LIBRARIANS' PERCEPTIONS OF QUALITY DIGITAL REFERENCE SERVICES BY MEANS OF CRITICAL INCIDENTS

by

Eylem Özkaramanlı

B.A., Hacettepe University, 1998

M.A., Hacettepe University, 2000

Submitted to the Graduate Faculty of the

Department of Library and Information Science

School of Information Sciences

in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

University of Pittsburgh

February, 2005

UNIVERSITY OF PITTSBURGH

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE

SCHOOL OF INFORMATION SCIENCES

This dissertation was presented

by

Eylem Özkaramanlı

It was defended on

February 25, 2005

and approved by

Edie M. Rasmussen, Ph.D., Advisor

Jose-Marie Griffiths, Ph.D.

David Robins, Ph.D.

Gloriana St. Clair, Ph.D.

Dissertation Director: Edie M. Rasmussen, Ph.D., Advisor

LIBRARIANS' PERCEPTIONS OF QUALITY DIGITAL REFERENCE SERVICES BY MEANS OF CRITICAL INCIDENTS

Eylem Özkaramanlı, Ph.D.

University of Pittsburgh, February, 2005

This research is an effort to understand chat reference services through librarians' perceptions of successful and less successful chat reference service. Ten Academic libraries in Ohio and Pennsylvania which offered chat reference services were identified and 40 librarians were interviewed in order to address the research questions of this study. The main methodology used was the Critical Incident Technique (CIT) that is based on collecting and analyzing the most memorable experiences of human behavior in order to evaluate and identify ways to increase effectiveness of service. On-site, personal interviews were conducted with librarians who provide chat reference services. The subjects were initially asked to define chat reference service and compare it with traditional reference services. Following CIT procedures, they were then asked to recall and describe successful and less successful chat reference interactions and to make suggestions for better chat reference services. The interviews were transcribed and entered into a database for coding and content analysis of the collected data using qualitative data analysis software (MAXqda). Coded data were transformed into categories to determine and describe librarians' perceptions of chat reference services. The six major themes that emerged from this study were: 1-Characteristics of chat reference, 2-Attitudes of librarians and users, 3-Efficiency of reference interview and question negotiation, 4-Service improvement and management issues, 5-Training and review, and 6-Publicity and user awareness. These themes were discussed throughout the study. Findings from the recorded critical incidents indicate the importance of "attitudes" of librarians and users, the role of question "negotiation" and "type", and the availability of "resources" in successful chat

reference service. The defining characteristics of chat reference, that it is online, remotely available and delivered through software raised issues of "technology", "chat software", "service location" and "service hours" which were also significant in defining service success. Furthermore, investigation of reference service quality criteria, evaluation measures and methods were explored by comparing literature on traditional and chat reference services and study findings. This study provides practical evaluation criteria for providing successful chat reference services in three categories based on: librarians' performance, chat software, and marketing issues. Further research for developing comprehensive digital reference evaluation criteria is recommended.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENTS

providing feedback, reading parts of my research, empathizing or offering help when I needed it.

Thank you to Donghee Sinn for being a supporting colleague and a close friend all through my Ph.D. Your support in person and by phone (for the last six months) was so helpful in times of discouragement. Work was most enjoyable with you and I will always remember our countless hours spent at Hillman library, never ending discussions on our dissertation blues and specially our rewarding time off from studying. Also, thanks to all friends who were there in person, or checking on me by calling, e-mailing during the times when I needed company. Thanks, Re-gine, Saurav, Rkia, Angela, Jae-Youn, Ling-Ling, Sujin, Ibrahim, Ozgur, Bahar, Evren, BElif, KElif, Sefika, Doga, Guzide....................................

To my parents, Ali and Tuncay Ozkaramanli, even though we are thousands of miles apart, your love and support have guided me more than you could imagine. Thank you for being proud of me, trusting me and never questioning my never-ending education life. My heartfelt thanks also goes to all my huge family in Cyprus, especially to my grandmother for all her prayers, my brother, my aunts, uncles, in-laws and all cousins who were looking forward to my graduation. I guess now it is the time to take a break from school.

And lastly, to Turgut, my beloved husband and friend. Thank you for the many things you did to help me in this journey; from cooking when I was too tired, encouraging me to get back to work even at the most hopeless times, to fixing my laptops so many times and preventing me crashing them, being my savior with LATEXand putting up with me when I was cranky and impossible. Your love and support have made all things possible.

1.0   INTRODUCTION AND OVERVIEW

1.1   BACKGROUND AND PURPOSE OF THE STUDY

Information technologies are becoming more sophisticated every day, and users' expectations and their demands on librarians are becoming increasingly complex. Accordingly, librarians keep seeking new ways to respond to those demands through technology-based solutions.

The most significant development in information technology in the last 25 years is the Internet. It has brought new challenges and opportunities to users, who are able to access extended information from their own computers instead of going to the library for the same information. Librarians have been quick to adopt this technology and to use the Internet in order to meet user demands.

The ready availability of e-mail and Web services has led to the development of digital reference services (DRS)[1] which have become a significant factor in this adaptation of the Internet to library services. Currently DRS are based on human intermediation and are in a continuing state of development.

Digital reference services started with e-mail technology. The Electronic Access to Reference Service (EARS) provided by the University of Maryland Health Services Library is considered to be one of the early DRS's (Weise and Borgendale, 1986). Greater access to the Internet and the growing information content of the Internet in the form of the World Wide Web (WWW) led users to expect information services from any location, resulting in a greater and greater dependence on electronic formats. With the advent of the WWW, libraries created on-line Web forms which asked the user to input their question and specific information on their information need (Janes et al., 1999), and posted 'frequently asked

---

[1]In this work, "Digital reference service" is referred to using its common abbreviation "DRS"

questions' (FAQs) to their Web pages hoping that the user would find his/her answer there (Kawakami, 2003). E-mail and Web forms are considered to be asynchronous forms of digital reference services since both involve communication with no expectation of receiving an immediate response from other communicators. FAQs, however, do not have an interactive component and may not address a patron's particular question.

The Internet Public Library (IPL) played a pioneering role in moving the digital transaction into a real time environment by providing synchronous reference service. The IPL used Multi-User Object Oriented (MOO) technology as an experimental real-time reference service in 1995 (Shaw, 1996). This technology was found to be problematic for reference purposes. Communication took longer because everything had to be typed, there were often multiple users talking at once, and the interface was not friendly (Shaw, 1996; Kawakami, 2003). Before MOO technology and the IPL, during the 1990s, several projects in academic library settings were also described in the literature. These projects included the Desktop Videoconferencing system (Pagell, 1996; Folger, 1997), CU-SeeMe (Folger, 1997; Morgan, 1996), and the Apple VideoPhone Kit (Lessick et al., 1997). These accounts were mostly descriptions of the systems' technological limitations, difficulties and lack of demand by the participating institutions. Web-based software which was originally designed for customer support for online shoppers was adopted by libraries in order to allow librarians to 'chat' with the users, 'push' web pages to the users' browsers, or to 'escort' them through their searches. 'Chat' became the most commonly used mode of communication in library digital reference services (Ford, 2002). Libraries use different kinds of software in order to support their chat reference services; mainly commercial, freely available or in-house developed chat software are the main options (Francoeur, 2001; Stormont, 2001).

One of the most critical issues in digital reference services is the evaluation of the quality of these services. Several researchers have suggested methods or measures for evaluation (Kasowitz et al., 2000; White, 2001; McClure et al., 2002) and the Reference and User Services Association (RUSA) RUSA (2004a) recently revised their "Guidelines for Behavioral Performance of Reference and Information Service Providers" by incorporating guidelines for digital reference transactions into the earlier 1996 Guidelines. However, relatively little work has been done on defining quality criteria for reference services and so far there are no

comprehensive studies in this area defining how to evaluate digital reference services for quality.

By developing a common understanding of chat reference quality criteria we can lay a foundation for the successful evaluation and improvement of these services. The purpose of this study is to examine chat reference services, which are one of the most popular forms of digital reference services, through the literature and through the use of the critical incident technique (CIT) to examine librarians' perceptions of successful chat reference services in order to identify those factors which contribute to the provision of quality services to chat reference users.

1.2   RESEARCH QUESTIONS AND ASSUMPTIONS

The following questions will be investigated in the process of this research:

1. How much of the experience from traditional reference service evaluation can be transferred to the evaluation of digital reference services?

2. What are the defining characteristics of Chat Reference and how can we use them in measuring quality in chat reference services?

3. What are librarians' perceptions of successful chat reference service ?

4. To what extent do librarians' perceptions and the results of research on quality chat reference service identify common characteristics?

5. What evaluation criteria and methods should be used for chat reference services?

The research questions are formulated and constructed primarily based on the following assumptions:

Assumption I : Academic Libraries need evaluation measures for their digital reference services in order to solve current deficiencies, which are not addressed by the traditional reference service experience.

Assumption II : Librarians' suggestions and support are needed for a successful DRS evaluation.

Assumption III : Librarians' perceptions of successful chat reference service can be identified using the critical incident technique.

Assumption IV : It is possible to formulate comprehensive evaluation criteria for evaluating existing chat reference services.

1.3   STRUCTURE AND OUTLINE

Previous sections provided a background to the study and defined research questions and assumptions. This section will provide an outline for the dissertation starting from a literature review.

