ask where a particular city or library is located. Examples of some clarifying questions are provided in Table 4.13.

Table 4.13: Examples of clarifying questions.

Examples of clarifying questions

what county is that?

are you enrolled at Keiser?

Well, you need to use your local library, so where do you live?

What library are you referring to?

Are you looking for books in your local library?

Who was the mayor of what city?

I can find you a tel # or e-mail for Orange County, would that help?

Would you like me to show you their website and we can take a look?

Do you have the titles of either book?

Where have you already looked?

Did you ask your grandmother? If she lives there, she might know.

Can I help you with anything else today?

Is it helpful at all?

Although the users' locations in location-based questions may be inferred from their entry web portals to the service or are stated in their original questions, information providers often still will clarify the locations of their questions before responding. The transcripts without any clarifying questions may be explained by at least two approaches to responding to location-based questions. In the first, the information provider does not ask any questions because the user is knowledgeable enough to include pertinent information in the question asked, and the provider provides a response without the need to probe the user with questions. In the second possible explanation for the lack of clarifying questions used, the information provider immediately infers that he or she will not be able to respond to a non-local user and refer him or her to the user's local information agency. In other instances, the information provider may give a response without asking any questions either because the information provider is local to the question and retains local knowledge without looking for information to formulate a response or an information provider finds a response without clarifying the location within the location-based question beyond the user's web portal or data from the original question.

The use of resources occurred in 44.5 percent of location-based question transcripts. Use of resources included offering detailed search paths (including URLs) and names of resources used to formulate the information provider's response. Operationalizing this definition for this

study resulted in the inclusion of every hyperlink or mention of a particular resource (e.g., WorldCat) by the information provider. Most resources were URLs, which included library websites, other websites related to the locations within location-based questions, and statistical resources (e.g., Census.gov). In a few instances, a library's OPAC or Google Maps were utilized to respond to location-based questions without a URL, but they were mentioned by the information provider as resources used to formulate a response. In all instances, the resources were used to assist a user in locating a response to his or her location-based question. In several instances, resources in combination with clarifying questions resulted in the information provider determining the location in the user's location-based question and resources were used to respond to it. In the majority of location-based question transcripts, resources were not used. The reason resources may not have been used is either because the information provider was local to the question and retained local knowledge without looking for a response or found and provided a response without an accompanying resource or explanation of the source of the response.

Non-responses occurred in only nine (i.e., 0.3 percent) of location-based question transcripts. A non-response included those transcripts without any response from the information provider. In these instances, either the service was not staffed at the time of the question or technical problems on the user or information provider side prevented the service from responding to the location-based question.

Referrals occurred in 37.5 percent of location-based question transcripts. Considering location-based question transcripts comprised 50.2 percent of total question transcripts in this study's content and quantitative analysis, at least 18.8 percent of total question transcripts in the study ended in referral. Referrals operationalized in this study resulted in the inclusion of any occurrence when the user was referred to another information provider or institution. In some instances, the referrals included a clarifying question, a resource, or both, in an effort to attempt to respond to the question before referral. However, in some instances an immediate referral occurred without any attempt to respond to the location-based question. Examples of some referrals are provided in Table 4.14.

Table 4.14: Examples of referrals.

Examples of referrals

That's ok. But I think you may have better luck if you call 433-7879.

For account information, your best bet is contacting your local library

I'm afraid my only other suggestion would be to call your library

Unfortunately you'll need to call or visit your local library to get a PIN number. There aren't any Charlotte Glades librarians online at this time.

They have a slightly confusing website. Here is the number for the Daytona Beach library: (386) 257-6036

I haven't been able to find a place on their website to submit requests online, but this is the number for Miami-Dade's interlibrary loan office: 305-375-4068. Since I don't work for a Miami-Dade library, I don't have access to the information I'd need to complete the request for you, but if you give them a call I'm sure someone at that library system will be able to help you with it.

I am a librarian at SCC and not the best person to ask a college specific non-research question.

I'm thinking that might be something you would find at the state library, i'm at Barry university in Miami shores so i'm not sure i'd be able to find that

If the question is with your specific account, I can't help you because I don't have access to that information. Also, I don't work for your county library, so I'm not qualified to comment on their policies

Immediate referrals aside, most referrals occurred when an information provider was either not able to locate a response to the location-based question through digital resources or when an information provider did not feel comfortable responding on behalf of another information agency. The latter causes implications for the consortium because most information providers that staff the service are non-local and do not have local knowledge to address questions concerning log-in and circulation policies or do not have access to technical services to fix users' problems. Without the local knowledge disseminated or access permissions granted, then non-local information providers will always need to refer users to their local libraries.

The inability of information providers to locate local knowledge on websites may indicate that information agencies do not adequately disseminate that information for either users or non-local information providers. Several transcripts indicated that information providers find non-local library websites to be confusing, difficult to navigate, and missing required information to formulate a response. Both poorly designed library websites and a lack of access permissions given to non-local information providers are reasons for referrals and often resulted in several users with responses indicating the attitude "How come I got on this 'ask a librarian' and I can't ask a question?" User dissatisfaction may result in less use of the service.

The implications of the negotiation of location-based questions and the formulation of responses to the location-based questions are discussed in Chapter 5. The following section provides counts of these elements from the quantitative analysis.

Findings from quantitative analysis

Quantitative analysis included the counts of the occurrences of four types of responses from RUSA guidelines, which included clarifying questions, resources, non-response, and referral, and combinations of those guideline elements as well as how they were used to formulate responses to location-based questions (Reference, 2004). The following findings discuss the counts of RUSA guideline elements and discuss the responses by location-based question type. Table 4.15 percentages are out of 3,308 total location-based questions (3,303 transcripts, plus five that had two questions).

Table 4.15: Counts and percentage of guideline elements from content analysis.

RUSA guideline elements	Counts	Percentage of transcripts
<i>clarifying questions</i>	2,410	72.9%
<i>resources</i>	1,471	44.5%
<i>non-response</i>	9	0.3%
<i>referrals</i>	1,239	37.5%

Table 4.16 examines referrals more closely. Fewer than 8 percent of referrals are immediate and nearly a third receive clarifying questions and resources before referral. The percentages discussing non-local and local information providers' rates of referral are out of the 1,217 location-based transcripts containing referrals because 18 transcripts had questions that concerned unknown locations. The higher percentage of non-local information providers referring users may only reflect that the majority of information providers staffing the service are non-local, as research question four later addresses. Local information providers refer local users because many do not have access permissions to respond to any account related issue.

Table 4.16: Counts and percentage of referrals from content analysis.

Referrals	Counts	Percentage of referral transcripts
<i>total referrals</i>	1,239	100%
<i>immediate referral</i>	94	7.6%
<i>referral in transcripts that included using clarifying questions and resources</i>	352	28.4%
<i>referrals with known locations</i>	1,217	98.2%
<i>referrals by non-local information providers</i>	1,008	82.8%
<i>referrals by local information providers</i>	209	17.2%

As discussed in the findings for research questions one and three, the largest percentage of location-based questions were library questions. Table 4.17 illustrates the results of quantitative analysis of how information providers negotiate and respond to *library* location-based questions.

Table 4.17: Counts and percentage of guideline elements in library location-based transcripts from content analysis.

RUSA guideline elements found in library location-based question transcripts	Counts	Percentage of transcripts
<i>clarifying questions</i>	1,848	71.5%
<i>resources</i>	933	36.1%
<i>non-response</i>	7	0.3%
<i>total referrals</i>	1,138	44.0%
<i>immediate referral</i>	89	3.4%

Local information providers retain local knowledge to formulate responses without providing a source or asking any clarifying questions. Clarifying questions and resources were used in tandem to respond in 29.7 percent of transcripts. In 292 instances, transcripts that ended in referral also included clarifying questions and resources, and in these transcripts, it was clear that the information providers made efforts to formulate a response before resorting to a referral. In many instances, questions concerning log-in (59.6 percent referral) and circulation policy

questions (44.5 percent) ended in referrals from the service because the information providers either could not locate a response on poorly designed library websites or they did not have permissions to access accounts to reset passwords or renew books. These are the two of the highest number of library location-based questions asked to the service as discussed in research question one and three. Table 4.18 below illustrates university location-based transcripts and the similarity of their percentages of RUSA guideline elements to library location-based transcripts.

Table 4.18: Counts and percentage of guideline elements in university location-based transcripts from content analysis.

RUSA guideline elements found in university location-based question transcripts	Counts	Percentage of transcripts
<i>clarifying questions</i>	30	75.0%
<i>resources</i>	20	50.0%
<i>total referrals</i>	17	42.5%
<i>immediate referral</i>	1	2.5%

No matter whether local or non-local information provider, *library* and *university* questions received smaller percentages of clarifying questions and resources and higher percentages of referrals than *attribute of geography* and *geography* types of location-based questions as depicted in Tables 4.19 and 4.20. The *university* types of location-based questions were responded to with similar percentages for clarifying questions and referrals; however, more resources were used in responding to *university* questions. Almost 60 percent of total referrals were by non-local information providers and the remainder were from local information providers.

Table 4.19: Counts and percentage of guideline elements in attribute of geography (other) location-based transcripts in content analysis.

RUSA guideline elements found in attribute of geography (other) location-based question transcripts	Counts	Percentage of transcripts
<i>clarifying questions</i>	518	79.0%
<i>resources</i>	499	76.0%
<i>non-response</i>	2	0.3%
<i>total referrals</i>	84	12.8%
<i>immediate referral</i>	4	0.6%

Perhaps, higher referral rates occur for *library* and *university* questions due to the fact that those questions can be referred to another provider in the service and several *attribute of geography (other)* questions cannot (e.g., Ancient Rome). Despite the smaller percentage of referrals, non-local information providers still referred twice as many questions as local information providers, and again this may be due to the fact users are more likely to receive a non-local information provider in the chat service.

Despite the assumed lack of expertise, there was only a 21.6 percent referral rate for legal questions. This referral rate was lower than the referral rate for library circulation policy questions (i.e., 43.0 percent). The issues related to disparities in response to *library* type questions compared to other *attribute of geography* questions, like this example, are discussed in Chapter 5. *Geography* location-based transcripts comprise the smallest number of location-based questions from content analysis.

Table 4.20: Counts and percentage of guideline elements in geography location-based transcripts from content analysis.

RUSA guideline elements found in geography location-based question transcripts	Counts	Percentage of transcripts
<i>clarifying questions</i>	14	56.0%
<i>resources</i>	19	76.0%

Information providers did not refer any *geography* location-based questions and used a combination of online mapping applications and clarifying questions to respond to the questions. One *directional* location-based question was asked, which concerned travel from one location to another, and the information provider used a combination of clarifying questions and resources to formulate a response.

In short, information providers attempted to determine what a user wanted and what locations a question concerned, and then provided a response. In several instances, providers did not ask any clarifying questions because the location was assumed from the user's entry web portal or original question. Information providers did not always provide a resource because often copying and pasting text from another source into the transcript gave the answer. *Library* and *university* type location-based questions were more likely to be referred. *Library* location-based questions received the fewer resources mentioned per transcript. Perhaps, the use of fewer resources is due to a lack of good resources to point users. The implications of these quantities related to the negotiation of location-based questions and the formulation of responses to location-based questions are discussed in Chapter 5. The following section provides insight from information providers related to the elements of question-negotiation divulged during focus groups.

Findings from focus groups

Findings from the three focus groups, which included four, five, and eight participants respectively, support the findings from content and quantitative analysis. Each focus group was given the definitions of the three RUSA guideline elements and location-based questions before being asked the following five questions:

1. What techniques do you use to respond to location-based questions?
2. Have you used clarifying questions in responding to location-based questions?
3. Have you offered pointers or named resources you used in responding to location-based questions?
4. Have you referred users to other sources or institutions in responding to location-based questions?

5. What other techniques have you used in responding to location-based questions?

Focus groups included discussion on RUSA guidelines and how information providers used them to formulate responses to location-based questions (Reference, 2004). The following findings discuss the techniques used by information providers to respond to location-based questions, from their perspective.

The first question was intended to be a broad question to encourage information providers to share their experiences in total and the later questions discuss specific RUSA guidelines elements. The findings related to this question are echoed in responses to later questions. Information providers indicated they formulated responses online by going to the website the user was on; especially if it is his or her library's webpage and information providers treated location-based questions like any other question. By retracing a user's steps and clarifying the actual reason for his or her question, information providers developed a formulated response and answered location-based questions.

Several information providers indicated that they searched the users' local library websites and OPACs to find responses to their location-based questions related to libraries. Myflorida.com, SEFLIN, mylibraryservice.org, and other local government websites provided resources to address location-based questions concerning government. For directions and locating a library, Mapquest was used as a resource. Two information providers said they pushed web pages to users and this allowed both the information provider and user to look over the same web pages during a transaction. One mentioned calling a library to help a user, but most providers indicated they gave the library phone number to the user and expected him or her to get a local response, because the providers were unable to locate the answer on a library's webpage. Several information providers indicated that users did not understand the statewide service and users assumed the provider was at their local library. Users are "insulted when you don't know where they are" or "don't have their account information."

When asked about clarifying questions, all information providers indicated they used them. The information providers needed to ask clarifying questions if the query was not "very clear to begin with" or the provider was not sure what the user was asking. Information providers asked a user's zip code, his or her closest branch, which campus, the library he or she usually visits, and so forth to determine the location of his or her location-based question. The

information providers relied on the user's entry web portal to indicate the user's location; however, in some cases this did not match his or her actual location or the location of his or her question, so information providers usually confirmed the location with clarifying questions before responding.

The resources used by information providers included digital resources such as library websites, GoogleMaps, MapQuest, Factbook, search engines, ReferenceUSA, WorldCat, Internet Public Library (IPL), the FEL, Newsbank for obituaries, Government Printing Office (GPO) Access, United States Geological Survey (USGS), Thomas.gov, the Encyclopedia of Associations, and the Knowledge Base of the *Ask a Librarian* service. For digital resources, information providers pushed the pages to users with a feature of the chat software. One information provider indicated using non-digital resources, such as print maps. Information providers mentioned that they always cited a source and usually pushed URLs to users even if they provided the answer in the text of the transcript.

Information providers indicated they most definitely referred users, with multiple exclamation points in the chat focus group windows to emphasize that referral occurs; In most instances, the users were given a direct phone number to call their local libraries. The user's local library may provide answers when necessary information is not on a website, especially since the quality of library websites varies greatly and some "are really difficult to navigate." Information providers indicated several reasons for referrals, including users needing to go to their libraries to pick up materials anyway, the fact that a local provider may respond in a more timely manner, and log-ins relating to security and licensing issues that only local institutions should handle. In addition, information providers of the chat service are not given dummy passwords to assist in log-in and account matters. Still, in some instances referrals for log-ins may be avoided because a student might only need a description of the default password to constitute a correct response (e.g., your log-in starts with 206 and is found on your card).

Other techniques and thoughts provided during focus groups included the following discussion. Some information providers found chat more challenging as a mode of reference service. In fact, one information provider indicated that as opposed to phone call transactions, chat users do not receive step-by-step instructions. Chat does not include breathing or awkward pauses of silence and information providers do not type the step-by-step details of their search

strategies, while busy searching in another window. Although many information providers indicated techniques of “getting the patron to ask what they want” and trying to determine the user’s “real” need, as well as providing updates when the information provider is still looking, several information providers pointed out that in chat “most chatters want an answer, not an explanation.” “Chat is like the vending machine of library interactions” and other reference transaction techniques do not apply.

No matter whether the information providers simply gave the correct response or explained to the users how the responses were found, the information providers of the focus group reiterated on the fact that “information is hard to find on most library websites!” Information providers did indicate that they used a combination of clarifying questions and a variety of resources to negotiate and respond to location-based questions, but also they often referred users to their local libraries. The implications of these comments related to the negotiation of location-based questions and the formulation of responses to location-based questions are discussed in Chapter 5. The following section provides further findings from unobtrusive testing.

Findings from unobtrusive testing

The unobtrusive testing findings reinforce question-negotiation techniques described in content analysis, quantitative analysis, and focus group findings. Similar to content analysis and quantitative analysis, unobtrusive testing reports the counts of the occurrence of four types of responses from RUSA guideline elements, which include clarifying questions, resources, non-responses, and referrals, and combinations of those guideline elements as well as how they were used to formulate responses to location-based questions (Reference, 2004). The following findings demonstrate the counts of RUSA guideline elements and discuss the responses by location-based question type. The percentages are calculated using $n=165$ (with 162 being asked to the service, and 3 resulting in a non-response). Table 4.21 provides the counts and percentages of RUSA guideline elements in unobtrusive testing.

Table 4.21: Counts and percentage of guideline elements from unobtrusive testing.

RUSA guideline elements	Counts	Percentage of transcripts
<i>clarifying questions</i>	130	78.8%
<i>resources</i>	83	50.3%
<i>non-response</i>	3	1.8%
<i>total referrals</i>	64	38.8%
<i>immediate referrals</i>	9	5.5%
<i>referrals by non-local information providers</i>	59	35.8%
<i>referrals by local information providers</i>	4	2.4%

The higher percentage of non-local information providers referring users may only reflect that the majority of information providers staffing the service are non-local, as research question four later addresses. The findings from this much smaller sample appear to reinforce the relatively high referral rate found in content and quantitative analysis, as well as similar rates of clarifying questions and resources.

As discussed in the findings for research question three, the largest percentage of location-based questions were *library* questions. Table 4.22 illustrates the results of unobtrusive testing related to how information providers negotiate and respond to *library* location-based questions.

Table 4.22: Counts and percentage of guideline elements in library location-based transcripts from unobtrusive testing.

RUSA guideline elements found in library location-based question transcripts	Counts	Percentage
<i>clarifying questions</i>	104	82.5%
<i>resources</i>	20	50.0%
<i>total referrals</i>	59	46.8%
<i>immediate referral</i>	9	7.1%
<i>referrals by non-local information providers</i>	55	43.7%
<i>referrals by local information providers</i>	4	3.2%

As compared to findings from content analysis, clarifying questions occurred less frequently and resources occurred more frequently in this small population from unobtrusive testing. Clarifying questions and resources were used in tandem to respond in 34.9 percent of transcripts; this finding is within a few percentage points of the content analysis findings. Referrals were slightly higher in this small sample.

In 13 instances (i.e., 10.3 percent), referrals also included clarifying questions and resources and in these transcripts, it was clear that the information providers made efforts to find a response before resorting to a referral. Twelve of 19 questions concerning log-in (63.1 percent) and seven of 15 circulation policy questions (46.6 percent) ended in referrals from the service because the information providers could either not locate a response on poorly designed library websites or did not have access and permissions to access an account to perform actions such as resetting a password or renewing books. These are the two of the largest number of *library* location-based questions asked to the service as discussed in research question three, and the unobtrusive testing findings reinforce the content and quantitative analysis findings.

In unobtrusive testing, four of 21 library questions were responded to correctly; however, all of these *library* questions may have been answered if information agencies disseminated their local knowledge in simple text through websites or the service's knowledge base (e.g., the library offers printing). In 11 unobtrusive testing transcripts, information providers used librarian knowledge to assume the correct response. These assumptions were correct in nine instances; however, assumptions of other information agency circulation policies and library services may not always be accurate (e.g., not every library may allow printing or purchase every book in a series).

Information agencies do not provide access and permissions to their users' library accounts to non-local information providers staffing the service. Findings from unobtrusive testing show that one of *nine library circulation policies* type questions were responded to correctly. These types of questions may have been answered correctly more frequently if non-local information providers were given access and permissions to library accounts. Table 4.23 below illustrates how information providers respond to *university* location-based transcripts and the similarity of the unobtrusive testing percentages to findings from content and quantitative analysis.

Table 4.23: Counts and percentage of guideline elements in university location-based question transcripts from unobtrusive testing.

RUSA guideline elements found in university location-based question transcripts	Counts	Percentage
<i>clarifying questions</i>	8	88.8%
<i>resources</i>	8	88.8%
<i>total referrals</i>	3	33.3%
<i>referrals by non-local information providers</i>	3	33.3%

The *university* types of location-based questions comprised only nine questions, so any comparison to other findings is difficult. For both local or non-local information providers, *library* and *university* questions received higher percentages of referrals than *attribute of geography* and *geography* types of location-based questions depicted in Tables 4.24 and 4.25. Table 4.24 illustrates *attribute of geography (other)* location-based questions asked during unobtrusive testing.

Table 4.24: Counts and percentage of guideline elements in attribute of geography (other) location-based transcripts from unobtrusive testing.

RUSA guideline elements found in attribute of geography (other) location-based question transcripts	Counts	Percentage
<i>clarifying questions</i>	15	62.5%
<i>resources</i>	20	83.3%
<i>non-response</i>	2	0.3%
<i>total referrals</i>	1	4.2%
<i>referrals by non-local information providers</i>	1	4.2%

Only one *attribute of geography (other)* location-based question was referred. This finding matches earlier findings. Perhaps these questions are referred less frequently because these questions cannot be referred to any other provider. All three *geography* location-based questions were responded to with a combination of clarifying questions and resources and none were referred. The implications of these findings as related to the negotiation of location-based

questions and the formulation of responses to location-based questions are discussed in Chapter 5. The following section provides a summary of findings related to the negotiation and formulation of response to location-based questions.

Summary

The techniques used to negotiate and respond to location-based question transcripts, found in content analysis, quantitative analysis, focus group, and unobtrusive testing methods provide data that reinforces the findings from the other methods. The high rate of referral speaks to the importance of this study and the potential for future research, especially for questions related to libraries that are referred (i.e., 44.0 percent in content analysis, 46.8 percent in unobtrusive testing). Chapter 5 includes recommendations related to this finding and the other techniques related to negotiating and formulating responses to location-based questions for information providers, chat consortium managers, participating information agency administrators, and chat software developers.

Percentages of location-based question transcripts, in total and by type, of total question transcripts (Research question 3)

After content and quantitative analysis, the researcher determined that 3,303 transcripts contained at least one location-based question. Five of those 3,303 transcripts contained two types of location-based questions. In addition, 3,424 location-based questions occurred in the 3,303 transcripts. The following provides calculations of the percentage of location-based question transcripts, in total and by type, of total question transcripts. Transcripts that contained other questions were not analyzed to see how many other questions were within those transcripts, because the issues related to quantifying other questions (i.e., a user asks how do you know when a boy likes you within a transcript and the transcripts contains multiple other questions related to the first other question) were beyond the scope of this study. The percentage of location-based question transcripts, in total and by type, of total transcripts were calculated, as opposed to the percentage of location-based questions of total questions.

The transcript percentage provides a frequency for the occurrence of location-based question transcripts for this chat consortium. In order to make this calculation, the researcher conducted counts of unusable transcripts, other question transcripts, and location-based question transcripts. Counts for location-based questions within the location-based transcripts were also calculated to add to the findings. Figure 4.1 illustrates the totals of each type of location-based question related to the total transcripts. Please note that the total for location-based questions adds up to more than the total of location-based question transcripts because several transcripts contained two or three location-based questions.

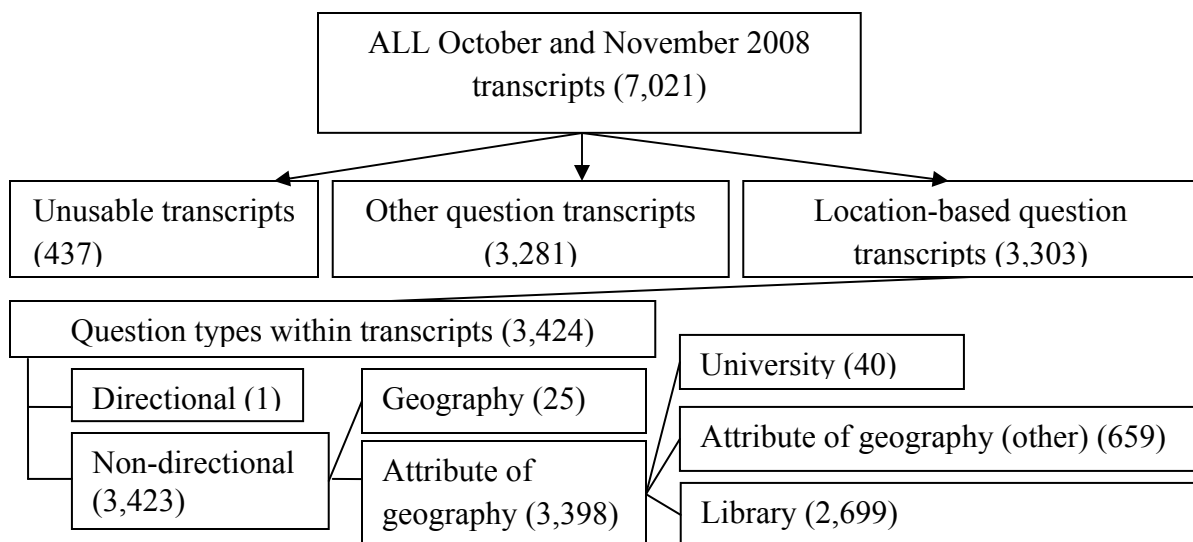


Figure 4.1. Quantitative analysis of location-based question types.

Unusable transcripts included transcripts used for system tests, trainings, or information provider-to-information provider communications (Pomerantz et al., 2006). These unusable transcripts appeared despite InstantService containing a separate training area, where the chat consortium manager encourages these types of communications to occur to avoid training activities being recorded and skewing usage statistics of the actual chat reference service. However, unusable transcripts constituted 6.2 percent of the study’s transcripts. Often information providers would check to make sure their individual web portals to the service were

working, conduct impromptu trainings, and send pleasantries regarding the holidays to other information providers.

Calculations of the percentage of location-based question transcripts of total question transcripts occurred after the removal of unusable transcripts. Table 4.25 provides the findings of location-based question transcripts of total question transcript percentages.

Table 4.25: Counts and percentage of location-based questions of total question transcripts.

Types of transcripts	Counts	Percentage
<i>other question transcripts</i>	3,281	49.8%
<i>location-based question transcripts</i>	3,303	50.2%
<i>TOTAL question transcripts</i>	6,584	100%

Half of all transcripts were location-based question transcripts. Figure 4.2 provides a visualization of the findings of the percentages of location-based question type transcripts and other question transcripts of total question transcripts.

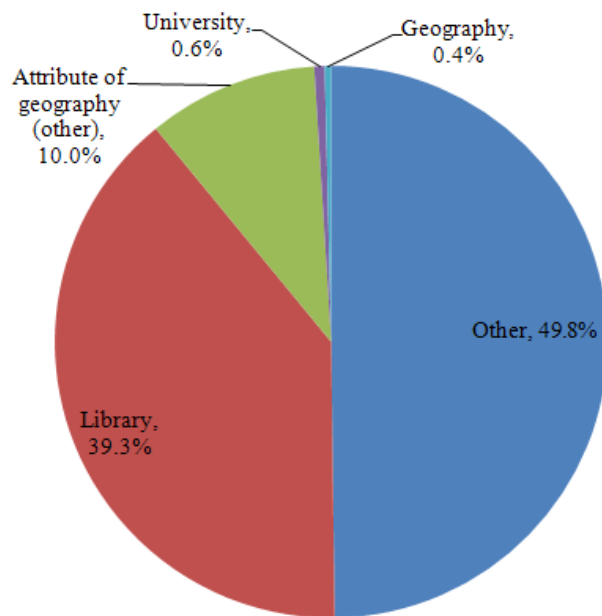


Figure 4.2. Quantitative analysis of the percentages of location-based question and other question transcripts.

Table 4.26 provides the findings of location-based question transcripts by type.

Table 4.26: Counts and percentage of location-based question types to total location-based question transcripts.