Chapter 2 comprises a literature review of DRS with the purpose of identifying the characteristics of these services. As mentioned in section 1.1, the evaluation process is considered to be the most crucial component in improving public services. In order to evaluate chat reference services and develop quality criteria, this study will look into traditional reference services, their evaluation and the methodologies used for quality measurement. Comparing traditional reference service evaluation with DRS practices and seeing their similarities and differences is helpful for the design of DRS evaluation criteria.

Chapter 3 describes the methodology and data collection methods of the study. Here, the research questions are re-investigated followed by the pilot study analysis in order to provide an outline to the main study. Selection of sites and subjects and explanations of the data collection methods are also explored. This chapter provides the methodological framework of the study.

In chapter 4 the findings of the study are explored. The coding scheme of the study and the data analysis are presented consecutively in order to provide context for the research results. The results which were presented to additional judges for the reliability test are also discussed in this chapter.

The final chapter summarizes the major findings by providing general comments and by responding to the research questions of the study. Following the major findings, limitations of the study are explored, and suggestions for further study are presented.

1.4 LIMITATIONS

- The population of the study is the librarians who provide chat reference service within an academic library environment in the United States. The sample is drawn from these library systems, and includes university libraries as well as college libraries within the states of Pennsylvania and Ohio.

  Therefore, this study is limited to the academic libraries within two states. In order to overcome this limitation, a diverse sample of libraries have been selected. Representative samples of small library systems like colleges, ARL libraries, and consortia are chosen for the purpose of this study.

- This study is limited to 10 academic libraries and 40 chat reference librarians from these institutions. Therefore, generalization is limited to the research participants and the theory.

  Although the sample size is small, this is often the case for qualitative research (Bradley, 1993; Sutton, 1993). Subjects of the study are chosen based on the information richness factor and their relevance to the research questions as suggested by Patton (1990). The sample was taken from diverse institutions, providing a rich sample representing a variety of librarians from different backgrounds, experience, and specialty areas.

- This study does not involve users of chat reference services and relies on librarians' statements and their perceptions of users. The emphasis in this study was on integrating the service providers' point of view on successful chat reference services.

- The study is based on qualitative research methods and is relatively subjective in nature. It concerns librarians' perceptions of successful and less successful chat reference interactions.

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

The literature review for this study addresses the facets of traditional face-to-face reference services and digital reference services in three main parts:

1. The reference interview as a key element of reference services,

2. Digital reference services and their current status, and

3. The process of evaluating reference services.

Section 2.2 concentrates on the importance of the reference interview, principally in the traditional reference environment, and its transfer to the digital environment. The reference interview with its components and characteristics, and the interview techniques leading to the best results, are discussed in detail in order to demonstrate the role of the reference interview in reference services.

Section 2.3 emphasizes digital reference services. It starts with definitions of DRS and continues with a discussion of e-mail reference, which was the primary technology used in the 1980s. E-mail use, its applications, and its comparison with other media are discussed with the support of related literature and studies. Web form use as a reference tool is another element addressed in this section.

This section continues with a discussion of real-time synchronous reference service which followed e-mail reference. With the introduction of real-time reference technologies, mainly chat reference, many libraries conducted studies to examine their own experiences with the software as well as the performances of library staff with the new technologies. These studies along with the other broader studies in the literature are the main focus of this section. At

this juncture, features, selection criteria and comparison of the software, and best practices are discussed.

The final part of the literature review, Section 2.3.2, emphasizes the need for assessment in reference services. It compares traditional reference evaluation to digital reference and presents definitions, basic criteria for the measurement of reference effectiveness, users vs. librarians' perceptions on evaluation, the steps in effective assessment and standards which have been developed and agreed upon for the measurement of reference effectiveness. In conclusion, the stages of evaluation in DRS and attempts to identify digital reference quality standards are briefly described.

2.2 THE REFERENCE INTERVIEW

Since library collections have expanded to include online resources, patrons require help in using these resources and interpreting information that they encounter online. As Katz (1997) suggested, there is more information than most people appreciate and if people are to be truly informed they will need the assistance of a librarian. Reference librarians are the key personnel in library user services, since they assist people with their information needs. The assistance of a librarian is important, and an optimal reference experience requires an interview with the user and a well-planned search process.

The reference interview is the communication between a patron and a librarian. This interaction between librarian and user is the most important element of the reference interview since it influences the results of the interview and ultimately the success of the reference process (Gatten, 2001; Whitlatch, 1990).

Interviewing techniques which are useful in the reference interaction have been developed for other purposes, such as survey research or therapies (White, 1981). Libraries adopted these techniques and with the help of professional librarians they developed their own techniques to explore the information needs of their users.

A reference librarian should be ready to tackle all kinds of queries and s/he should behave as a professional. S/he should first identify the information needs of the user and gather

related information based on that need in an organized way. At this time, librarians should identify the problems behind the question; consider subjects related with other areas; be concerned with users' limitations (intelligence, level of motivation etc.) as well as external limitations (deadline, material availability etc.) (White, 1985).

A good reference interview plays an important role in information retrieval systems and a successful one should be:

- well organized to achieve a particular outcome
- have parts which are logically related with each other
- as fast as possible to achieve its goals (White, 1985).

The quality of the interview may be affected by decisions made by the librarian, or by other factors which are not under the librarian's control. Decisions taking place during the interview may affect several dimensions. According to White (1981), the four main dimensions of the reference interview are:

1. Structure: Contents and their order during the interview
2. Coherence: Perceptions of the user during the interview which would guide him/her on how to understand what is happening and how to cooperate with the librarian.
3. Pace: Speed and efficiency of question/answer exchange.
4. Length: Use of time during the interview. Decision-making is the major feature which affects the length of the interview.

Traditionally reference service is provided through direct, face-to-face librarian and user interaction at the library itself, where the user has an immediate information need. During a face-to-face reference interview the librarian has an opportunity to see users' verbal, nonverbal, and visual expressions, and users can reshape their requests during the interview process. The most suspect element of the interview is the end-product which depends on the search strategy and the structure of the information system. Performance of librarians, physical settings, verbal and nonverbal behavior and user satisfaction are four components of the reference interview (Jennerich, 1980; White, 1985; Straw, 2000).

The objectives of the reference interview are the same regardless of the medium but the skills and techniques used to achieve it would be different in different media (Abels, 1996).

The transfer of the benefits of face-to-face reference to the digital environment is achievable. The presence of a traditional reference desk with librarians sitting behind it is no longer critically important and that physical appearance has changed into an electronic data center with all the capabilities of traditional reference service. Functional relationships between users and librarians are also changing as well as the reference environment, the medium of the service provided and user expectations from both libraries and librarians (Katz, 1997; Wilson, 2000). The librarians' role, however, remains the same as a connector between user and the collection, virtual or otherwise (Ross, 2003).

Reference librarians now have the opportunity to interact with their users over the Web. They must make an extra effort to create a suitable environment in order to closely approximate the user experience in a face-to-face reference transaction (Wilson, 2000; Katz, 2002). In their study, Janes and Silverstein (2003) also claim that DRS reflects an attempt to adapt traditional reference practice to a new set of technological environments by using the same real-time interview and response process. Librarians should first accept and understand their new roles in a technological environment and improve their skills in terms of learning this new environment.

2.3 DIGITAL REFERENCE SERVICES (DRS) : DEFINITIONS AND DEVELOPMENT

Libraries are continuing to provide their traditional services while supporting their remote users with Web-based information services. New technologies give reference services the opportunity to conduct reference transactions over the Web and those services (which have been named digital reference — as well as virtual reference, online reference, electronic reference, or real-time reference) need to be excellent.

Janes et al. (1999, p.146) defined digital reference services as *"a mechanism by which people can submit their questions and have them answered by the library staff member through*

9

some electronic means (e-mail, chat[1], Web forms[2] etc.), not in person or over the phone".

Today, this definition must be slightly changed to accommodate the introduction of new software which allows librarians to answer reference questions synchronously/in person with the support of the telephone or other additional tools (such as black-boarding, file-sharing etc.) if necessary. Real time, synchronous technologies would lead us to describe DRS broadly as the real time human help delivered through the Internet (Meola and Stormont, 2002).

Digital reference can be summarized as a *"reference service initiated electronically, often in real-time, where patrons employ computers or other Internet technology to communicate with reference staff, without being physically present"* (RUSA, 2004a). Communication channels used frequently in digital reference include chat, videoconferencing, Voice over IP, e-mail, and instant messaging.

2.3.1 E-mail and Web Form Based Reference Services

E-mail reference has been used as a common technology for answering questions from a library remote-user for decades. The health sciences and engineering fields used e-mail technology earlier than the social science field; e-mail reference services came about for use in health sciences and engineering libraries starting from the mid 1980's (Gray, 2000). The Electronic Access to Reference Service (EARS), which was established in 1984 by the University of Maryland Health Services library, was one of the first online reference services (Weise and Borgendale, 1986).

Contemplating the past, Ryan (1996) also examined previous technological innovations in reference work, mainly mail, telephone and teletype. She concluded that these technologies were quickly adapted and efficiently used in reference services.

For the period of the late 1980's and 1990's, e-mail reference was a popular subject in the digital reference literature. Still and Campbell (1993) provided a thorough overview of the early years of e-mail reference, and described a 1988 survey of members of the Association

---

[1]See Appendix A for a chat-reference example transcript.