Types of location-based question transcripts	Counts	Percentage
<i>library</i>	2,586	78.3%
<i>attribute of geography (other)</i>	656	19.9%
<i>university</i>	40	1.2%
<i>geography</i>	25	0.8%
<i>directional</i>	1	0.03%
<i>TOTAL location-based question transcripts</i>	3,303	100%

Figure 4.3 provides a visualization of the findings of the percentages of location-based question types of total location-based question transcripts. A single *directional* location-based question was removed from this figure because a single question is difficult to visualize when it represents 0.03% of the location-based question transcripts.

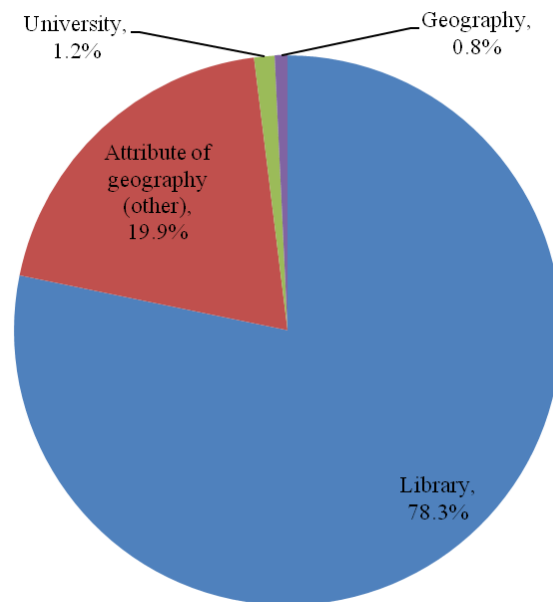


Figure 4.3. Quantitative analysis of the percentages of location-based question type transcripts.

The following discussion covers the percentages of the types of location-based questions in detail ranging from the largest to the smallest percentages of total location-based questions. As Figure 4.3 indicates, the largest percentage of location-based question transcript type for this service were the *library* location-based questions, which represented almost four out of every five location-based question transcripts and nearly two out of every five total question transcripts.

Library location-based questions

Library location-based questions occurred in 2,586 transcripts, but those transcripts contained 2,699 questions within them. *Library* location-based questions comprised 78.3 percent of all location-based question transcripts and 39.3 percent of total question transcripts. Considering that all web portals used to access the service are located on library web pages, except for the *Ask a Librarian* homepage web portal, the finding that the majority of location-based questions concerned a library is not surprising. Table 4.27 provides the counts and percentage of the types of *library* location-based questions and their percentage of total *library* questions.

Table 4.27: Counts and percentage of types of library location-based questions.

Types of library location-based questions	Counts	Percentage
<i>circulation policies</i>	897	33.2%
<i>find a physical item</i>	705	26.1%
<i>log-in</i>	517	19.2%
<i>library card</i>	220	8.2%
<i>library services</i>	152	5.6%
<i>hours</i>	61	2.3%
<i>problems</i>	45	1.6%
<i>employment</i>	39	1.4%
<i>library location</i>	20	0.7%
<i>staff contact information</i>	16	0.6%
<i>inside library location</i>	7	0.3%
<i>collection development</i>	7	0.3%
<i>other (occurred four or less times)</i>	13	0.6%
TOTAL library questions	2,699	100%

The top three types of *library* location-based questions included *circulation policies*, *find a physical item*, and *log-in*, which together comprised over 78.5 percent of the *library* questions. Although the other types of *library* location-based questions are addressed in this study’s recommendations, special importance was given to the three most frequently appearing *library* location-based question in unobtrusive testing. Three of the types of *library* location-based questions—*circulation policies*, *find a physical item*, and *library services*—contained further subtypes of questions and counts and percentages of the subtypes are listed in Tables 4.28—4.30.

Table 4.28: Counts and percentage of subtypes of library circulation policies location-based questions.

Subtypes of library circulation policies location-based questions	Counts	Percentage
<i>renewal</i>	182	20.3%
<i>delivery</i>	154	17.2%
<i>place a hold</i>	146	16.3%
<i>finer</i>	144	16.1%
<i>returns</i>	73	8.1%
<i>borrowing privileges</i>	62	6.9%
<i>request</i>	54	6.0%
<i>account</i>	29	3.2%
<i>donations</i>	21	2.3%
<i>reserve</i>	8	0.9%
<i>lost or damaged</i>	7	0.8%
<i>other circulation policies</i>	17	1.9%
TOTAL library circulation policies	897	100%

Library circulation policies questions were divided into 17 subtypes of questions. The 11 most asked, from most to least, were *renewal*, *delivery*, *place a hold*, *finer*, *returns*, *borrowing privileges*, *request*, *account*, *donations*, *reserves*, and *lost or damaged*. Six other types all occurred four times or less. The six least frequently asked types included oddities such as the cataloging scheme used by the library, what some library jargon terms mean, such as check shelves and non-circulating, OPAC functionality, receiving e-mail alerts for due dates, and how to suggest a purchase for the library.

The subtypes of *find a physical item* questions reflect the 15 types of physical items requested. The nine most frequently asked subtypes listed from most to least frequency were *find a book*, *find a video*, *find a journal article*, *find a newspaper article*, *find other media*, *find language software*, *find an audio book*, *find a dissertation or thesis*, *find a play*, and *find an image*.

Table 4.29: Counts and percentage of subtypes of library find a physical item location-based questions.

Subtypes of library find a physical item location-based questions	Counts	Percentage
<i>find a book</i>	423	60.0%
<i>find a video</i>	97	13.8%
<i>find a journal article</i>	51	7.2%
<i>find a newspaper article</i>	50 (27 were obituaries)	7.1%
<i>find other media</i>	20	2.8%
<i>find language CDs or software</i>	17	2.4%
<i>find an audio book</i>	14	2.0%
<i>find a dissertation or thesis</i>	7	1.0%
<i>find a play</i>	6	0.9%
<i>find an image</i>	6	0.9%
<i>other find a physical item questions</i>	14	2.0%
TOTAL library find a physical item	705	100%

Six subtypes were asked four or fewer times and included peculiar requests such as find a directory, find a magazine, find a government document, find a test, find a reading counts list, and find a strategic plan.

The subtypes of library services questions reflect the 24 types of services. The eight most frequently asked subtypes listed from most to least frequency included *copy, print, and faxing services, education, voting, software, Internet access, computer access, room reservations, and e-resource access.*

Table 4.30: Counts and percentage of subtypes of library services location-based questions.

Subtypes of library services location-based questions	Counts	Percentage
<i>copy, print, and faxing service</i>	32	21.1%
<i>education</i>	31	20.4%
<i>voting</i>	14	9.2%
<i>software</i>	12	7.9%
<i>Internet access</i>	11	7.2%
<i>computer access</i>	9	5.9%
<i>room reservations</i>	6	3.9%
<i>e-resource access</i>	6	3.9%
<i>other library services location-based questions</i>	31	20.4%
TOTAL library services location-based questions	152	100%

Sixteen subtypes were asked four or fewer times and included events, purchasing books, book or genealogy clubs, projectors, tours, bookmobile, rooms with law books, and whether the library had parking, microform readers, book recycling, translation services, a separate chat service just for one county, Dolly Parton Library program registration, the supplies for children to build a snowman out of snow, allowed users to advertise at the library, or was open to the public.

The implications of *library* location-based questions comprising 78.3 percent of all location-based question transcripts and 39.3 percent of total question transcripts are discussed in Chapter 5. The following section provides counts for the types of *attribute of geography* questions, which did not concern the location of a library or a university.

Attribute of geography (other) questions

The *attribute of geography* questions concerning other locations comprised the second largest group of location-based question transcripts, which included 659 (19.9 percent) questions within 656 transcripts. *Attribute of geography* location-based questions comprised 10.0 percent of total question transcripts. Because the locations varied considerably in these questions, from a specific residence to the planet Earth, the *other attribute of geography questions* were subdivided

by topics rather than locations. The two types were questions concerning general information *about a place* and *statistics* related to a location. Table 4.31 provides the counts and percentage of the types of *attribute of geography* location-based questions and their percentage of total *attribute of geography* questions.

Table 4.31: Counts and percentage of types of attribute of geography (other) location-based questions.

Types of attribute of geography (other) location-based questions	Counts	Percentage
<i>about a place</i>	528	80.1%
<i>statistics</i>	131	19.9%
<i>TOTAL attribute of geography (other) location-based questions</i>	659	100%

Both of the types of *attribute of geography* location-based questions—*about a place* and *statistics*—contained further subtypes of questions and counts and percentage of the subtypes are listed in Tables 4.32 and 4.33.

About a place attribute of geography questions included a variety of topics. Although the subtypes were divided by topics and not by geography, 212 (40.2 percent) of *about a place* questions concerned locations within Florida, 36 (6.8 percent) of *about a place* questions concerned the U.S., 268 (50.8 percent) of *about a place* questions concerned a foreign location other than the U.S. or Florida, which included 63 questions concerning Ancient Rome, 8 (1.5 percent) of *about a place* questions concerned the Earth as a whole, and four contained unknown locations. These findings indicated more *about a place attribute of geography* questions concerned locations outside of Florida. The subtypes of *about a place attribute of geography* questions reflected the eight question types. The subtypes listed from most to least frequency included *about a place, historic research, legal, consumer, find a person, education, and employment*.

Table 4.32: Counts and percentage of about a place attribute of geography (other) location-based questions.

Subtypes of about a place attribute of geography (other) location-based questions	Counts	Percentage
<i>miscellaneous</i>	221	41.9%
<i>historic research</i>	116	23.2%
<i>legal</i>	76	15.2%
<i>consumer</i>	43	8.6%
<i>find a person</i>	38	7.6%
<i>education</i>	18	3.6%
<i>employment</i>	11	2.2%
<i>map</i>	5	1.0%
<i>TOTAL about a place attribute of geography (other) location-based questions</i>	528	100%

The subtype *miscellaneous* of *about a place attribute of geography questions* contained a great variety of questions concerning topics that did not fit in the other categories and pertained to general information about various places.

Statistics attribute of geography questions included a variety of questions concerning different topics. Although the subtypes were divided by topics and not geography, 58 (44.3 percent) of *statistics attribute of geography* questions concerned Florida, 26 (19.8 percent) of *statistics* questions concerned the U.S., 35 (26.7 percent) of *statistics* questions concerned a foreign location on the planet Earth, and 12 (9.2 percent) of *statistics* questions concerned the Earth as a whole. All *statistics attribute of geography* questions contained a known location. The subtypes of *statistics attribute of geography* questions reflected the six question types. The six most frequently asked subtypes listed from most to least frequency included *demographics*, *monetary*, *election*, *statistics*, *climate*, and *time*.

Table 4.33: Counts and percentage of statistics attribute of geography (other) location-based questions.

Subtypes of statistics attribute of geography (other) location-based questions	Counts	Percentage
<i>demographics</i>	70	53.4%
<i>monetary</i>	23	17.6%
<i>election</i>	17	13.0%
<i>miscellaneous</i>	8	6.1%
<i>climate</i>	7	5.3%
<i>time</i>	6	4.6%
<i>TOTAL statistics attribute of geography (other) location-based questions</i>	131	100%

Eight types of *miscellaneous statistics* questions were asked only once each. These questions did not fit into the other subtypes and included requested counts for West Virginia coalmines, Orlando churches, amount of U.S. waste water per day, driving age limit in Florida, percentage of cremated versus buried persons in Florida, number of planets in our solar system, dimensions of a temple in Greece, as well as which country has the most libraries.

The implications of *attribute of geography* location-based questions comprising 19.9 percent of all location-based questions and 10.0 percent of total question transcripts are discussed in Chapter 5. The following section provides counts for the types of *university* location-based questions.

University location-based questions

University location-based questions comprised a small minority of total location-based questions and included only 40 questions from 40 transcripts. *University* location-based questions comprised 1.2 percent of all location-based question transcripts and 0.6 percent of total question transcripts. The 40 *university* questions were subdivided into seven types of questions that from most to least frequency were *administration*, *grants*, *log-in*, *technology*, *hours*, *books*, and *employment*. Table 4.34 provides counts and the percentage for the seven types of *university* location-based questions.

Table 4.34: Counts and percentage of types of university location-based questions.

Types of university location-based questions	Counts	Percentage
<i>administration</i>	17	42.5%
<i>grants</i>	5	12.5%
<i>log-in</i>	5	12.5%
<i>books</i>	5	12.5%
<i>technology</i>	4	10.0%
<i>hours</i>	3	7.5%
<i>employment</i>	1	2.5%
TOTAL university location-based questions	40	100%

Although *university* location-based questions occurred infrequently, these questions may help address some issues that are discussed in Chapter 5. The following section provides counts for the types of *geography* location-based questions.

Geography location-based questions

Geography location-based questions comprised the smallest question type; 25 questions occurred within 25 transcripts. *Geography* location-based questions comprised 0.8 percent of all location-based question transcripts and 0.4 percent of total question transcripts. *Geography* questions are questions about the *site* (i.e., latitude and longitude) or *situation* (i.e., concern the physical relation of a location to another location). Table 4.35 provides counts and the percentage for the two types of *geography* location-based questions.

Table 4.35: Counts and percentage of types of geography location-based questions.

Types of geography location-based questions	Counts	Percentage
<i>site</i>	17	68.0%
<i>situation</i>	8	32.0%
TOTAL geography location-based questions	25	100%

The locations within the *site* questions included one each about Africa, Finland, Mexico, New York, the U.S. military bases around the world, ancient Roman trading routes, and where Martin Luther King, Jr. was killed. Two questions concerned Hawaii and eight questions concerned specific places in Florida. The *situation* questions included five Florida locations in relation to which continent Florida is in, where the information provider was located in relation to the user, the distance between Ft. Lauderdale and both Omaha, Nebraska and Las Vegas, Nevada, as well as the relation of two community college satellite campuses to each other. Three physical relation of locations concerned what city Mt. Rushmore is in, if one state is west of another, and if Norway is in Spain.