[2]See Appendix B for an example 'web based query form' taken from the Internet Public Library site (http://www.ipl.org/div/askus/)

of Research Libraries regarding electronic mail use in reference services. Differences between e-mail and other related media, the e-mail reference model, and user/librarian attitudes toward this service were some other subjects from the early to mid 90's (Abels, 1996; Bristow, 1992). Despite its popularity as a topic for discussion in the Library and Information Sciences (LIS) literature, e-mail reference service received little attention from patrons (Still and Campbell, 1993).

A number of authors considered developing guidelines for e-mail reference and identified some specific issues in planning, improvement or management of digital reference services (Lankes, 1998; Sloan, 1998). These studies have commonly suggested guidelines for the support of electronic reference services.

Abels (1996) states that a systematic approach is the most effective way of conducting a reference interview over e-mail. This approach is simply based on organizing a non-structured query sent by a user, and resending it to the user in a systematic way in order to increase the success of the reference interview. In this fashion, the librarian has the opportunity to systematize the question and with the approval of the user she can answer it completely. Abel's study took place in the College of Information Sciences at the University of Maryland, and also included the design of a template request form which includes detailed information on the subject to be searched, the constraints of search results and some personal data. The author suggests that the introduction of the request form will be helpful for e-mail reference services in answering complicated questions.

Gray (2000) also provides a brief overview of selected research on issues surrounding digital reference in libraries, by examining e-mail reference before and after the proliferation of the World Wide Web, as well as current practices in digital reference. She analyzed Web sites of ten large research libraries by using the observation method. Question types, response time, definitions and use of forms were identified as important elements to achieve a basic understanding of reference services conducted in these libraries.

Janes and Silverstein (2003), on the other hand, investigates the channels of DRS and provide general characteristics of the e-mail, web forms, and chat reference by means of their effects on DRS practice. Their study gives the differences between synchronous[3]

---

[3]Synchronous digital reference service such as chat provides reference nearly in real-time. Communication

and asynchronous[4] digital reference and claims that these services reflect an attempt to adapt traditional reference practice to the DRS environment by using the advantages of the real-time interview.

Analyzing and evaluating DRSs, White (2001) conducted a survey on a sample of twenty Ask-A services in a comprehensive study. Ask-A services are generally expert services which are human mediated, non-library, commercial, or noncommercial information service projects which offer self-declared expert answers to user queries, and most of these services specialize in a particular subject. An example is the AskERIC service which is based on education resources (Lankes, 1998; Janes et al., 2001).

White's study was based on systems analysis, asking 110 questions in 18 categories about the sample DRSs, broadly under four main areas which were:

1. Mission and purpose

2. Structure and responsibilities to client

3. Core functions

4. Quality control.

Her comprehensive outline of the questions is applicable to today's DRS assessment through some means of modification (White, 2001).

Janes et al. (1999) also conducted a survey of 150 academic library Web sites to identify the proportion of libraries conducting digital reference service, and they examined the characteristics of these services. They found that 45% of the sample libraries had DRS. According to the results of this study, simple Web forms —which asked only for name, question information, and authentication if required— were the most popular method used by 65% of the sample libraries. For comparison, Janes et al. (2001) report 60%, White's study (2001) finds 71.4%, and finally a survey by Pomerantz et al. (2004) shows that 83% of academic libraries acquire their DRS questions via web forms. Even though these studies vary in terms of their population sizes and groups, it is obvious that the use of web forms for question submission is a well-established practice. Janes (2002) conducted a study which

and interaction between patron and information professional is also known as live reference or real-time reference.

[4]Asynchronous digital reference service based on e-mail or Web forms involves communication with no expectation of receiving an immediate response from other communicators.

explored librarians' experience and attitudes by surveying both academic and public libraries. The results obtained from this study are also valuable, such as the indication that 78% of librarians are only familiar with e-mail and Web-form based reference but not with chat or other real-time reference services.

An e-mail or web form based reference interaction can eliminate the pressure to provide immediate service to users, such as occurs when they are on the other side of the desk or waiting online. Furthermore, these forms permit the librarian to step back and think about the range of responses to a user's problem which means a more thoughtful process of question negotiation (Straw, 2000). On the other hand both e-mail and web forms are asynchronous and lack the benefits of real-time interaction. For example, question clarification results in a further delay, or the actual information need of the users could change from one e-mail to the next (Abels, 1996).

In this section we defined digital reference and its development through its brief history. The use of Web forms and e-mail reference services were the main issues discussed. The next section focuses on real-time synchronous reference services, mainly the use of chat technology which allows user and librarian to interact synchronously, applications of new technologies and the current status of DRS.

2.3.2 Real-Time Reference Services

Libraries are moving towards a virtual environment by making their sources and services available online. As a result of the increase in digital resources which can be reached remotely from libraries' Web sites, research is being conducted outside of the library building. Digital reference traffic is expected to increase as more people start to use these services daily and as a result it is critical for libraries to improve their digital reference services and to resolve management issues related to these services (Gray, 2000; Wilson, 2000).

By the late 90's, librarians had explored new formats for DRS in addition to e-mail and web forms, which would be more interactive and live. This led to real time, synchronous reference services in which librarians have the opportunity to help users with their immediate information needs. Today, as we can see from the literature and related conferences, the focus

is on new technologies and software support to conduct the most effective reference services (Gray, 2000; McGlamery and Coffman, 2000; Francoeur, 2001; Coffman, 2001).

With the introduction of chat reference and other real-time reference technologies many libraries conducted studies related to their own experiences. These studies help us to better understand the best practices, software selection or comparison plans for real-time reference services Kibbee et al. (2002); Ware et al. (2003); Patterson (2001); James and Butler (2001); Stormont (2001); Francoeur (2001); Kimmel and Heise (2001); Boyer (2001).

According to Breeding (2001) the digital reference product must include knowledge-based approaches, online chat, e-mail, co-browsing, pre-constructed messages (FAQ), and logging and statistical reporting. These features together with others like the slide-show, Voice over Internet Protocol (VoIP), user queuing, video conferencing or collaboration with other librarians are important in real-time reference services.

There are three categories of software used in libraries, according to Francoeur's study (2001):

1. Chat

2. Web Conferencing

3. Web Contact Center Software

Chat software makes it possible for the user and librarian to communicate in real-time. The collaborative browsing or escorted browsing feature of some software allows them to synchronize their browsers so they can follow each other's moves (Ellis and Francoeur, 2001). Page pushing allows the librarian to send Web-pages or search results directly to the user and saves some time while avoiding mistakes in URL spellings etc. Canned responses, as well as FAQs, can be helpful for the librarian, and directly pushing that information to the user can save time and effort. A file sharing feature also allows librarians to send instructional guides, policy statements etc. to the user (Francoeur, 2001; Patterson, 2001).

Video conferencing and VoIP features of the software are used by a few libraries but most libraries and their users are probably not technologically ready to use these services. Video conferencing requires users to have Web-cams, a special software installation and substantial bandwidth on both the librarian's and user's sides. This limits the usability and

availability of these methods. VoIP is a Web based telephone service which allows users to talk to a librarian over the phone during the reference interaction. As of 2004, it is still a developing technology and not widely used (Kibbee et al., 2002; Francoeur, 2001). When these technologies become more common in the near feature they will provide a way to enhance reference interaction.

Libraries are also participating in the development of 24/7 reference service for their users. The main examples of these developments are:

- The Virtual Reference Desk project(http://www.vrd.org), a network of organizations that share expertise in providing human intermediated question and answer services on the Web (sponsored by US Department of Education)

- Metropolitan Cooperative Library Systems (MCLS), a 24/7 Reference project in California (supported by Federal LSTA funding and administered by the California State library) (Stormont, 2001; McGlamery and Coffman, 2000)

- The Collaborative Digital Reference Service (CDRS), a project headed by the Library of Congress (http://www.loc.gov/rr/digiref) (Kresh, 2000)

- The Ready for Reference Service, under development by the Alliance Library System in Illinois (Sloan, 2001a,b).

Many real-time digital technologies/software have been developed during the last decade. For example the 24/7 Reference Product, Virtual Reference Software, LiveAssistance, HumanClick(sm), LivePerson and many others are available for library use (http://www.public.iastate.edu/~CYBERSTACKS/LiveRef.htm). Many of these applications were originally designed for live customer support services for companies in the business sector (Coffman, 2004), and then major web commercial sites and retailers started to use them.

The System-wide Operations and Planning Advisory Group (SOPAG) (Mitchell et al., 2001) conducted a survey of 30 ARL libraries which engage in some level of real-time reference services and researched their choice of system and the system features. They provided a comparison chart of the features of DRS software. 24/7 Reference, Convey, NetAgent, Live Assistance, Live Person and Live Helper were found to be offering advanced features, offered by six major vendors and used in ARL libraries as of 2002.

Another broad survey found that a total of 272 libraries, including both academic and public libraries, offered chat reference services (Francoeur, 2001). Despite the large number of public libraries served by chat reference (45%, n=122), the majority of libraries served by chat reference were found to be academic libraries (54%, n= 148). The others (1%) identified were one government and one special library. This is a valuable survey, gathering information on types of library and how they offer chat reference. Software used in these libraries, their service hours, whether the library belongs to a consortium and policies about the service were among the important data gathered by the research.