Geography location-based questions occurred very infrequently. The small quantities still provide some points of discussion in the context of other findings and are discussed in Chapter 5.

Summary

Library, attribute of geography (other), university, and geography location-based question transcripts comprised half of total question transcripts from two months of data. Nearly 40 percent of the total question transcripts contained a *library* location-based question and 10 percent of the total question transcripts contained an *attribute of geography (other)* question. The frequency of occurrence of these types speaks to the importance of this study and the potential for future research, especially coupled with findings related to referrals from research question two. Chapter 5 includes recommendations related to these quantities of location-based questions for non-local information providers, chat consortium managers, participating information agency administrators, and chat software developers. However, discussion is proportional and fewer recommendations and conclusions relate to *university* and *geography* location-based questions because combined they represent one percent of total question transcripts.

Percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to (Research question 4)

To formulate a response to this research question, the researcher determined the collocation of the geocoded location or locations within the location-based question transcripts and the locations of the information providers responding to the transcripts from both the 3,294 transcripts from content and quantitative analysis and the 162 transcripts from unobtrusive testing. From the location-based question transcripts of content and quantitative analysis, 51 out of the 3,294 location-based transcripts had questions that concerned unknown locations. The location was unknown for a variety of reasons, including, but not limited to: (1) the entry portal for the user was not provided, (2) the user left prematurely before disclosing the location in their question, or (3) the information provider referred the user before determining the location of his or her question. Therefore, the percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to could only be calculated for 3,243 transcripts from content and quantitative analysis. In unobtrusive testing, the locations of questions and information providers were known because the locations in the questions were predetermined and the information providers were all currently listed in the chat consortium manager's master list of those staffing the service.

Local information providers are those within the same county as any location in a location-based question and non-local information providers are those not within the same county as any location in a location-based question. Information providers were considered local for questions concerning Florida, the United States, and the Earth because their information agency falls within the boundaries of those larger locations. Similarly, information providers were considered non-local for locations that did not collocate, such as Africa, Ancient Egypt, or China. Another example of a non-local information provider is an information provider who responded to a location-based question that concerned locations outside the county of his or her information agency (e.g., information provider was in Orange County and location in the question was in Broward County).

In quantitative analysis, after removal of the 51 instances where the location or locations of each location-based question were unknown, the percentage of location-based question

transcripts responded to by non-local information providers of total location-based question transcripts was calculated. Information providers that were non-local to the location or locations in location-based question transcripts included the majority of transcripts. Non-local information providers responded to 2,394 of the 3,243 total location-based question transcripts. For unobtrusive testing, 137 of the 162 questions asked were responded to by non-local information providers. Table 4.36 provides the totals and percentage. Since unobtrusive testing transcripts only contained one derived location-based question each, the totals of transcripts and questions are equal. The unobtrusive testing numbers do not include three non-responses, because the information provider that did not respond cannot be determined as either local or non-local.

Table 4.36. Totals and percentage of information providers responding to location-based questions.

Method	Non-local information provider	Local information provider	All information providers
<i>quantitative analysis</i>	2,394; 73.8%	849; 26.2%	3,243; 100%
<i>unobtrusive testing</i>	137; 84.6%	25; 15.4%	162; 100%

These numbers indicate that non-local information providers responded to the majority of location-based questions. Although numerous situational factors may have caused the unobtrusive testing non-local information providers percentage to be higher than that determined from quantitative analysis, the researcher knows that larger information agencies with higher chat service usage tend to staff the service more often. Therefore, the percentage of non-local information providers for quantitative analysis was lower because the information agencies that receive the most questions staffed the service most often as opposed to unobtrusive testing where each information agency was asked a question, which meant a greater percentage of questions concerned these smaller information agencies that do not staff the service as frequently.

Even though these findings are not generalizable beyond this consortium, these findings indicate that users are not likely to receive a response from a local information provider when using this consortium. These findings are not startling because the purpose of any chat consortium is to reduce the costs associated with staffing the service and extending hours of

operation by pooling the human resources of multiple information agencies. This consortial condition results in increasing any user's chances of receiving assistance from non-local information providers. These findings indicate the importance of giving non-local information providers the resources to respond to location-based questions because the majority of location-based questions received most likely will concern non-local locations to the information providers staffing the service. In Chapter 5, practical recommendations address this issue.

Summary

The frequency of non-local information providers responding to location-based questions may not be surprising because of the consortial condition of shared staffing; however, this finding speaks to the importance of this study and the potential for future research. Chapter 5 includes practical recommendations for non-local information providers, chat consortium managers, participating information agency administrators, and chat software developers related to the finding that non-local information providers are more likely to respond to location-based questions.

Correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers (Research question 5)

The following sections discuss findings for the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers, attempt to measure the potential weakness of chat consortia that location-based questions pose, and underscore the importance of this study. In this study, a correct response includes the correct response to a location-based question, which was determined to be representative of the typical questions in chat reference by a panel of peer chat reference information providers. A correct and complete response includes both a correct response and a resource, usually a URL. A correct and incomplete response, includes a correct response and lacks resources. An incorrect response to a location-based question is any wrong response to a location-based question. Table 4.36 provides the total results of unobtrusive testing, for correct and complete, correct and incomplete, and incorrect response fill rates, for total, local, and non-local information providers. Three non-

responses were not included in these calculations because either a user or technology error on the side of the provider or proxy user occurred, or the service was not staffed with anyone during operating hours. A non-response was neither correct nor incorrect.

Table 4.37. Correct response fill rates for information providers responding to location-based questions.

Responses	Non-local information provider	Local information provider	All information providers
<i>Correct and complete</i>	41.6% (57)	60.0% (15)	44.5% (72)
<i>Correct and incomplete</i>	21.9% (30)	28.0% (7)	22.8% (37)
<i>Incorrect</i>	36.5% (50)	12.0% (3)	32.7% (53)
<i>Total responses</i>	100.0% (137)	100.0% (25)	100% (162)

The correct response fill rate for total information providers is 44.5 percent, comprised of 15 and 57 correct and complete responses from local and non-local information providers, respectively. Local information providers' correct response fill rate is 60 percent as opposed to non-local information providers' correct response fill rate that is nearly 42 percent. With a small number of questions in an exploratory study, the researcher may not generalize; however, this discrepancy may indicate that local information providers have a higher response fill rate than non-local information providers. Table 4.38 provides the correct response fill rates by type of location-based question. Unobtrusive testing questions were asked to provide insight into the most frequently asked types of questions to the service.

Table 4.38: Percentage of location-based question types of total location-based questions transcripts.

Types of location-based question transcripts	Asked	Correct response fill rate (Correct and complete)
<i>library</i>	126	36.5% (46)
<i>attribute of geography (other)</i>	18	88.8% (16)
<i>university</i>	9	66.6% (5)
<i>geography</i>	3	66.6% (5)
<i>TOTAL location-based questions</i>	165	43.6%

For the *university* questions, all four incorrect responses were from non-local information providers and of the five correct and complete responses, only one information provider was local. This population is too small to draw conclusions from; however, the study appears to show non-local information providers perform at a lower correct response fill rate. This holds true for the *library* questions, as only three of the incorrect responses were from local information providers, but only 12 local information providers responded to *library* location-based questions.

Summary

The correct response fill rate for library location-based questions finding speaks to the importance of this study and the potential for future research. Chapter 5 includes practical recommendations for information providers, chat consortium managers, participating information agency administrators, and chat software developers related to the correct response fill rate, including the lower correct response fill rate of non-local information providers compared to local information providers. Special attention is given to *library* location-based questions because of other findings in this study.

Conclusion

Chapter 4 discussed findings for all five research questions derived from data collection and data analysis of four methods—content analysis, quantitative analysis, focus groups, and unobtrusive testing. Key findings include:

- The majority of location-based question types asked were *library* type questions. Other *non-directional* location-based question types included *university* and *attributes of geography* concerning other locations. Less than one percent of questions concerned physical geography.
- 46.8 percent of transcripts reviewed using content analysis and 33.3 percent of transcripts examined unobtrusive testing ended in a referral.
- 50.2 percent (3,303 of the total 7,021) of the question transcripts collected across two months contained at least one location-based question. Of these transcripts, 3,424 location-based questions were posed.
- 78.3 percent of location-based question transcripts contained *library* location-based questions.
- 73.8 percent (2,394 of 3,243; with known question locations) in content analysis and 84.6 percent (137 of 162) in unobtrusive testing were responded to by non-local information providers.
- The correct response fill rate was 43.6 percent correct and complete and 66.0 percent correct and incomplete in unobtrusive testing. Local information providers' correct response fill rate was 25.6 percent higher for correct and 19.3 percent higher for correct and complete, compared to non-local information providers.

Findings reduced the lack of understanding of how information providers formulate responses to location-based questions and the correct response fill rate to location-based questions in a statewide chat consortium. An assessment of this study's assumptions, findings, and methodology are discussed in Chapter 5. In addition, Chapter 5 includes a revised study approach and practical recommendations to improve chat reference services.

CHAPTER 5

CONCLUSION: ASSESSMENT OF THIS STUDY'S ASSUMPTIONS, FINDINGS, METHODOLOGY, AND STUDY APPROACH, RECOMMENDATIONS, AND IMPLICATIONS

Introduction

The purpose of this exploratory study was to understand how information providers formulate responses to location-based questions and the correct response fill rate to location-based questions in a statewide chat consortium. To address this purpose, the study's goal was to reduce a lack of understanding of chat reference and location-based questions in order to provide practical recommendations on how information providers at participating information agencies in chat consortia may mitigate the challenges of accurately responding to location-based questions. Objectives for that goal were to:

1. Identify the types of location-based questions.
2. Explore how information providers formulate responses to location-based questions.
3. Evaluate the percentage of location-based question transcripts, in total and by type, of total question transcripts, the percentage of non-local information providers responding to location-based questions of total location-based questions responded to, and the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers.
4. Evaluate this study's assumptions.
5. Assess the usefulness of the exploratory study approach.
6. Provide practical recommendations to improve chat reference services.

The above objectives guided this study's research questions. Chapter 4 reviewed the findings of content analysis, quantitative analysis, focus groups, and unobtrusive testing that addressed this study's first three objectives and five research questions. The final three objectives, related to the assessment of this study's assumptions, limitations, findings, methodology, and study approach, as well as recommendations and implications, are addressed in this chapter.

A review and assessment of this study's assumptions

After completion of this exploratory study, the original assumptions require some re-assessment. This exploratory study includes the following assumptions:

1. Multiple methods provide a more comprehensive view of chat reference and location-based questions than any single method would have alone (Bertot et al., 2001).
2. Methodology that takes into account multiple perspectives (e.g., information providers and a proxy user) provides a more comprehensive understanding of chat reference and location-based questions.
3. Information providers in this chat consortium negotiate questions either inside their information agencies' structures or at locations within the same political boundaries as their information agencies' structures.
4. Local information providers have local knowledge concerning the attributes of a location or locations near or within their information agency, which non-local information providers lack or would have some difficulty locating.

The multiple methods did provide a more comprehensive view than any single method alone by allowing data collection and analysis to address this study's five research questions. Future studies would benefit from multi-method approaches. Multiple perspectives also allowed for a more comprehensive understanding of chat reference and location-based questions; however, the user's viewpoint included only one proxy user asking derived unobtrusive testing questions. The perspective of real service users would benefit future studies.

The assumption that information providers negotiate questions either inside their information agencies' structures or at locations within the same political boundaries of their information agencies' structures was not addressed in this study. An additional method in future studies may assess information providers' actual locations while staffing the service.

The assumption that information providers have local knowledge concerning the attributes of a location or locations near or within their information agencies, which non-local information providers lack or would have some difficulty locating would remain in future studies unless addressed by additional methods. Additional methods to address this assumption could include a test, other than unobtrusive testing, of information providers concerning local and non-

local location-based questions to determine their local knowledge of their own information agency compared to their knowledge of other participating information agencies, and other attributes of locations that are not associated with participating information agencies of their chat consortium. Creating and conducting such a test would be problematic because questions and participants would come from the diverse geography of Florida.

A review and assessment of this study's limitations

Following the completion of this exploratory study, the original limitations require some re-assessment. This exploratory study included the following limitations:

1. *Ask a Librarian*, for privacy purposes, does not retain chat transcripts prior to October 2008.
2. Chat reference software queuing determines the information provider reached for each question from content analysis and unobtrusive testing.
3. The ability to geocode locations in location-based questions to the county level is contingent on the accuracy of the geospatial data found in the chat transcripts.
4. Authentication of correct responses through official public and private organization websites, telephone calls, and other print and electronic reference resources as necessary helps to validate correct responses, but some errors may remain due to the inability of the researcher to validate beyond the resources available. For example, the hours of operation of an information agency can be found on a website; however, the website may not have been kept up to date.
5. The researcher cannot easily record the actions taken by information providers or users that occur outside of chat transcripts.
6. Content analysis, quantitative analysis, focus groups, and unobtrusive testing results are not generalizable beyond this exploratory study.

The limitation of data remains in future studies of chat reference and location-based questions. Any chat consortium studied would require some retainment of chat transcripts for analysis, regardless of privacy concerns. Future studies would also retain the limitation of the chat reference software queuing inherent to the software used by each chat consortium. Another

limitation, which is not easily overcome, is the limitation of determining locations for geocoding in chat transcripts. If users divulge the incorrect location, or no location at all, related to their location-based question, this limitation will remain in future studies. The researcher took caution in geocoding the geospatial data of locations within location-based questions to the county level. County level granularity did reduce geocoding errors. Future studies may require geocoding at the address level, which is possible with today's geographic information systems software, correct addresses provided for users' locations in location-based questions, and the locations of participating information agencies.

Future chat reference and location-based questions studies will retain the limitation of authenticating correct responses through official public and private organization websites, telephone calls, and other print and electronic reference resources. The potential for errors in all resources will remain due to the inability of any researcher to validate beyond the resources available.

Although this exploratory study's methodology did not record the actions taken by information providers or users that occurred outside of chat transcripts, future studies may record the actions of users and information providers during reference transactions of location-based questions not recorded in the transcript via direct observation or recording software. This study attempted to address this limitation by conducting focus groups with information providers to gather data on their actions; however, the gap between their focus group discussion and the actual actions of information providers remains. Availability of information providers and users would be a limitation of implementing any method with direct observation or recording software to trace actions, particularly considering the diverse geographic expanses of chat consortia (e.g., statewide and nationwide). Users also retain privacy concerns that would impede such a method. Due to the limitations of this exploratory study, results from the methodology are not generalizable beyond Florida Electronic Library's *Ask a Librarian*. Duplication of this study's methodology in the same or similar chat consortia would either indicate some commonality or differences in correct response fill rates to location-based questions or types and frequency of location-based questions. Utilizing this study's reliable protocols in samples of other chat consortia would provide data for comparison to this exploratory study's data. Table 5.1 shows the potential methods to address some of this study's assumptions and limitations. The revised

study approach incorporates some of the potential methods to address assumptions and limitations and some of these assumptions and limitations lead to future research questions.

Table 5.1. Potential methods to address assumptions and limitations.

	Method(s)	Issue
Assumptions	survey, focus group, interviews	Information providers in this chat consortium negotiated questions either inside their information agencies' structures or at locations within the same political boundaries as their information agencies' structures.
	test	Local information providers have local knowledge concerning the attributes of a location or locations near or within their information agency, which non-local information providers lack or would have some difficulty locating.
Limitations	direct observation, recording software, survey	The researcher could not easily record the actions taken by information providers or users that occurred outside of chat transcripts.
	multi-methodology utilized in more location-based question studies	Content analysis, quantitative analysis, focus groups, and unobtrusive testing results are not generalizable beyond this exploratory study.

Assessment of findings

Considering the assumptions and limitations of this study and the efforts taken to mitigate the limitations, the study's findings point to the importance of further study of chat reference and location-based questions. The large percentage of location-based questions, especially *library* location-based questions, suggests that even with limitations in the methodology users frequently ask location-based questions. These question transcripts represent a considerable percentage of total question transcripts. A large number of these questions are referred. In addition, the majority of information providers responding to location-based questions are non-local to the locations the questions concern.

Correct response fill rates to location-based questions found in this study are not generalizable. The researcher limited the number of location-based questions asked in unobtrusive testing to 162 to minimize the additional burden on the chat service. Duplication of this study's methodology in the same or similar chat consortia would either indicate some commonality or differences in correct response fill rates to location-based questions or types.

Considering the disparity between the number of local and non-local information providers responding to the unobtrusive questions in this study and the many other factors that may explain the difference in correct response fill rates between the two groups, findings of this exploratory study's unobtrusive testing only demonstrate a potential gap between local and non-local information providers. Future studies may ask the same location-based question more than three times to a service in order to obtain responses from both local and non-local information providers to compare rates per individual question. Regardless of assumptions and limitations inherent in these findings, location-based questions are asked to the service, are mostly responded to by non-local information providers, and do not receive 100 percent correct responses.

Assessment of methodology

The study included four methods to explore chat reference and location-based questions—content analysis, quantitative analysis, focus groups, and unobtrusive testing. The four methods provided the perspectives of both information providers and a proxy user on chat reference and location-based questions. A committee reviewed all data collection instruments to address internal validity. In order to address internal validity in unobtrusive testing, a panel of information providers reviewed unobtrusive testing location-based questions to ensure the representativeness of the questions as typical questions.

Data collection and analysis of content analysis, focus groups, and unobtrusive testing provided qualitative data on the types of location-based questions and how information providers formulate responses to location-based questions. Measures of percentage and accuracy from quantitative analysis and unobtrusive testing provided quantitative data on the percentage of location-based question transcripts, in total and by type, of total question transcripts, the percentage of non-local information providers responding to location-based question transcripts of total location-based question transcripts responded to, and the correct response fill rate of location-based questions in a statewide chat consortium. Although future studies utilizing this methodology would retain the assumptions and limitations discussed, additional methods shown in Table 5.1 would mitigate some of the weaknesses in this study's methodology.

Content analysis and quantitative analysis of two months of transcripts from the chat consortium provided a large amount of data to analyze to draw the question types and quantities of both location-based questions asked and the RUSA guideline elements used by information providers to negotiate and formulate responses to location-based questions. This methodology provided findings to influence the choice of methods selected for the revised study approach. Intrarater and interrater reliability of the content analysis method indicates the study's protocols are reliable. Future non-independent studies may benefit from multiple coders and sampling of transcripts to reduce those studies' timelines. Additional training of coders may improve the interrater reliability of the content analysis protocol.

The counts and percentages produced with quantitative analysis were limited to transcripts from content analysis. Perhaps future studies could develop an operationalizable definition for the non-location-based questions (i.e., other questions) and additional coders could assist in counting all other questions asked to provide a more detailed frequency of location-based questions to total questions. An additional method in future studies may assess information providers' actual locations while staffing the service; however, future studies may choose to assume that an information provider's local knowledge relates to his or her affiliated information agency regardless of his or her location while staffing the chat service. Geocoding at the county level reduces geocoding errors. However, future studies may focus on only *library* location-based questions and require geocoding the participating information agencies that the location-based questions concern. It may be assumed that increasing the granularity of location would increase the percentage of non-local information providers responding to location-based questions (e.g., a University of Central Florida librarian, which is in Orange County, responding to an Orange County Public Libraries user would no longer count as a local information provider within the same county boundaries, because his or her affiliated information agency is non-local).

Focus group methodology conducted in chat sessions provided the information provider's perspective on location-based questions in chat reference. Although this study considered the economic conditions of Florida librarians and conducted the focus group in chat sessions, future studies conducted in more economically endowed environments and with librarians not accustomed to communication in the chat mode may benefit from face-to-face focus groups that

retain non-verbal cues lost in chat session focus groups to assist in steering the focus group discussion. The focus group method allowed information providers to build on the comments and questions of others and added value to the discussions occurring in this method. Perhaps, future studies would incorporate more focus groups, more questions, or additional interviews for individual perspectives. This method only recorded the comments of focus group participants and future studies may include other methods, such as direct observation, to record the actions taken by information providers outside of focus groups because the gap between focus group discussions and the actual actions of information providers remains. The focus group method findings also indicated the reliability of other methods because participant responses and discussion of question-negotiation techniques matched findings from content and quantitative analysis.

The correct response fill rate of location-based questions in a statewide chat consortium was determined using unobtrusive testing. This method retains the criticisms and limitations discussed previously. Additionally, the limitation of the small number of questions asked remains. For this exploratory study, the method did provide a baseline correct response fill rate and additionally reinforced other findings from content analysis. Future studies may utilize this method to underscore the inability of information providers to respond accurately to some location-based questions and point to potential solutions for this inaccuracy.

Assessment of the study approach

The study approach was influenced by existing digital reference research approaches by Lankes (2004b), and Pomerantz (2005), and underlying assumptions from relevant metatheories. The exploratory study approach adopted the five explicit assumptions below (Dervin, 2003; Tobler, 1970):

1. Everything is related.
2. Near things are more related than distant things.
3. Both humans and reality are sometimes orderly and sometimes chaotic.
4. There is a human need to create meaning, and knowledge is something that always is sought in mediation and contest.

5. There are human differences in experience and observation.

A summary of these five assumptions for this study reads—for a location-based question, an information provider must determine the location or locations in the question to formulate a correct response, and because a local information provider is closer in proximity and more familiar to a location or locations within his or her same county, a local information provider may provide a higher correct response fill rate to location-based questions than a non-local information provider.

Findings from this exploratory study have modified the exploratory study approach and those changes are discussed in the following section. This revised study approach provides new ways of analyzing the question-negotiation process between information providers and users. The revised study approach may assist all reference researchers by including location in future studies of face-to-face and digital reference.

Revised study approach

The revised study approach contains several similarities to the exploratory study approach, including the user inputs, information provider inputs, and question-negotiation outputs. In any study of reference, the user seeks a correct response from an information provider to his or her submitted question and the information provider seeks a correct response to a user's question in order to provide a response. The user inputs questions to the service, and these may be location-based questions or other questions. The information provider, either local or non-local to the location or locations in a user's location-based question, inputs clarifying questions and resources used to negotiate and formulate a response. After question-negotiation between the user and information provider, one of five potential responses to a user's location-based question occurs as an output of the revised study approach. The five potential responses to location-based questions in this revised study approach include a correct and complete response, a correct and incomplete response, an incorrect response, a referral, or a non-response.

In the revised study approach, assessment occurs of the user inputs, the information provider inputs, and the question-negotiation outputs. The assessment of the user inputs includes identifying both other and location-based questions. The researcher would use other questions to

evaluate the percentage of location-based questions, in total and by type, of total questions. In the assessment of user inputs, the researcher would use the exploratory study findings to determine location-based question types and identify any new types of location-based questions. As in the exploratory study approach, the assessment of the user inputs occurs via content analysis and quantitative analysis. An additional method to assess user inputs is added. An optional web-based survey at the conclusion of transactions would be added to ask users of the service whether their questions concerned a location, if so, what that location was, the topic that their questions' concerned, and user satisfaction.

As in the exploratory study approach, the information provider inputs allow the researcher to determine how information providers formulate responses to location-based questions introduced by aforementioned input transcripts. To evaluate the percentage of location-based questions responded to by non-local information providers of total location-based question transcripts responded to, assessment of information provider inputs is required to determine the number of local information providers. In the revised study approach, local information providers are those affiliated with the same information agency as any location in a location-based question and non-local information providers are those not affiliated with the same information agency as any location in a location-based question. Therefore, only *library* location-based questions could receive a local information provider and all other location-based questions concerning other locations outside of libraries would be always receive a non-local information provider. The assessment of the information provider inputs occurs via content analysis, quantitative analysis, focus groups, and refined unobtrusive testing.

The assessment of the question-negotiation outputs includes analysis of the correct response fill rate of information providers' responses to location-based questions, in total and by type, for both local and non-local information providers. The unobtrusive testing method would include the additional step of following up any referral and determining the correct response fill rate of the information providers to whom the user may be referred.

After the assessments of user inputs, information provider inputs, and question-negotiation outputs, the revised approach leads to findings. The findings influence the study's outcomes, which include the following—further revision of the study approach, a new discussion to address the study's assumptions, additional practical recommendations and implications to

help mitigate the weakness of location-based questions for chat consortium managers, participating information agency administrators, information providers, users of chat reference, and chat software developers, and future research questions for researchers. Assessment results, recommendations, and implications will help to address any future study’s purpose, goal, and objectives. A graphic representation of the revised study approach appears in Figure 5.1. For reference, the exploratory study approach is found in Figure 1.7 on page 28. Changes appear in bold.

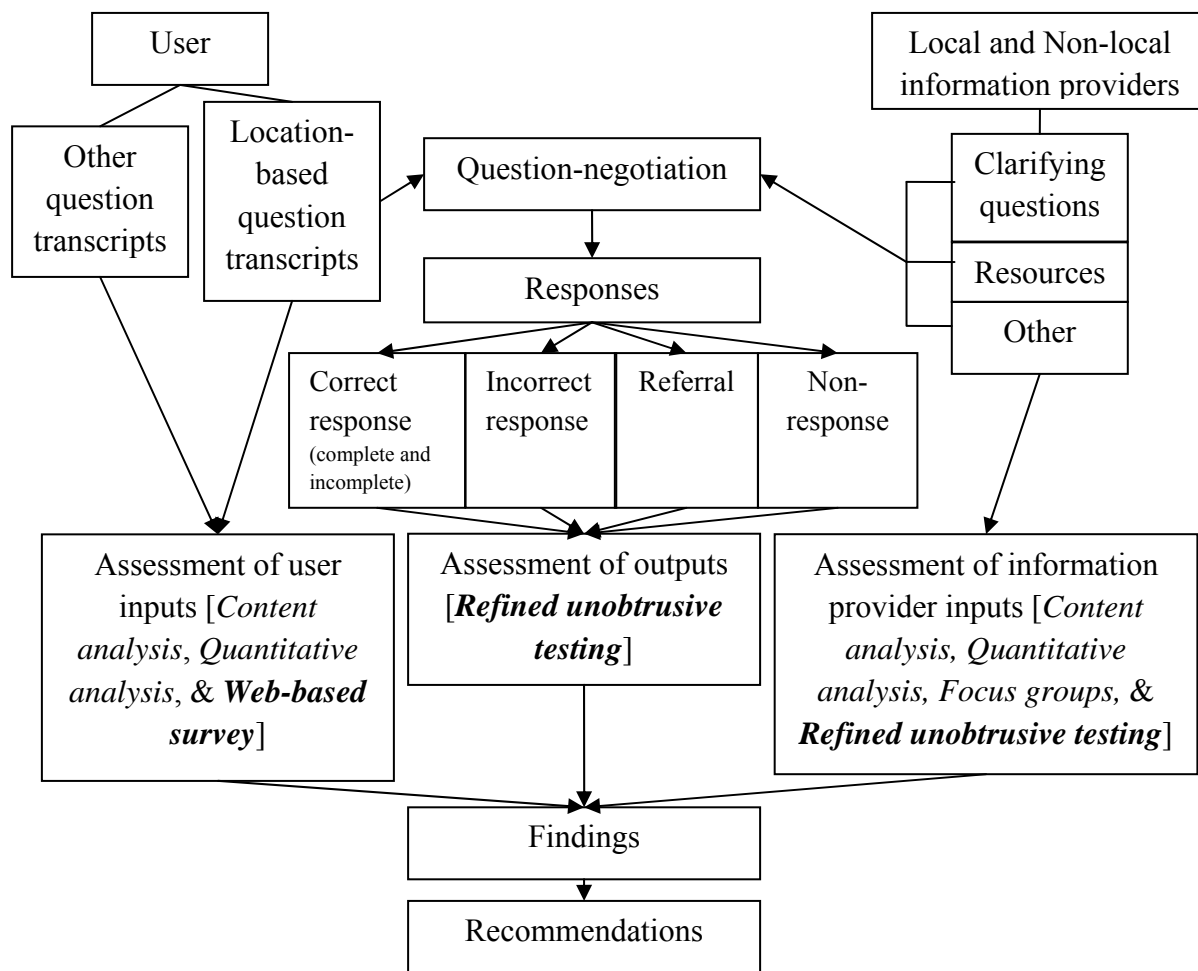


Figure 5.1. Revised study approach.