According to Gross et al. (2001), the focus of existing studies in the digital reference literature is on user demographics, nature of the questions and responses, user and staff behaviors and expectation and satisfaction with the digital reference services. On the basis of these articles, case studies, and individual experiences, it is now possible to see the big picture of digital reference and to discuss the progress which libraries have made in offering the service (Coffman, 2004).

The literature also includes many studies which rely on data collected by institutions from their individual experiences (Stormont, 2001; Kimmel and Heise, 2001; Kibbee et al., 2002; Patterson, 2001; James and Butler, 2001). The findings of these studies can also be beneficial for the improvement of DRS as they provide information on current practices as well as on their success or shortcomings. There is much more that needs to be known about digital reference service in both stand-alone and collaborative efforts. Coffman (2004) estimates that 3,000-4,000 libraries are currently providing real time digital reference services but there is no study which accurately tells us how many services are really in operation. Quality evaluation of DRS is also a major research question and there are only a few works which address this issue in the literature.

The following section of the study addresses the importance of evaluation in reference services. It compares traditional reference evaluation to the digital reference and highlights the need of evaluation in DRS. It presents the steps in effective assessment, the criteria which have evolved for the measurement of reference effectiveness, the stages of evaluation and the attempts which have been made to identify digital reference excellence.

2.4 QUALITY EVALUATION AND MEASUREMENT: TRADITIONAL VS. DIGITAL REFERENCE SERVICES

2.4.1 Evaluation for Quality

"Evaluation is the ongoing activity, part of the planning process, which assesses the effectiveness of current procedures and provides data that can help set the direction of future activities" (Watson, 2001, p.80).

The main aim of this evaluation process is to improve service. Common evaluation approaches include comparing results with defined goals, established criteria or both. As Weingand (1997, p.33) states: *"No service can be considered truly excellent unless the product offered meets the standards of high quality"*.

Evaluation can be conducted with subjective (qualitative) and/or objective (quantitative) methods. Qualitative methods are typically surveys, observations, interviews, focus groups and case studies that allow us to gather complex data in order to assess quality concerns. In evaluation with the goal of improving user services, qualitative research has potential, and these methods are considered ideal for assessing the quality of service provided (Gorman and Clayton, 1997; Whitlatch, 2001). On the other hand, quantitative research provides statistical data or works with known quantities. It asks questions including: how much? by whom? when? and where is the service used? (Novotny, 2001). In order to make the evaluation process quantitative we can count the number of sessions, number of users, category of users (faculty or student), institutional affiliation, type of question (ready reference, request for resource, research), length of the session, resolution (was the question answered?, did patron quit the session without an answer?), or the resources used. However, counting these services/things is not enough for effective evaluation.

A combination and balance of qualitative and quantitative methods is recommended to make evaluation more effective (Whitlatch, 2000; Watson, 2001; Griffiths and King, 1991; King and Griffiths, 1991) in order to fulfill the objectives of the library. This way, the methods used support each other's limitations and the results of the evaluations will be stronger.

17

2.4.2 Evaluation in Reference Services

Evaluation of reference services literally means to pinpoint the significance of the service offered, and basically relates to the quality of the service (Allen, 1995). According to Katz (1997) evaluation may also be required to meet the demands of some accrediting groups or administration directives. Traditionally, evaluation is built into routine study of practices, the revision of the library manual, or management studies.

Conducting effective assessment of reference services requires careful planning and development of the evaluation project. Assessment is composed of three parts:

1. The thing to be measured
2. The means by which the measurement is taken
3. A judgment about the sufficiency or goodness of the thing being measured (Hernon and Altman, 1998, p.47).

Katz (2002, p.118-120) suggested five steps to analyze evaluative process in libraries, which are:

1. Determine the purpose and goals of the evaluation
2. Measure the current status according to standards
3. Decide on methods to gather data/information
4. Determine the methodology
5. Analyze the results and draw the conclusion.

Productivity, efficiency, user satisfaction and financial ability to acquire resources are the four basic criteria which researchers have agreed on to measure reference effectiveness (?Whitlatch, 1990, 2000).

These criteria can be generalized under four stages identified by Allen (1995) which shows the aspects of reference services that need to be evaluated.

1. Inputs: Reference materials and reference staff.

   In many reference and information departments, there may already exist programs to evaluate some of the inputs (the components that go into providing reference services). In particular, the departments may have established mechanisms for evaluating the reference

materials in terms of their quality and coverage, and the reference staff in terms of their performance in providing reference services. This evaluation of resources constitutes the first level of evaluation.

2. Outputs: Factual questions answered (correctly, promptly); Instruction given, amount of assistance provided about library.

   Making use of high-quality resources does not necessarily guarantee that high-quality service will be provided. A variety of libraries have tested a number of mechanisms to measure the quality of service directly (the outputs). Typically, these measures focus on the reference transaction, in which questions are answered or instruction and assistance are provided. Evaluation of reference transactions constitutes the second level of evaluation.

3. Outcomes: Information needs satisfied, user's library skills and knowledge improved.

   Finally, at the third level of evaluation, measuring outcomes is more difficult. Even if the service is using high-quality resources (the first level) and doing a good job of dealing with individual transactions (the second level), it may not be meeting the needs of its user community in an effective and efficient manner. Again, mechanisms exist that enable a library to assess the extent to which it is meeting the information needs of its community: in other words, the outcome of the service.

In a somewhat similar way, McClure and Lankes (2001) focused on the components of evaluation in digital reference services and grouped these components under:

- Outcome measures (quality of answers: accuracy of responses, appropriateness to user audience, opportunities for interactivity, instructive activities);

- Impacts of process measures (effectiveness and efficiency of process: service accessibility, timelines of response, clarity of service procedures, service extensiveness, staff training and review, service review and evaluation, privacy of user information, user awareness-publicity);

- Economic measures (costing and cost effectiveness of digital reference: cost to conduct a digital reference service session, infrastructure needed to support quality digital services, impact of these costs on other library expenditures);

- User satisfaction (degree to which users engaged in digital reference services are satisfied with the process and the results; satisfaction indicators can include accuracy, timeliness, behavior of the staff, technical considerations, physical facilities and others).

Although these techniques are generally applicable to all reference services, a lot of experience has been gained in evaluating traditional reference services. The transition to the evaluation of digital reference services and the new tools and challenges that it brings has not been done in a well-planned and analytical fashion. It is important to re-assess the different measures that need to be evaluated in a digital reference service, and some preliminary work has been done on this subject. As Whitlatch (2001) suggested, traditional research methods can be utilized effectively in the electronic reference environment, basically by taking existing methods, determining the best methods which fit into digital area and using them for the best means of DRS.

Accordingly, libraries determine quality by measuring internal traits such as product condition, accuracy, reliability and the changing characteristics of timeliness and convenience. Service quality deals with expectations of the users and librarians (Hernon and Whitman, 2001; Weingand, 1997).

Recently, a pilot study of the quality of chat reference, based on user perspectives, was reported (White et al., 2003). This study conducted an obtrusive observation technique and looked into chat reference from the information seekers' perspective. It addressed quality of service output by studying the accuracy and completeness of the quality of answers provided to chat-reference patrons. The results of the study suggested that answer accuracy in chat-reference is higher than in traditional in-library reference services and it reported an average session length, queuing time and number of turns per session.

Reference effectiveness is subjective in nature and establishing quality characteristics for reference services is relatively difficult in terms of quantitative standards. Caplan (2000) declares that it is difficult to develop standards for digital libraries because there is no common community, vocabulary, interest or structure for communication. Reference services are not identical and they differ from each other in policy, procedure, expertise and available resources. Establishing quality characteristics for reference services is relatively hard in terms of quantitative standards. In the absence of generally accepted standards for evaluation,

libraries have generally developed individual standards for their institutions.

2.4.2.1   User vs. Librarian Perspectives on Evaluation

It is becoming important to measure service quality which indicates 'how customers respond to services or functions' (Hernon and Altman, 1998). In order to measure their "customer response" libraries have been surveying user satisfaction levels from services or resources by using many tools or techniques. Those measures are very important and valuable for libraries.

Librarians and patrons assess reference services in different ways. Users evaluate services by means of their satisfaction, unlike librarians who use qualitative or quantitative measures. Some users might not be satisfied even though their questions are answered correctly by the librarian while other users might be satisfied without getting appropriate answers to their queries.

Satisfaction may or may not be directly related to the librarians' performance on a specific occasion. User satisfaction levels are results of different expectations, perceptions and personal evaluations. Expectations change according to what users want and how urgently they want it. Therefore user measures only provide a limited assessment of reference services (Whitlatch, 1990).

In short it can be said that service quality and user satisfaction cannot be the same. Service quality requires strategic planning and can sometimes uses assessment on user satisfaction. User satisfaction, however, does not necessarily depends on service quality. Together, service quality and satisfaction represents the user's perception of quality (Hernon and Whitman, 2001).

Mitchell and Harris (1987) conducted a detailed study in order to find out if librarians and patrons assessed a good reference interview differently. They hired professional actors to play the parts of a librarian and patron from written scripts and used librarians and patrons as subjects to observe three different interactions from recorded videotapes. This research basically focused on social aspects (nonverbal warmth, inclusion, gender) of the reference interview. Not surprisingly, results of the study showed that librarians are more difficult to

21

please and were more critical than patrons.