The revised study approach may be used to assess transactions in chat reference research or any reference mode that records transactions. For example, e-mail and telephone question-negotiation potentially include non-local information providers and location-based questions. Location-based questions likely occur in all question-negotiation (e.g., where's the bathroom?). Although researchers may assume most face-to-face location-based questions are local and face-to-face data would be difficult to collect, the studies could assess the same inputs and outputs of question-negotiation. This study's findings indicate that location exists in some questions and that correct responses require local knowledge. The portions of the revised study approach including the location-based questions and local and non-local information providers could be incorporated into other theories, models, and conceptual frameworks from library and information studies literature, to integrate geography into the study of information-seeking behavior (Case, 2007; Fisher, Erdelez, & McKechnie, 2005; Raber, 2003).

Recommendations

Practical recommendations from this study include those for chat consortium managers, participating information agency administrators, information providers, users of chat reference, and chat software developers. Unfeasible solutions are not considered or discussed because of situational factors related to the variety of information agencies participating in the consortium, such as uniform circulation policies for all participating information agencies, standardized information architecture of all information agencies' websites, closing all digital reference consortia, or the *de facto* strategy of non-local information providers referring all location-based questions. These practical recommendations are intended to assist all involved with the chat consortium studied to improve the accuracy of responses to questions users actually ask and overcome the weakness of location-based questions in chat consortia. A short recommendation section is included for RUSA, but that is not included in the practical recommendations for chat consortia.

Recommendations for chat consortium managers

The chat consortium manager acts as gatekeeper to the information agencies that participate in the service and the information providers that staff the service. The steady growth of the *Ask a Librarian* service to 107 participating information agencies, as detailed previously in this study, reflects the desire of individual agencies to join a statewide chat consortium. The chat consortium manager could implement some minimum requirements to be met and maintained by both those information agencies currently participating and those seeking to participate in staffing the chat consortium. Minimum requirements currently include:

- Sending staff to training for *Ask a Librarian*,
- Contributing librarians' time to staff the collaborative service, and
- Promoting use of *Ask a Librarian* to library users, including providing a link to the service from the library's website.

Additional requirements could include populating the chat software's knowledge base, incorporating local knowledge into information agencies' websites, providing log-in assistance at the entry portal page for each information agency, and allowing non-local information providers to access user accounts.

Although a knowledge base exists in the chat consortium software, some participating information agencies do not incorporate their local knowledge into the knowledge base. As shown in Figure 1.4, the knowledge base includes each information agency and corresponding metadata of website links and/or other data to help non-local information providers locate information to respond to commonly asked questions. For example, a non-local information provider could search an information agency's website for the cost of printing or go into the knowledge base under printing and find the link. This may save time in responding for those staffing the services who are unfamiliar with each participating information agency website's information architecture. If participating information agencies do not populate the knowledge base with their local knowledge and links to where that knowledge can be located, then non-local information providers are left without the local knowledge to respond to many *library* location-based questions. Types of local knowledge that information agencies should put into the knowledge base include the most frequently asked *library* location-based questions that include

circulation policies, find a physical item, log-in, library card, and others as detailed in Chapter 4. The correct response fill rates to library location-based questions might benefit from an increase in all information providers having access to all participating information agencies' local knowledge.

The chat consortium manager could also require participating information agencies to populate their websites with the *library* location-based questions asked and detailed in Chapter 4. Non-local information providers require local knowledge to address many *library* location-based questions and study findings indicate that they are not findable on library websites. If those participating information agencies disseminate local knowledge through their websites, then non-local information providers may be able to respond accurately to location-based questions and users may not need to ask them as frequently because the local knowledge can be found on the libraries' websites. Perhaps, most information agencies would not put information regarding their printing, copying, and faxing services on their websites, assuming that all users with that information need would ask when inside the information agency. Still, 32 of those types of questions were asked in two months, and adding a small section of information on those services to a website could have allowed non-local information providers to respond to the questions more accurately.

A specific recommendation for *log-in* location-based questions, which are the third most frequently asked type of *library* location-based questions in content analysis findings, includes utilizing another site to disseminate local knowledge. Although log-in help should be disseminated through the knowledge base and information agencies' websites, the page of the entry web portal to the chat service offers a site for information agencies to post local knowledge regarding log-in. For example, one information agency offers this assistance before a user actually posts any question to the service. The assistance text is provided below:

NEED TO SIGN INTO LIBRARY RESOURCES?

[The Borrower ID is your G#. Your pin is the last 4 digits of your G#.](#)

The chat consortium manager should require all participating information agencies to post this simple text to reduce the confusion for many users concerning log-in. Perhaps, this would also assist information providers, as well as users, in finding an accurate response to one of the most frequently asked location-based questions (i.e., 7.4 percent of total question transcripts). The text

for the log-in web portal page above also included the following text, which introduces another issue related to the service:

(Please note that, in most cases, you will be communicating with a librarian who does not work at your local library and does not have access to your personal library card records.)

This text communicates an important fact to the users that those information providers staffing the service are aware of, but many first time users are not. Repeatedly in content analysis and unobtrusive testing, users were referred because non-local information providers could not access personal library accounts. Access to library accounts allows information providers to reset passwords, renew items, update account information, and address many other issues related to circulation policies, which are the most frequently asked type of *library* location-based. The chat consortium manager should require participating information agencies to provide this access and permissions. Some information agencies may deny extending this access and permissions; however, those that do will reduce the questions referred back to local information agencies. Also, providing access and permissions to at least the *Ask a Librarian* information providers that staff the service at odd hours would increase those information agencies' hours of operation related to most library services by 84 hours a week. Nearly 13 percent of the total question transcripts asked to the service contained circulation policy questions and several of those could be responded to by non-local information providers, if only those non-local information providers had access and permissions.

Recommendations for participating information agency administrators

The participating information agency administrators control the administrative aspects of their individual information agencies, which includes dissemination of pertinent local knowledge to respond to library location-based questions on their websites. The current 107 participating information agencies include a variety of libraries, a museum, and a school district. Even if the chat consortium manager does not implement any of the suggested requirement recommendations, information agencies could self-impose the same recommendations and improve service for their users. These recommendations include populating the chat software's knowledge base, incorporating local knowledge into their websites, providing log-in assistance at

the entry portal page, and allowing non-local information providers to access personal library accounts and permissions to facilitate library service.

By populating the chat software's knowledge base, incorporating local knowledge into their websites and adding text to assist in log-in at the entry portal page, participating information agency administrators may assist non-local information providers in accessing local knowledge to improve service by their individual information agencies, as well as the chat consortium as a whole. In addition to incorporating local knowledge into information agency websites, information agency administrators could reassess how well their pages are crawled by popular search engine bots. The previous section details how these recommendations could be accomplished. Although situational barriers exist to sharing access to personal library accounts, allowing non-local information providers to assist users via access to accounts would improve user satisfaction, increase information agencies' hours of operation, and reduce the number of referrals sent back to the users' local information agencies.

Recommendations for information providers

Information providers staff the service and seek local knowledge to respond to location-based questions. Focus group findings reveal that information providers are aware of the challenges associated with responding to location-based questions and have the skills to respond to them. Content analysis and unobtrusive testing findings indicate that not all transactions include RUSA guideline elements that could increase the correct fill rate of response. Further training for information providers to utilize clarifying questions, supply resources with responses, and have a better understanding of the locations and policies of participating information agencies in the chat consortium, as well as the geography of the state, may improve correct response fill rates.

Information providers may not be familiar with the intricacies of all the participating information agency websites or be aware of the chat software's knowledge base. Training for information providers now includes using and populating the chat software's knowledge base; however, if few populate the resource it does not assist information providers. Training should include discussion of the differences between information agencies and the dangers of assuming

similarities between one's own information agency and others when providing a response. For example, participants in training could discuss their return policies and compare theirs to others to illustrate the potential flaws in assuming a correct response without checking a resource, such as an information agency's website.

Training should include some discussion of the participating information agencies and the geography of the state. The varied types of information agencies and their locations would assist new information providers in responding to location-based questions. Although information professionals could obtain information in other ways, prior local knowledge of smaller Florida communities' locations (e.g., Fort Lonesome is in Hillsborough County) and participating information agencies' locations would speed response times and some discussion of Florida's geography during training could help (e.g., the University of Central Florida's main campus is in Orlando, Orange County). The training could include a discussion of participants' current and past positions in Florida as well as any other locations they have lived or visited in Florida. In addition, training could include discussion and use of mirror worlds, such as Google Maps, to help information providers find locations they are unfamiliar with.

Information providers do have skills to respond to most location-based question, but training that includes a review of RUSA guidelines would assist information providers in responding to all questions correctly. Determining the resources the user has already tried, learning the location the user's question concerns, and providing the resources used to formulate a response to the user would improve information providers' correct response fill rates. Even if the chat consortium manager and information agency administrators implement the recommendations previously mentioned, some location-based questions will still require referral. However, information providers can utilize their skills as information professionals and participate in multiple training sessions to increase their efforts to provide correct responses to location-based questions to improve the service and refrain from immediate referrals, which occurred in three percent of all location-based question transcripts from content analysis.

Recommendations for users

Users of the service ask a variety of questions and expect correct responses. A handful of users from outside of the state of Florida used the service because they had questions concerned with historical research, or they were looking for obituaries and persons within Florida. These users expect a correct response and *Ask a Librarian* remains a viable option for those doing historical research concerning locations in Florida. All users are cautioned about the statewide staffing of the service. Users in content analysis findings expressed a need for a local information provider; however, users may receive a correct response from any information provider and should not fear receiving a non-local information provider since non-local information providers may still be able to respond to some location-based questions. Users can assist their information providers by clearly articulating their questions, divulging the location of their location-based questions, and understanding that the information providers may encounter the same obstacles in locating a response as the users' previous attempts have. Without changes to the chat consortium, users also must understand that non-local information providers cannot assist with library account issues, including renewing items, placing holds, and many other library services. In many instances, the user's local information agency is still the best resource to contact for an accurate response to questions concerning the location and attributes of his or her local library.

Recommendations for chat software developers

Chat software developers create the technology that allows chat reference service to occur. Future versions of this technology may address the weakness of location-based questions by building geographic intelligence into the systems. For example, a user entering a consortial service could be required to provide the location of his or her question, especially if this question concerns a particular information agency. This step may assist information providers by reducing the time and necessity to ask clarifying questions concerning the location of the user's question. Geographic intelligence built into the systems would take the location provided by the user and prompt an interactive map of the location in the question to appear and queue the websites of

local information agencies. This type of application may be built for both information providers and users for a variety of devices.

Although the current chat software shows the entry portal of the user, the user's entry portal does not always indicate the actual location of the user's question and does not provide local knowledge of the physical location. The same issues exist for software that utilizes IP addresses to determine a user's location. The IP address does not always correspond with the location of the user's questions and geographic intelligence would need to be built into those systems to prompt interactive maps or other features utilizing geography from the text within the question, as opposed to the user's location based upon the IP address.

In addition, the current chat software's knowledge base is static, which means that changes to information in the knowledge base require manual data entry from participating information agencies when changes occur. Future chat reference software may incorporate dynamic Web 2.0 technologies to cause knowledge bases to remain as ever-changing as the hours and other policies of participating information agencies. Taking advantages of such technologies would allow participating information agencies to make updates and changes once, and any knowledge base connected to the information agencies' database would reflect any changes automatically. Although adoption in the library community may be difficult to implement, other customers of chat software may find this feature useful (e.g., customer service for corporations with multiple and geographically-dispersed outlets).

Recommendations to RUSA

The most current RUSA definition of reference transactions includes "information consultations in which library staff recommend, interpret, evaluate, and/or use information resources to help others to meet particular information needs," and excludes "formal instruction or exchanges that provide assistance with locations, schedules, equipment, supplies, or policy statements" (Reference and User, 2008, para. 1). This study indicates that half of the transcripts for this chat consortium collected over two months would fall into the latter category, which would exclude them from studies of only reference transactions. This study indicates these types of questions are asked, are asked frequently, are referred frequently, and are not often responded

to correctly or completely when asked. The first part of the RUSA definition may be interpreted to include assisting the information needs of users related to location-based questions because they are in fact particular and do require staff to recommend, interpret, evaluate, and/or use information resources to respond to them. RUSA should consider removing exclusion categories and including all questions users ask in the definition of a reference transaction, because no matter what question a user asks a librarian, that user expects a correct response. In addition, what would a librarian be without users? Librarians and other information providers should strive to provide correct and complete responses to all questions asked.

Another RUSA guidelines definition should be changed to allow researchers to operationalize the variables. RUSA guidelines include providing other sources as referrals, but this study does not in order to make resources and referrals mutually exclusive. If the definition for referral continues to include the use of resources, how would librarians and researchers differentiate between the resources (4.6) and referrals (5.7) when coding? The current definition of referrals places static resources such as a website at the same level as dynamic information providers. Perhaps, a subset of referrals could emerge that separates referrals to people from referrals to digital resources.

Summary

This section provided practical recommendations for chat consortium managers, participating information agency administrators, information providers, users of chat reference, and chat software developers. Some specifics were provided on implementation of these recommendations, but situational factors and technology adoption would impede several of these recommendations. A short section of recommendations to RUSA was also included, but not intended for those related to chat consortia. Table 5.2 shows a summary of the practical recommendations. These recommendations are intended to improve the accuracy of responses to location-based questions through changes to the chat consortium and chat reference software.