2.4.3 Establishing Quality Standards to Reference Services

A quality standard is a specific statement for the determination of desired service performance. According to McClure et al. (2002) quality standards are important in terms of:

- encouraging library personnel to discuss quality issues related to the services
- providing clear guidance to quality matters related to the services
- education of library staff on the quality issues related to the services
- recognition of different acceptance levels of quality for different aspects of services (for example, traditional vs. digital reference)
- providing a basis for accountability of services

The following sections will review quality standards in traditional reference and in the digital reference services to show their similarities and differences.

2.4.3.1 Traditional Reference Services

Measurement and evaluation of reference services has been discussed in the literature for many years, and many evaluation studies have been reported (White, 1985; Shwartz and Eakin, 1986; Smith, 1991; Allen, 1995). According to ? reference librarians began to set standards and measures for performance with Vavrek's guidelines in the early 1970s (Vavrek, 1971). In the same time period, Childers (1970) in his dissertation conducted an unobtrusive study of telephone reference. He hired proxy users to ask questions at the reference desk via telephone and from the responses received he was able to ascertain the proportion of correct answers given by libraries. Those early studies came up with inventory lists for evaluating reference services.

Von Seggern (1987) studied the literature on evaluation and standards up to 1987 and classified it under: answering success, accuracy and quality of services, cost and task analysis of services, interview and communication effectiveness, enumeration and/or classification of reference questions, reference collection quality, staff availability, and use and nonuse of

reference services. Other studies (White, 1985; Lam, 1988; Smith, 1991) evaluate reference interviews. White (1985), suggests some guidelines for a good reference interview as a preliminary step in her evaluation.

The Reference Librarians Association (RLA) also conducted a team project on Reference Service Evaluation in 1989 (Reference Evaluation Project 1993). The project included many North Suburban Library Systems (NSLS) members representing academic, school, public, and special libraries. As a result they developed a manual of procedures and guidelines for reference services in general. This study focused mainly on traditional reference services in public libraries.

Lam (1988) wrote on intercultural aspects of the reference interview and Smith (1991) examined the reference interview and determined the degree of desirable and achievable evaluative practices. Another study which investigated whether or not the role of self-disclosure on the part of librarians promoted patron satisfaction showed that librarian self-disclosure was significantly correlated to the feeling that the interview was warm, friendly and interesting (Markham et al., 1983).

2.4.3.2 Digital Reference Services

Obviously, those studies discussed in the previous section are from a traditional library reference services perspective. However, they can be applicable to DRS with some modifications.

In the DRS environment, Kasowitz et al. (2000) proposed a list of twelve quality characteristics to identify digital reference standards. These characteristics can be summarized as:

1. Authoritative: Reference librarians should have the necessary knowledge and educational background on some subject area or should have skills in order to qualify as an expert.
2. Accessible: Reference services should be easy to reach and navigate through the Internet by any user regardless of equipment sophistication, physical disability or language barrier.
3. Fast (turnaround of response): User queries should be addressed as quickly as possible.
4. Private (protects user's information): All communications between librarian and the user should be held in complete privacy.

5. Consistent with good reference practice: Service should meet the necessities of efficient reference interaction.

6. Clear in user expectations (clear response policy): Clear communication should occur either before or at the start of every digital reference interaction in order to reduce the user's confusion and inappropriate inquiries. An effective interview helps the user to communicate in order to transfer necessary information to experts and clarify user questions.

7. Reviewed regularly: Ongoing review and assessment can help to ensure the quality, efficiency, and reliability of transactions as well as overall user satisfaction.

8. Provides access to related information: Besides offering direct resources to users' direct information needs, digital reference services should offer access to other supporting information sources and user information needs.

9. Noncommercial: Reference services should be provided for all users of a particular institution without any commercial incentive.

10. Publicized: Institutions which provide digital reference services are responsible for informing potential users about the value of the information gained from use of the service. A well-defined public relations plan can ensure that services are well publicized and promoted on a regular basis.

11. Instructive: The reference services process offers more to users than straight answers to their basic question and plays an important role in their learning process. They are guided to subject knowledge as well as information literacy.

12. Offers training to experts: Offering effective orientations or training processes helps information specialists to be prepared and respond to inquiries efficiently.

It is possible to group these characteristics into two main categories: user transactions (which are visible to the user and occur during the question-answer process) and service development/management issues (which are related to decision-making in creating and maintaining the services and affect user satisfaction and overall quality). Moreover, they are applicable to most library reference matters and they can serve as a model for digital reference consortia and cooperation in general (Kasowitz et al., 2000; Lankes, 2000; VRD, 2000, 2003).

Sloan (1998) also studied digital reference and suggested some guidelines for supporting digital reference services, covering topics including administrative/management, services, primary clientele, personnel, infrastructure/ facilities, finances, and evaluation.

As Whitlatch (2000, p.1) claims: "there are many ways to define reference service quality, but there is no 'right' way". Moreover, there are no agreed-upon quality criteria for the evaluation of these services even though studies have been undertaken in order to cover this point. While digital reference services can borrow from traditional reference services as they serve a common aim, directly transforming traditional reference services into a digital environment would not be the solution to defining quality characteristics (Peters, 2000; McGlamery and Coffman, 2000; Lankes, 1998).

Kawakami and Swartz (2003) suggest that appropriate steps for DRS evaluation are analysis of session transcripts, examination of user comments, and librarian and user focus groups. They conducted a series of assessments examining their DRS experience at the University of California. They began by reviewing their training program through analysis of librarians' performances during chat sessions, based on a list of competencies. In the next phase, all librarians were asked to discuss their experience and chat transcripts in order to develop criteria to assess DRS transactions. The user comments from exit surveys were also examined. The findings of this study generated basic tips on training, assessing and communicating about Digital Reference.

In order to improve digital reference service quality, the goals and objectives of this service must be identified. Quality evaluation of digital reference services is not a simple process and requires many methods and techniques as does traditional reference evaluation.

Several studies attempted to develop standards for reference services. In terms of testing and refining measures and quality standards to describe digital reference service, a project "Assessing Quality in Digital Reference Services" which was conducted by the Information Institute of Syracuse at Syracuse University and the Information Use Management and Policy Institute at Florida State University is valuable. The main aim of this project was "to better understand and describe the nature of quality digital reference services" (McClure and Lankes, 2001). Gross et al. (2001) analyzed the results and some literature from this project. They concluded that a majority of the evaluation attempts reported are anecdotal

and limited (small sample sizes and low response rates); in those studies the main strategies used are the analysis of question logs and user surveys. They also noted that the majority of questions received were of the ready reference type and the volume of questions received was minimal. This project resulted in the publication of a manual "Statistics, Measures and Quality Standards for Assessing Digital Reference Library Services" McClure et al. (2002) in order to help libraries develop DRS assessments by providing guidelines, procedures and measures.

According to McClure et al. (2002), examples of DRS Quality Standards are as follows:

1. Courtesy: In order to collect data to meet the courtesy standard a survey can be attached to the DRS response so that users can rate the service and provide feedback. Another way to get users' assessment would be contacting them via e-mail or telephone.

2. Accuracy: Accuracy of the DRS depends on the ratio of correct answers to questions received. The standard of accuracy can be determined by producing data from a sample of DRS transaction logs and judging the answers provided.

3. Satisfaction : Data for assessing satisfaction can be gathered by a survey attached to a DRS response or by contacting users via e-mail or telephone to obtain their assessment.

4. Repeat Users: The log files of DRS can be analyzed to get data on repeat users. This can be done by determining the number of times the same IP number, user ID, or other identifier has been linked to a question during the specific time period.

5. Awareness: Awareness can be defined as the population of the user group with knowledge of the existence of the service. A survey can be conducted to a target population in order to determine the extent of their awareness of the service.

6. Cost: The average cost can be estimated by computing the cost per DRS transaction by studying a sample conducted over an acceptable period of time. Then the average cost per transaction is compared against the agreed upon quality standard.

7. Completion Time: Completion time can vary depending on the type of questions, their difficulty, or the hours of operation. Because of these differences this standard should be defined carefully.

8. Accessibility: Ease in finding, using the service, availability of software etc. are factors which influence accessibility.

2.5 SUMMARY

In this chapter, literature on librarian/user interaction in the traditional versus the digital environment, current issues on digital reference services and reference service evaluation measurements were briefly discussed.

The importance of the reference interview was addressed in detail as the main component of reference services. In addition, traditional vs. digital reference interview guidelines and practices were also identified and discussed by studying the literature.

Digital reference services were defined in order to distinguish their differences from traditional reference services and to understand their features better. Many studies are also cited to address the current status and various applications were given to understand the characteristics of DRS better.

Last of all, the assessment of reference services was reviewed. The literature on traditional as well as digital reference service evaluation processes and quality standards was addressed and studies related to these aspects were referenced. Further analysis of the literature is assessed and defining digital reference standards is presented in Chapter 4 in response to Research Question 1.

The goal of this chapter has been to provide a background for the study of digital reference services. The design and methodology of the proposed study are presented in the following chapter.

3.0   RESEARCH DESIGN AND METHODOLOGY

3.1   INTRODUCTION

This study is designed to measure librarians' perceptions of successful chat reference service and develop a set of evaluation criteria for the improvement of these services. In the following sections, research design and methodology are described, providing details on the techniques used, population and sample of the research and pilot study. Before the methodological design is presented the research questions of the study will be elaborated to emphasize the framework of the study.

3.2   RESEARCH QUESTIONS

This section covers the research questions of the study and provides the methodological design of the research.

1. *How much of the experience from traditional reference service evaluation can be transferred to the evaluation of chat reference services?* To develop quality measurements for chat reference services, studies of traditional reference services have been examined. To address Research Question 1 (RQ1), a literature review of traditional reference services was conducted to determine the evaluation criteria and the methodologies for quality measurement which have been used. Reference librarians were also interviewed to explore their perceptions of chat reference, gathering more information on their experience of traditional and digital reference and adding more reliability to the answer to RQ1.

Comparing traditional reference service evaluation with DRS practices and seeing their similarities and differences enables us to find out to what extent the experiences from traditional reference service evaluation are transferable to the evaluation of digital reference services. Data gathered from the literature were combined with the interview data from librarians' perceptions of chat vs. traditional reference experiences in order to strengthen the results. Subjects were asked to compare their experiences at a traditional reference desk with their experiences with chat reference in terms of main differences, similarities, and advantages over each other in order to address RQ1.

2. *What are the defining characteristics of Chat Reference and how can we use them in measuring quality in Chat Reference Services?*

A literature study on DRS in general, as well as specifically on chat reference, was conducted with the goal of identifying the characteristics of these services. The quality measurement of DRS as addressed by the literature is summarized and the quality criteria for the measurement of ideal chat reference services investigated. Librarians also provided information on chat reference characteristics on various occasions during interview sessions.

3. *What are librarians' perceptions of successful chat reference service ?*

Using a critical incident technique, librarians' perceptions of chat reference interaction have been addressed by interviewing librarians who were performing chat reference services. This investigation of librarians' perceptions of chat reference comprises the main part of the analysis. As part of the critical incident technique, librarians were asked to recall successful and less successful interactions that took place during chat sessions, and to discuss their experiences. From an analysis of the descriptions of the critical incidents, a scheme was generated to categorize librarians' perceptions from successful chat reference interactions together with their suggestions for improvement of chat reference interaction in the future.

4. *To what extent do the librarians' perceptions and conducted research on DRS have common characteristics?*

The information gathered from the literature is compared with the librarians' attitudes and expectations from chat reference by putting together the results of interview data,

incident analysis and related literature answering RQ4.

5. *What evaluation criteria and methods should be used for chat reference services?* The findings from RQ3 and RQ4 were transferred to a set of selected quality criteria for chat reference services.

3.3 PILOT STUDY

A pilot study was conducted with the aim of providing an opportunity to test the critical incident technique and to develop a preliminary outline of categories of librarians' perceptions. This section presents a description of the methodology used in the pilot study and discusses the findings from the analysis of interview data as well as their implications for the main study.

The pilot study was conducted at the Libraries of Carnegie Mellon University (CMU), Pittsburgh, PA, in July 2003. Carnegie Mellon University was selected for the pilot study because of its location and open access to the researcher, and because its librarians have extensive experience with chat reference. The CMU libraries started to offer a chat reference service in October 2000, and at the time of the study, 15 reference librarians and five student interns were providing chat reference service within the library system. They are using LivePerson (http://www.liveperson.com/) chat software and the average number of questions the service receives per month is 60[1].

3.3.1 Interview Questions

Data was collected through open-ended interviews with five full-time reference librarians in July 2003. Before starting the interview each librarian was given an oral introduction to the study and was asked to sign an informed consent form (see Appendix C) to obtain written approval for the interview. They were asked for their permission to tape the interviews, and they were assured of the confidentiality of the interviews.

---

[1]General information on CMU chat reference service was gathered/updated from e-mails shared with Ms. Jean Alexander (Head of Reference Services at CMU) on 4th February 2004.

Interview questions were in semi-structured format, based on a critical incident technique which seeks librarians' memorable experiences on successful and less successful chat reference interactions with the intent to collect detailed information relevant to research questions. Specific questions were asked and the librarians provided full and detailed descriptions of their experience and opinions. Follow-up questions were also used and clarification and expansion of the answers provided when needed. Pilot study interview questions were intended to elicit information on librarians' general ideas on chat reference services, their comparison to traditional reference services, their experiences on providing chat reference services, focusing on successful and less successful interactions, and their suggestions for improvement of chat reference services.

3.3.2   Subjects

Subjects included three female and two male full-time librarians who are performing chat reference service to the CMU community. Four of the librarians had over 10 years experience in academic reference work (an average of 15.75 years) while one librarian was a recent graduate with one year's experience. The average number of years of chat reference experience is two years and eight months. All librarians held M.L.S. degrees and their backgrounds were varied — science, art, social sciences, linguistics. Their diverse backgrounds provided additional richness to the collected data.

3.3.3   Pilot Data Analysis

The use of tape recording and its transcription is the main method used to create texts of interviews (Seidman, 1998). In the pilot study, the first phase of the analysis was the transcription of the tape recordings of the interviews by the researcher. All interviews were assigned a label for identification and the tapes were audited two or more times for verification and accuracy. Interviews took 30-45 minutes and their transcription to verbatim took about two to five hours on average per interview. The second phase of the analysis was to determine the topics covered in each interview. This included the determination of the definition of chat reference and its characteristics, successful and less successful interactions

(main CIT questions) and librarians' suggestions for service improvement.

In the third phase the topics which had been identified, and content of the interviews were reviewed again and similarities and differences within all interviews were sought in order to make a general categorization of discussed topics.

Coding is the process of organizing the text of the unstructured data in order to see the patterns and ideas within it (Auerbach and Silverstein, 2003; Morse and Richards, 2002). In order to code the transcripts, the content and relational dimensions that have an impact on librarians' perceptions of chat reference and reported critical incidents were identified and described under categories. A category refers to a group of words which has a similar meaning, it is essential in coding the data. In order to produce the categories, the researcher carefully and repeatedly read the transcripts, in particular the reported incidents, and noted the topics discussed in each interview. These topics were then sorted under general groups forming the main categories. There is no single correct way to analyze interview data (Smith, 1995). The researcher is interested in learning from respondents' experiences and trying to understand the content and complexity of these experiences rather than taking a measure of the frequency of certain words and concepts. In order to understand the content and the meanings of the respondents, it is necessary to read the transcripts carefully and identify representative themes.

There are a number of computer software packages now available to assist with qualitative data analysis. In this research, interview data was coded and analyzed using Max for Qualitative Data Analysis software (MAXqda). MAXqda gives the user the flexibility to create and import texts (in this case interview data) in rich text format (rtf), and then to edit, organize, and code the texts in order to create a hierarchical category system with up to ten levels (http://www.maxqda.com/maxqda-eng/about.htm). Interview transcripts were imported to MAXqda in rtf format and the transcripts were analyzed. The ideas and perceptions which were significant to the study were coded under the coding system developed after careful readings of the transcripts. When new ideas were introduced during the flow of the study, new codes were created and indexed to MAXqda. These codes were then grouped under themes.

Figure 1 is a sample screen from MAXqda. It demonstrates the analysis process under

three windows:

- Document Systems : to import/store texts (interview transcripts)
- Text Browser: to open/edit texts for coding
- Code System : to organize/code the data and create category systems

In formulating the preliminary category scheme, three general perceptual themes emerged from the pilot study. These are:

1. Perceptions of Successful Chat Experiences
2. Perceptions of Less Successful Chat Experiences
3. Chat Reference Improvement

The preliminary category scheme is outlined below:

Pilot Study Category Scheme

I Perceptions of Successful Experiences

    1. User Characteristics

        a. comfortable

        b. patient

        c. appreciative

    2. Question Negotiation

        a. ready reference

        b. quick answer

    3. Librarians' Involvement

    4. Service Characteristics

        a. remote accessibility

        b. anonymity

        c. multitasking

II Perceptions of Less Successful Experiences

    1. Service Related

        a. Lack of audio/visual clues

            i. talking is better than typing
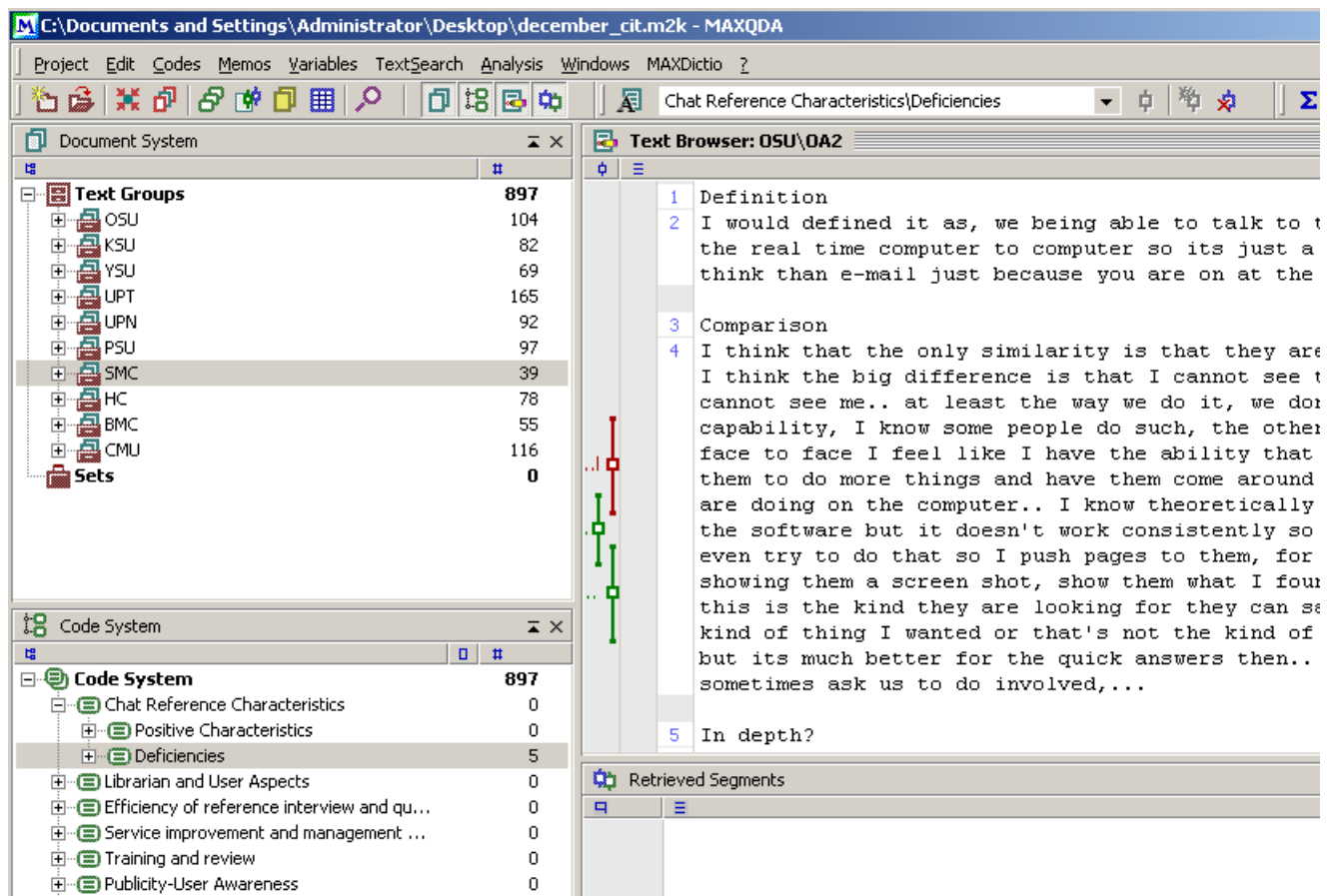
Figure 1: Sample screen from MAXqda.

  ii. hard to understand what they really want

  iii. face to face interaction is preffered

 b. Question negotiation

  i. in-depth questions

  ii. speciality questions

 c. Lack of personal touch

 d. Time pressure

 e. Fear of losing the patron

 f. Privacy issue

  i. transcripts issue

2. Technical and software related issues

 a. authentication problems

 b. proxy/connection problems

3. User related issues

 a. unfinished interaction problem

III Chat Reference Improvement

1. Software and service related

 a. improvement of digital resources

 b. accessibility to printed resources

  – fingertip scanner

 c. proper functioning of software

  – page-pushing

  – co-browse

 d. promotion

 e. collaboration

2. Suggestions for personal improvement

 a. mind-set

  i. ability to self-control

  ii. adjustment to new format

iii. ability to build trust

b. knowledge-base

   i. communication skills

   ii. knowledge of reference work/services

  iii. necessity of training

c. questions negotiation

   i. specialty questions

     − get them started

     − follow up

     − call and ask subject librarians

     − keep them engaged

3.3.3.1 Pilot Study Critical Incidents Findings

Recorded "Critical Incidents"= 10

- Emerging themes:

  1. Question Negotiation (QN) = 5

  2. Technical and Software (TS) = 4

  3. User &Librarian Related (UL) = 2
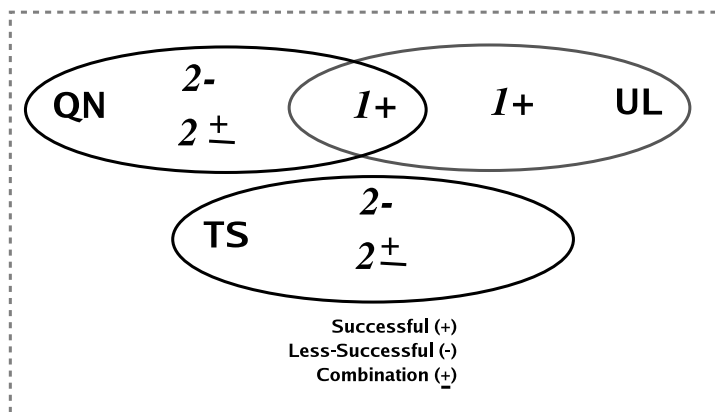
Figure 2: Pilot study findings

A total of 10 usable incidents were reported from the pilot interviews. Four out of ten incidents focused on "software/technical" related issues while six of them focused on "user/librarian related issues" and "question negotiation". Reported incidents were two successful (positive), four less successful (negative) and four combination incidents which had characteristics which were both successful and less successful. The researcher identified themes associated with each incident and sorted them under categories. Both successful incidents were focused on "answering specialty questions" in a successful manner after which both librarian and user were satisfied with the results. In one successful incident the librarian mentioned that she "understood the question right", "was familiar with the subject/resources", and that the "software worked properly". The other successful incident was related to the librarian's "knowledge-base/reference work" and the "users' patience".

Two of the less successful incidents involved "software/technical" related deficiencies where the "user disconnected" during the transaction and the librarian had difficulty connecting the user back and answering the question. The librarian used the terms "time consuming", "hard to understand his question this way", "if only the software functioned properly". The remaining negative incidents were focused on questions outside the librarian's specialty area and a lack of resources which prevented the librarian from giving an adequate answer.

There were four incidents which were found to be a combination of successful and unsuccessful characteristics because of their nature. Two of these incidents were related to software/system deficiencies. While these incidents were considered "less successful interactions" because of the "lack of personal touch" or "software problems", since the librarians were able to help the users and walk them through the information they wanted by follow up with e-mail and got positive feedback, these incidents were also considered to be successful. The remaining two incidents were focused on "answering specialty questions". These incidents involved questions which librarians were hesitant to answer at the beginning of the interaction but then were able to help the user work through the answers and get them started on their research. The librarians suggested "collaboration with subject specialists", "at least get them started" in answering complicated questions. Two of the librarians mentioned how good it feels to answer questions outside their specialty area.

3.3.3.2 Summary of Pilot Study

The main goals of the pilot study were to test the interview instrument, gain experience with CIT, develop a preliminary category scheme for librarians' perceptions of chat reference and upgrade the methodology for the study based on this experience. All of these goals were accomplished at the end of pilot study.

In order to get better response rates, the instruments used, including the interview questions and CIT, were slightly modified after the pilot study. The modifications to interview questions were mainly to change the order of the questions, based on the flow of the interview sessions and given answers. For example, in the pilot study librarians were asked to compare traditional reference services to chat reference services as a final question. During the interview sessions, however, librarians provided overviews of the differences between chat and traditional reference right after the definition of chat reference. The order of the questions was changed accordingly.

The pilot study helped the researcher gain experience with CIT, and based on the feedback obtained from librarians, the content of interview questions was modified, the wording and order of questions was adjusted, and strategies for discussing the critical incidents developed to obtain better results.

During the critical incident categorization and analysis, the researcher had difficulties in differentiating less successful from successful incidents. Four incidents were categorized under both successful and less successful. Since a total of 10 incidents was collected in the pilot study, an inability to classify four of these was significant. It was found that librarians have different perceptions of successful and less successful interactions and during the main study critical incident analysis process, the researcher decided not to reassess librarians' perceptions and to report them as the librarians suggested. Therefore, the incidents collected from the pilot study were resorted when transferred to the critical incident category scheme in the main study. Therefore, the concept of "combination of successful and less successful" was eliminated and incidents were sorted under successful or less successful according to the librarians' own perceptions.

The development of the scheme of categorization of librarians' perceptions and the critical incident analysis from the pilot study provided a preliminary model for further analysis. The

researcher gained more understanding of CIT and trained herself in interview techniques, leading to a better understanding of how to get more useful information from the subjects.

The pilot study provided the basis for the design of the main study. The following section will describe the selection of sites and participants, data collection methods and the data analysis of the study.

3.4   METHODOLOGICAL FRAMEWORK OF THE MAIN STUDY

This section explains the methodological framework of the study. Before focusing on data collection methods and analysis, the following section describes the selection of sites and participants.

3.4.1   Selection of Sites

In this study, the subjects were librarians who perform chat reference services in university and college libraries in the states of Pennsylvania and Ohio. OhioLink and the Tri-College consortia along with the Pennsylvania State University library system, the University of Pennsylvania, and the University of Pittsburgh were selected for the purpose of this study. A total of ten libraries (including Carnegie Mellon University in the pilot study) were studied in order to collect data from chat reference librarians.