Table 5.2. Summary of practical recommendations.

Subject	Practical recommendations
<i>Chat consortium manager and Participating information agency administrators</i>	<ul style="list-style-type: none"> • Populating the chat software’s knowledge base, • Incorporating local knowledge into information agencies’ websites, • Providing log-in assistance at the entry portal page, and • Allowing non-local information providers to access user accounts.
<i>Information providers</i>	<ul style="list-style-type: none"> • Training on use of RUSA guidelines, • Training on differences between information agencies’ policies, • Training on the locations of participating information agencies in the chat consortium, and • Training on the geography of the state.
<i>Users</i>	<ul style="list-style-type: none"> • Use <i>Ask a Librarian</i> if doing historical research concerning locations in Florida, and • For an accurate response to questions concerning the location and attributes of their local library, contact the local library.
<i>Chat software developers</i>	<ul style="list-style-type: none"> • Build geographic intelligence into the systems, and • Incorporate dynamic Web 2.0 technologies to allow knowledge bases to update without manual data entry.

Implications

Implications from this study include those for chat consortium managers, participating information agency administrators, information providers, users of chat reference, and chat software developers. The possible implications stemming from a lack of knowledge about chat reference and location-based questions include unwarranted costs, increased search time for information providers and users, user dissatisfaction and increased complaints, lower chat consortia usage, reduction in number of chat consortia participating information agencies, administration and logistical problems, and incorrect responses. This study addressed correct response fill rate to location-based questions and the percentages of location-based question transcripts received and non-local information providers responding to them. Implications stem from the correct response fill rates, the finding that 50.3 percent of transcripts in content analysis contained location-based questions, and the finding that 39.3 percent of transcripts in content analysis contained a *library* location-based question.

Implications for chat consortium managers

The chat consortium manager presides over the operations of the statewide chat reference consortium in this study and her job depends on its success. Location-based questions present implications for the operation of the service because nearly 40 percent of the total question transcripts from content analysis concerned *library* location-based questions. These *library* location-based questions comprise a large percentage of total question transcripts and concern participating information agencies that the chat consortium manager has some control over (i.e., allowing the agencies to participate in the service or not). This study found that 44 percent of *library* location-based questions from content analysis were referred. Considering the prevalence of these questions and the rate of referral, these findings indicate that almost one out of every five question transcripts (i.e., 17.6 percent) asked to the service ended in referral to a user's local information agency. Users of the service expect accurate responses to their questions and the rate of referrals for *library* location-based questions indicates that the service does not provide accurate responses for all. Although these referral rates could be reduced if the chat consortium manager implemented some of the recommendations previously discussed, the rate is lower than referral rates in studies of digital reference ranging from 29 to 38 percent (Kwon, 2005; Nilsen, 2004, 2006).

Unobtrusive testing findings found an overall correct response fill rate of 44.5 percent. The correct response fill rate for non-local information providers was slightly lower. Coupled with the finding that 73.8 percent responding information providers from content analysis and 84.6 percent of responding information providers from unobtrusive testing were non-local information providers, the findings indicate the importance of giving non-local information providers the resources, access, and permissions to respond to location-based questions. This is because the majority of location-based questions received in the chat service most likely will concern non-local locations to the information providers staffing the service. Implications related to these findings call for some adaptation to prevent unwarranted costs, increased search time for information providers and users, user dissatisfaction and increased complaints, lower chat consortia usage, reduction in the number of chat consortia participating information agencies,

administration and logistical problems, and incorrect responses to the service, whether this will be the recommendations previously provided or others.

Implications for participating information agency administrators

The participating information agency administrators control the operations of their individual information agencies, including their websites. Location-based questions present implications for their individual information agencies, their information providers, and their users. Nearly 40 percent of the total question transcripts from content analysis concerned *library* location-based questions and these types of questions are those that administrators could help information providers respond to by adopting some of the recommendations previously discussed. The types of *library* location-based questions indicate what types of local knowledge users and non-local information providers assisting users must be able to locate. Forty-four percent of library location-based questions from content analysis were referred and for these questions to be referred at a lower rate, information agencies may disseminate their local knowledge in the manner discussed in the recommendations through the knowledge base and their websites. In unobtrusive testing, 46 of 80 *library* questions were responded to correctly; however, all 80 of these library questions could have been answered if information agencies disseminated their local knowledge in simple text through websites or the service's knowledge base (e.g., the library offers printing).

Information agencies should also consider providing those non-local information providers staffing the service with access and permissions to their users' library accounts. Findings from unobtrusive testing include that one of nine *library circulation policies* type questions received a correct response. More of these types of questions could be answered correctly if non-local information providers were given access and permissions to library accounts, but if not, the implications remain for the quality of service provided to the information agencies' users.

Information agency administrators considering joining any chat reference consortium should consider these implications prior to joining the service. Their users will seek accurate responses from other information agencies' providers and may not receive them. Unobtrusive

testing findings found a correct response fill rate of 44.5 percent for all location-based questions for this chat consortium. The correct response fill rate for non-local information providers was slightly lower, and coupled with the finding that 73.8 percent responding information providers from content analysis and 84.6 percent of responding information providers from unobtrusive testing were non-local information providers, findings indicate the importance of giving non-local information providers the resources, access, and permissions to respond to location-based questions.

In addition, information agency administrators' information providers will be seeking correct responses for users from other information agencies and utilizing the knowledge base and websites of other information agencies. Their information providers may require further training, as described in the recommendations section, and encounter obstacles in responding to non-local location-based questions, as indicated in the findings of this study. Implications related to this study's findings require participating information agency administrators to consider these issues before joining the service, as well as to adjust the dissemination of their local knowledge prior to joining the service as discussed in recommendations. Perhaps, this self-assessment will improve information agencies' current dissemination of local knowledge on their own websites.

Implications for information providers

Information providers staff reference services and seek knowledge to respond to location-based questions. Implications of location-based questions are relevant to those information providers in this study's chat consortium as well as any other information provider. The implications of the types and subtypes of *library*, *attribute of geography*, *university*, and *geography* location-based questions and their frequencies indicate that information providers will need to formulate responses to them. Findings on the negotiation and formulation of responses to location-based questions show techniques that assist information providers in providing correct and complete responses to location-based questions.

Information providers, as focus group findings suggest, are aware of location-based questions. *Library* location-based questions comprised 78.3 percent of all location-based question transcripts and 39.3 percent of total question transcripts in content analysis. Therefore,

information providers will encounter these types of questions most often. *Attribute of geography* location-based questions comprised 19.9 percent of all location-based questions and 10.0 percent of total question transcripts in content analysis. *University* and *geography* location-based questions occurred much less frequently, but responding to these question types requires similar techniques, such as those discussed in recommendations, to the other types of location-based questions. Unobtrusive testing findings suggest information providers' correct response fill rates for *attribute of geography (other)* (88.8 percent), *university* (66.6 percent), and *geography* (66.6 percent) location-based questions are higher than *library* location-based questions (36.5 percent).

Findings from content analysis, focus groups, and unobtrusive testing indicate that information providers attempted to determine what a user wanted and what locations a question concerned through clarifying questions. Clarifying a user's question assists in providing a correct response, especially if a correct response is contingent on knowing the location of the user's question. In 11 unobtrusive testing transcripts, information providers used librarian knowledge to assume the correct response. These assumptions were correct nine times; however, assumptions about other information agencies' circulation policies and library services based on library norms may not always be accurate. Clarifying questions were not used in 18 of the 109 correct responses in unobtrusive testing; however, clarifying questions do assist information providers in negotiating and formulating responses to location-based questions in most instances.

Findings from content analysis, focus groups, and unobtrusive testing indicate that information providers utilized resources to find responses to location-based questions. Because resources were required for a correct and complete response, all correct and complete responses from unobtrusive testing included resources. Correct responses are provided without resources to users; however, the resource documenting where an information provider identified the response allows the user to locate that information again and adds to the credibility of the response and service overall. In content analysis, 44.5 percent of location-based question transcripts contained resources and 50.3 percent of location-based question transcripts contained resources in unobtrusive testing. For information providers to provide correct and complete responses, they must have provided users with the resources used to locate their response.

The study found that a considerable number of location-based questions were referred. Information providers will continue to refer many location-based questions, especially *library*

location-based questions, if local knowledge is not disseminated more effectively or access and permissions to other information agencies is not given.

Information providers will continue to respond to location-based questions and, without changes, refer many of them. “We are actually here to answer reference questions” reflects a dismissive attitude to many *library* location-based questions found in content analysis and promotes users’ attitudes such as “I guess this service is not intended for problems like mine.” Focus group comments reinforce this mentality through statements such as “Chat is like the vending machine of library interactions” and the implications of this attitude include incorrect responses to location-based questions, especially the library type. Using that analogy, in food service a vending machine is to a restaurant what in library service chat reference is to visiting an actual library. Indeed, users do ask *library* location-based questions to this chat service and expect accurate responses. Information providers may utilize their skills to respond to location-based questions as they would any reference question. The implications of use of these techniques and a dismissive attitude may lead to user dissatisfaction and increased complaints, lower chat consortia usage, and reduction in chat consortia participating information agencies.

Implications for users

Users of the service ask a variety of questions and expect correct responses. Implications of location-based questions for users are that users who ask location-based questions may not receive correct responses. Findings indicate that a considerable number of users’ questions concern locations, especially libraries. Content analysis and unobtrusive testing findings show that users are likely to receive a non-local information provider, 73.8 percent and 84.6 percent respectively. Unobtrusive testing found a correct response fill rate for library questions of 36.5 percent. This finding indicates that a user’s best resource for finding a correct response is his or her local information agency. As information providers indicated in content analysis and focus groups, they empathize with users and also have difficulty locating local knowledge on poorly organized library websites. In addition, non-local information providers cannot access library accounts; however, users will continue to ask those questions that may be correctly responded to only by users’ local information providers who have the access and permissions to handle user

account problems. The implications for users are that they will have increased search time, and may experience dissatisfaction and receive incorrect responses.

Implications for chat software developers

Chat software developers develop the technology that allows chat reference service to occur. Implications of this study for chat software developers include highlighting the importance of building geographic intelligence into their systems. The locations of users' questions could be collected in forms prior to question-negotiation, as described in the recommendations section to assist information providers responding to location-based questions. Future chat reference software may also be expected to incorporate dynamic Web 2.0 technologies to allow knowledge bases to contain the intelligence to self-update based on changes to websites of participating information agencies. The chat software developers who successfully implement these changes to address the weakness of location-based questions stand to profit from increased customers through applications that connect users with questions to information providers with responses and assist the information providers in formulating those responses more quickly.

Summary

This section provided implications from this study for chat consortium managers, participating information agency administrators, information providers, users of chat reference, and chat software developers. The possible implications stemming from a lack of knowledge about chat reference and location-based questions include unwarranted costs, increased search time for information providers and users, user dissatisfaction and increased complaints, lower chat consortia usage, reduction in chat consortia participating information agencies, administration and logistical problems, and incorrect responses. Table 5.3 shows a summary of the implications. These implications highlight issues stemming from this study's findings and the potential effect on the subjects involved with chat consortia.

Table 5.3. Summary of implications.

Subject	Implications
<i>Chat consortium manager and Participating information agency administrators</i>	<ul style="list-style-type: none"> • Many location-based questions, especially library type are received, • The majority of information providers are non-local to the locations in the location-based questions asked, • The correct response fill rate is higher than other studies, but could be improved by adopting recommendations.
<i>Information providers</i>	<ul style="list-style-type: none"> • Receive more training, • Utilize resources to correctly respond to location-based questions, and • Attempt to provide correct and complete responses to all user questions.
<i>Users</i>	<ul style="list-style-type: none"> • For an accurate response to questions concerning the location and attributes of their local library, contact your local library.
<i>Chat software developers</i>	<ul style="list-style-type: none"> • Build geographic intelligence into the systems, and • Incorporate dynamic Web 2.0 technologies to cause knowledge bases to update without manual data entry.

Future research questions

Researchers of any mode of reference may benefit from the findings that generated these detailed research questions. Previous researchers assumed that local information providers would have greater knowledge concerning the attributes of a location or locations within their same area than non-local information providers and that non-local information providers would have difficulty locating that local knowledge, resulting in local information providers having a higher correct response fill rate than non-local information providers (Berry, Casado, & Dixon, 2003; Bishop & Torrence, 2007; Hyde & Tucker-Raymond, 2006; Kwon, 2007; Sears, 2001). This exploratory study attempted to measure the correct response fill rates of local and non-local information providers and overcome some of the problems associated with non-operationalizable definitions of location-based questions, resources, and referrals used in previous studies. Future research questions include some of those included in this study and other research questions to address some of the issues raised by this study. These research questions remain vital to the future study of location-based questions because location in chat reference service remains a relatively unexplored area of reference research.

The first research question from this study was:

1. What are the types of location-based questions?

This first question remains vital because the types of location-based questions would most likely be different in studies of other services in assorted locations. The types of location-based questions identified in this study may provide a taxonomy for similar chat consortia, but generalizing beyond this chat consortium is problematic as other chat consortia's location-based questions would reflect the users, participating information agencies, and geographies of those services. Future studies could explore question types at different levels of granularity, but could use the same research question in any reference mode.

The second question from this study to include in the future was:

2. How do information providers negotiate location-based questions and formulate responses?

The question-negotiation techniques used by information providers of other reference services may occur at different frequencies than in this study and may include other techniques not identified in this study. A comparison between the findings from this study and future studies would provide data to address trends in question-negotiation techniques of location-based questions. Future studies also could compare the question-negotiation techniques of non-local and local information providers for any similarities or differences and use the same research question in any reference mode.

Another question from this study to include in future study was:

3. What is the percentage of location-based question transcripts, in total and by type, of total question transcripts?

This third question allows future studies to gather percentages of location-based question transcripts, in total and by type, of total question transcripts to determine the frequency of location-based questions in other services. This research question would provide a measure to allow comparison of the prevalence of location-based questions in other services in any reference mode.

The fourth question from this study to include in the future was:

4. What is the percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to?

The percentage of location-based question transcripts responded to by non-local information providers of total location-based question transcripts responded to would be an important research question in any study regarding the correct response fill rate of location-based questions to continue to address the assumption that because a local information provider is closer in proximity, he or she is more familiar with the attributes of a location or locations near or within his or her information agency than a non-local information provider. In addition, the percentage provides a measure of the chance that a user will reach a non-local information provider in any consortium and several reference modes.

Another question from this study to include in future study was:

5. What is the correct response fill rate to location-based questions, in total and by type, for both local and non-local information providers?

The correct response fill rate question would benefit future research because it addresses the local knowledge assumption of this study mentioned above and provides a measure to evaluate the quality of a reference service. Future research may chose to only explore the correct response fill rate of *library circulation policies* questions, instead of all location-based questions. This research question could be used in several reference modes.

Other research questions could be used to address some of the issues raised by this study. For example, a research question to overcome the difficulty of operationalizing other questions could be:

6. What is a non-location-based question?

This question requires researchers to address the issue of operationalizing other questions. Although this study found that location-based question transcripts occurred in 50.2 percent of total question transcripts, the percentage of total questions could vary drastically based on how non-location-based questions (i.e., other questions) are operationalized. For example, when a user asks “how do you know when a boy likes you” within a transcript and the transcript contains multiple other questions related to the first *other* question, how should researchers quantify that question? Counting *other* questions that are non-location-based would require creating a reliable protocol that would differentiate between questions.

An additional research question related to the information-seeking behavior of users would include investigating what leads users to ask location-based questions. A research question to address this issue could be:

7. What information gaps cause users to ask location-based questions?

This research question would require user-centered methodology. Understanding the cause of a location-based question may allow researchers to provide recommendations to lower the reoccurrence of that particular information gap. For example, if findings indicate that the information gap occurs for users in the same location, signage, both digital and physical, could be added to the environment to allow users to locate responses to their location-based questions on their own.

Determining information gaps that cause users to ask location-based questions may be of interest to some researchers; however, other researchers would focus on the usability of information architecture to reduce information gaps related to location-based questions. A research question to address this issue could be:

8. What information architecture provides the most effective findability of local knowledge?

Usability studies of websites address many research questions, but focusing on improving the findability of local knowledge to provide responses to location-based questions would address a large number of questions. Perhaps, some information architectures provide more intuitive findability of local knowledge than others, and the design of websites could reflect an information architecture that works for each information agency's users. "Contact us" or "driving directions" may be clear for most users and organizations; however, information agencies may want to adopt similar standardization of information architecture for terms like the renewal of an item or reporting a lost item.

A similar issue results from determining which knowledge base elements are most useful for non-local information providers. A research question to address this issue could be:

9. What knowledge base local knowledge elements are most useful for non-local information providers?

If this study's recommendations are implemented, further study is required to know what local knowledge elements are most useful to information providers and should be included in the

software's knowledge base. The knowledge base would provide non-local information providers with the information needed to respond to several location-based questions; however, non-local information providers may prefer to utilize the knowledge base for some local knowledge elements and choose to go to an information agency's website for other local knowledge.

Different training activities and topics to cover for non-local information providers were mentioned in this study's recommendations, but no research has been done to know what kind of training would actually improve correct response rates to location-based questions. A research question to address this issue could be:

10. What kinds of training would improve information providers ability to more accurately respond to location-based questions?

Although experimental methodology involving pre-tests and post-tests would be one way to address this research question, the question may be responded to sufficiently with some of this study's findings. However, more research should be conducted to know what issues information providers are encountering in responding to location-based questions and which of those issues could be addressed with training. Trainings would also benefit from information provider feedback to assist instructors in what aspects of training were found most useful when responding to location-based questions.

A final research question follows:

11. What is local knowledge?

Although several authors have written on the subject, the concept requires further study. For now, researchers may continue to assume some local knowledge is gained from merely living in a physical space. Certainly, a library's late return policies, the best restaurant in town, and the nearest water well to your location in the desert, provide some examples of how a better understanding of how to organize and disseminate local knowledge would be beneficial. Although some examples already exist in mobile device applications, the data these applications rely on are distortions, even if small distortions, of physical space into a digital environment. Much more local knowledge remains liberated from the confines of these digital devices in less connected portions of the physical world, including the locations of wells in Rwanda and the circulation policies of some information agencies. Capturing all the Earth's local knowledge

from physical space and transforming it into the digital environment may not require defining the term, but researchers may benefit regardless from further discussion.

Conclusion

This exploratory study explored the question-negotiation process in the chat mode of responding to users' location-based questions in one statewide chat reference consortium, *Ask a Librarian*. Although most of the dissertation evades details of the political and economic context of this study, these times and situational factors cannot be overlooked in the conclusion. The consortium in this study has grown in number to include 107 information agencies. Certainly, the issues raised in Chapter 5 will be compounded by an increase in the number of information agencies and the geographic areas covered by the service. With cost cutting remaining paramount for participating information agency administrators, the benefit of cost savings will likely continue to overshadow any of the potential weaknesses of chat reference and location-based questions.

The necessity of pooling resources and services in tough economic times is not surprising; however, many local information agencies portray their resources and services as being local and only benefiting their constituents. In some services, such as database provision, hiding the fact that the resources are available statewide and not only exclusively at your local library is reasonable, but when non-local information providers staff a statewide chat service the majority of the time, there is no purpose in hiding the statewide makeup of the chat reference service. Who receives credit for services like *Ask a Librarian* and who is accountable with the issues addressed in Chapter 5 remain as complicated as the composition of the chat consortium in this study. The political posturing between the State Library and Archives, the six Multitype Library Cooperatives, the State University System of Florida Libraries, numerous and varied academic, community college, and public libraries, a museum, and a school district is expected and unavoidable when funding is fleeting.

Location-based questions comprised half of the question transcripts asked to the service and some might wonder what would happen to funding if users could find their own answers to these questions. All involved need to justify every dime expended in this era of accountability.

Findings that indicate an inability of this service to respond accurately to location-based questions may not be welcomed as an evaluation of the service, because in these times, that can be seen as reason to terminate the service. In fact, despite the increased user demand and number of information agencies offering this type of service, the likelihood of this chat consortium and other chat consortia disappearing is growing by the minute as more and more library services and resources are cut in response to decreases in funding.

Within this political context, chat reference and location-based questions remain a relatively unexplored, but potentially valuable area of reference research. Location-based questions are a weakness of any consortial service and may be overcome by implementing some of the practical recommendations provided in this dissertation, such as the dissemination of local knowledge and providing access and permissions to any information provider staffing such a service. Implications of location-based questions affect chat consortium managers, participating information agency administrators, information providers, users of chat reference, and chat software developers. Discussion of this study's assumptions, limitations, findings, methodology, and study approach, were addressed in this chapter. A revised study approach and future research questions were provided to further assess the weakness of location-based questions. As the benefits of consortia outweigh the weaknesses, chat and other digital reference consortia that avoid being cut will continue to grow in number and participation. Therefore, further evaluation of location-based questions has the potential to improve those services by increasing the correct response fill rate to those questions and providing a better understanding of the phenomenon for library and information scientists, information providers, and all those utilizing consortial chat reference services.

APPENDIX A

PROTOCOLS BY METHOD

1. Content analysis protocols

Location-based question or non-location-based question

1. Assign unique identifier to each transcript.
2. Read the complete chat transcript.
3. Remove unusable transcripts, which include transcripts used for system tests, trainings, or information provider-to-information provider communications.
4. Identify the reference question(s) from the question field or in the remainder of the chat transcript.
5. Identify any georeferenceable location or locations in transcript that the reference question(s) concern, which may be assumed from the user's entry web portal.
6. Classify transcript as a location-based question transcript if the question(s) concerns a georeferenceable location or locations.
7. Classify transcript as other question transcript if the question(s) does not concern a georeferenceable location or locations.
8. Repeat for all transcripts.

Types of location-based questions

1. For each location-based question transcript, determine the type of location-based question. Classification of types emerged from the data during data analysis, four non-directional location-based question categories emerged from a 10 percent pilot study: library, university, attribute of geography, and geography. In addition, subcategories emerged (e.g., library—circulation policies).
2. Record the type and potentially the subcategories of location-based question for the transcript.
3. Repeat for all location-based question transcripts.

Information providers' question-negotiation techniques

1. For each location-based question transcript, identify the information provider's techniques used in formulating a response to the location-based question.
2. Code by RUSA guideline elements of clarifying questions, referrals, and after a 10 percent pilot study, no non-RUSA guideline elements have emerged from the data; however, combinations of those guideline elements point to patterns of response from providers.

For examples of the protocol process, see Tables 3.5 and 3.6.

2. Quantitative analysis protocols

Counts of location-based questions, in total and by type, and total transcript chat questions

1. Using content analysis findings, count the number of location-based questions, in total and by type.
2. Using content analysis findings, count the number of total transcript chat questions.

Counts of non-local information providers and total information providers responding to location-based questions

1. For each location-based question transcript, identify the location or locations that the reference question concerns.
2. Look up the information provider's county from an *Ask a Librarian* database.
3. Determine and record the addresses by conducting a Google Maps search of each location in the location-based question.
4. Geocode address locations in location-based questions utilizing ArcGIS 9.3.
5. Determine collocation of information provider's county and locations in user's location-based questions utilizing ArcGIS 9.3.
6. Count the number of non-local information providers and total information providers responding to location-based questions.

For examples of protocol process, see Tables 3.8 and 3.9.

3. Focus group protocol and questions

1. Welcome participants and have participants complete consent form in Appendix B.
2. For chat session focus group, ask participants to use an anonymous screen name.
3. Define location-based questions.
4. Administer questions.
 - a. What types of location-based questions have you received?
 - b. What techniques do you use to respond to location-based questions?
 - c. Have you used clarifying questions in responding to location-based questions?
 - d. Have you offered pointers or named resources you used in responding to location-based questions?
 - e. Have you referred users to other sources or institutions in responding to location-based questions?
 - f. What other techniques have you used in responding to location-based questions?
5. Wrap up focus group and thank participants.

4. Unobtrusive testing protocols

Administration of unobtrusive testing

1. Use generated schedule for unobtrusive testing administration.
2. Enter through designated web portal.
3. Post unobtrusive testing question at scheduled time in the chat software's question field, but do not populate other fields.
4. Respond as necessary to the information provider.
5. Once the information provider provides the correct response or concludes the session in another manner, copy and paste the entire transcript into Word.

Information providers' question-negotiation techniques

1. For each saved unobtrusive testing transcript, identify the information provider's techniques used in formulating a response to the location-based question.
2. Code by RUSA guideline elements.
3. For each saved unobtrusive testing transcript, identify the location or locations that the reference question concerns.

4. Determine the information provider's county by look up in the *Ask a Librarian* information provider database.
5. Determine and record the addresses by conducting a Google Maps search of each location in the location-based question.
6. Geocode addresses of locations in location-based questions utilizing ArcGIS 9.3.
7. Determine collocation of information provider's county and locations in user's location-based questions utilizing ArcGIS 9.3.
8. Code as local or non-local information provider.
9. Compare responses to correct responses.
9. Code unobtrusive testing responses as correct response, both complete and incomplete, incorrect response, referral, or non-response.

APPEDIX B

IRB APPROVAL LETTER

- Use of Human Subjects in Research - Approval Memorandum <http://mail.google.com/mail/?ui=2&ik=74fa0d929e&view=pt&q=ap...>



bradley bishop <bradleywadebishop@gmail.com>

Use of Human Subjects in Research - Approval Memorandum

Human Subjects <humansubjects@magnet.fsu.edu>
To: bw06c@fsu.edu
Cc: cmcclure@lis.fsu.edu

Mon, Jun 1, 2009 at 9:18 AM

Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 6/1/2009

To: Bradley Bishop

Address: 1262 Poplar Drive
Dept.: COLLEGE OF INFORMATION

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
Chat reference and local questions: A multi-method evaluation of a statewide chat reference consortium

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.


If the project has not been completed by 5/31/2010 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB0000446.

Cc: Charles McClure, Advisor
HSC No. 2008.2121

 2008.2121consentform.pdf
22K

1/8/2010 8:35 AM

APPENDIX C

CONSENT FORM FOR FOCUS GROUPS

INFORMED CONSENT FORM

This research is being conducted by Bradley Wade Bishop who is a Ph.D. candidate at Florida State University. I understand the purpose of this research project is to evaluate chat reference and local questions. I will be asked about my personal perceptions and opinions about chat reference and local questions.

I understand that my participation is **completely voluntary**. All my answers to questions and my suggestions will be **kept confidential** and identified by a subject code number. Confidentiality will be held to the extent allowed by law.

I understand that there are minimal risks involved in this study. I understand that the entire project will be audio-taped and that the tapes will be used only for obtaining exactly what was stated in the interview or focus group. I understand that the tapes will be stored in the College of Information, Louis Shores Building, and will be kept until the research is completed. I understand that the tapes will be destroyed by the end of 2009.

I understand that if I have any complaints about the researcher(s) or concerns about the research project during or after the study, I may contact the Human Subjects Committee at Florida State University or the College of Information, Louis Shores Building, Florida State University.

I understand that this consent may be withdrawn at any time without prejudice, penalty, or loss of benefits to which I am otherwise entitled. I have been given the right to ask and have answered any inquiry regarding this study. Questions, if any, have been answered to my satisfaction.

I understand that I may contact Bradley Wade Bishop (813-210-3766) for answers to questions about this research or about my rights. I understand that I will receive a copy of the interview report.

Consent to Participation

I acknowledge that I am at least eighteen years old, and that I understand my rights as a research participant as outlined above. I acknowledge that my participation is fully voluntary.

Print Name _____ Witness _____
Signature: _____ Date _____
Participant #: _____

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