OhioLink and Tri-College are consortia which serve users beyond their academic institutions. The Pennsylvania State University library system is also selected since it has many campuses and serves all of them. These sites were selected in order to have a large sample of service population. The University of Pittsburgh and the University of Pennsylvania are two of the large ARL libraries within the state of Pennsylvania and were accessible to the researcher. They were also included in the sample of this study. Below is the complete list with brief information on the selected libraries.

1. **OhioLINK** is a consortium of Ohio's college and university libraries and the State Library of Ohio. It serves more than 600,000 students, faculty, and staff at 85

institutions (http://www.ohiolink.edu/about/). Ohio State University, Youngstown State University and Kent State University libraries were selected from OhioLink libraries as a representative sample of chat reference service providers. OhioLINK uses "eLibrarian" software (http://elibrarian.digi-net.com/) for their chat reference service.

2. **The Pennsylvania State University** serves over 75,000 students and 4,500 faculty from 20 campuses within the PennState system. PennState uses "24/7 Reference™" software (http://www.247ref.org/) for its chat reference services.

3. **The University of Pittsburgh** is an independent, state-related university which serves over 27,000 students and 4,000 faculty. The University of Pittsburgh uses "Docutek VRL*plus*" software (http://www.docutek.com/) for their chat reference services.

4. **The University of Pennsylvania** is a private university serving over 22,000 students and 4,400 faculty. The University of Pennsylvania uses "LiveAssistance" software (http://www.liveassistance.com/) for its chat reference service.

5. **Carnegie Mellon University** is a private university with a population of over 8,500 students and 2,200 faculty. Carnegie Mellon University uses "LivePerson™" software (http://www.liveperson.com/) for its chat reference service.

6. **Tri-College** is a consortium of three independent Liberal Arts College Libraries in Pennsylvania. All three of these colleges, Bryn Mawr College, Haverford College and Swarthmore College, were in the sample of this study. This consortium serves a total population of three institutions, which is around 4,400 students and 440 faculty members. Tri-College Libraries uses "Docutek VRL*plus*" software (http://www.docutek.com/) for its chat reference service.

3.4.2   Selection of Subjects

The researcher's goal was to involve at least three librarians within each of the selected institutions. The sample was taken from diverse institutions and a rich sample representing a variety of librarians from different backgrounds, experience, and specialty areas. As soon

as the researcher secured the approvals from the institutions[2], she contacted coordinators of digital reference services of the libraries to get approval to conduct interviews and for their help in getting volunteers from their sites. With the help of the chat reference coordinators, the researcher was able to reach chat reference librarians and recruit participants for the study.

A total of 40 librarians volunteered to be interviewed. The researcher met with these librarians individually at a time of their choice to conduct face-to-face interviews at their institutions.

3.4.3 Data Collection Methods

This section examines the critical incident technique and its use in this research.

3.4.3.1 Critical Incident Technique (CIT)

This study is designed to create an environment in which librarians can share their significant experiences in chat reference services. The Critical Incident Technique (CIT) describes a set of principles for qualitative research which is appropriate for the aims of this study. It first appeared during World War II for identifying effective vs. ineffective behaviors in military activities. Later, Flanagan led its development as a tool for studying human behavior (Fisher and Oulton, 1999), first described by Flanagan in the *Psychological Bulletin* in 1954. According to this paper: "the critical incident technique consists of a set of procedures for collecting direct observations of human behavior in such a way as to facilitate their potential usefulness in solving practical problems and developing broad psychological principles" (Flanagan, 1954, p.327).

Here 'incident' refers to an observable human activity which is good enough to permit predictions to be made about the person's profession. Furthermore, the incident must happen in a way that the observer would recognize it clearly without any doubt of its effects

---

[2]Before getting in touch with libraries and asking for volunteers for the study, the researcher contacted Institutional Review Boards (IRB) —or equivalent research departments— of each institution and obtained approvals to conduct interviews. Three of the institutions found this study to be exempt from IRB approval.

(Flanagan, 1954).

There are five key stages of CIT:

1. General aims of the activity: Objectives and functional descriptions of activity. This stage specifies the outline for an effective interview.

2. Plans and specifications: Observers' training process for evaluation. This stage specifies the instructions given to the observer, before data collection.

3. Collecting Data: Procedures for collecting data (interviews, group interviews, questionnaires, record forms). This stage refers to the importance of evaluating, classifying and recording the behaviors or results observed while the facts are still fresh in the mind of the observer.

4. Analyzing the data: After data collection, analysis and categorization starts. This stage summarizes and describes the data in an efficient manner so the results can be used for a practical purpose.

5. Interpreting and reporting: In this stage the findings are presented in a usable form with comments on their validity and reliability.

3.4.3.2   Design of the Study Using CIT

The Critical Incident Technique is used to gather and analyze the subject's most memorable experiences. It is the technique used to evaluate and identify ways to increase effectiveness of service in many fields and it is also used in the field of library and information science (Radford, 1993, 1996).

One advantage of the CIT is its flexibility and its adaptability for various settings (Woolsey, 1986). It is often used to study effective and ineffective human behavior. Because of the nature of this study, the chat environment which includes human/machine interaction was also described and its effectiveness and ineffectiveness measured by means of librarians' perceptions.

In this study, the subjects are chat reference librarians and their self reporting of chat reference experiences is obtained using the critical incident technique. The main goal is to study librarians' successful and less successful experiences in the chat environment in a dependable way.

Open-ended face-to-face interviews were conducted to gather related data. The interview started with general questions for the purpose of getting the librarians focused on the subject.

- How do you define chat reference services?

- How do you compare traditional face-to-face reference services with chat reference services?

Following the procedures of Flanagan (1954), more specific questions were then asked requesting the librarian to recall and describe successful and less successful chat reference interactions. Since the study seeks the data for service improvement, librarians were also asked to make suggestions for better chat reference services.

- Could you recall any successful interaction that you held over chat reference?

- Could you recall any less successful chat reference interaction?

- Could you describe the factors that made the interactions successful or less successful?

- Do you have any suggestions to improve the service?

These questions are initial open-ended, broad questions which form the basis for librarians' responses. More focused or closed questions were asked accordingly in order to reveal more details of the critical incidents [3](see Appendix E for Interview Questions). Interviews were audio-taped and tapes were transcribed to create a data set for each respondent. In order to analyze the data from the transcripts, content analysis was conducted. The next section will explore this technique within the research context.

3.4.3.3 Content Analysis

---

[3]Depending on the answers, questions were modified and additional questions were asked over the interview sessions. Some librarians had trouble remembering the interactions when first asked but in the course of the session, the researcher was able to get very good incidents from them. For example, most of them mentioned the fact that chat is not a good environment for in-depth reference questions. The researcher followed-up this comment with questions like "do you remember any specific interaction in which you answered an in-depth question which would require a detailed reference interview". Sometimes the questions were rephrased, for example when they were unable to recall a less successful incident, they were asked if they could remember an interaction in which they felt that something was missing or, which they wished they had conducted differently, to get them remember incidents.

Content analysis is one of the most commonly used data analysis techniques used to identify and record the meaning of documents and other forms of communication in a systematic way (Westbrook, 1994; Allen and Reser, 1990).

In other words, it is a research tool used to determine the presence of certain words or concepts within the texts. Researchers analyze the presence, meanings and relationships of such words and concepts, then make inferences about the messages within the texts. In this study the texts refers to interview transcripts.

To conduct a content analysis on interview transcripts, the text needs to be coded, or broken down into manageable categories on a variety of levels and then examined using one of two basic methods: conceptual analysis or relational analysis (Westbrook, 1994).

Conceptual analysis is based on concepts which are chosen for examination and analysis. Here the presence of concepts is important and quantity is measured. Relational analysis is also known as semantic analysis and it focuses on meaningful relationships within the text (Westbrook, 1994). Both conceptual and relational analysis methods were used in this research.

In order to code the transcripts, the content and relational dimensions that have impact on librarians' perceptions and critical incident reports were identified and described under categories. A category refers to a group of words which has a similar meaning, and it is essential in coding the data. In order to produce the categories, the researcher carefully and repeatedly read the transcripts as well as the incident reports, noted the topics discussed in each interview and determined whether they related to successful and/or less successful perceptions.

The category selection is based on the similarities of the collected data/incidents which are related to the intended use of the data —which in our case is to create a set of criteria associated with successful chat reference— based on librarians' perceptions as data collected from the interviews.

This section described the procedures and methodology used for data collection and analysis. The following chapter will discuss the development of the category scheme and the findings from this study.

4.0   RESULTS OF THE STUDY

Interviews, in which they were asked about their perceptions of chat reference, and to recall successful and less successful chat reference interactions, were conducted with 40 chat reference librarians.

Information about the subjects on gender, degrees, position, years of experience etc. was obtained through the "Librarian Profile Form" (See Appendix D) immediately after the interviews. The 40 librarians included 26 females and 14 males. They all held a Masters degree in Library and Information Sciences. Twelve had a second subject Masters degree and five held Ph.D. degrees.

The amount of time per week that they provide chat reference services ranged from one hour to six hours. There was one exceptional librarian who provides chat reference for 10 hours per week and two librarians who had stopped doing chat reference at the time of the study. Table 1 provides more information on the subjects.

4.1   DEVELOPMENT OF THE CODING SCHEME

The preliminary coding scheme used in this study was based on the categories which were identified during the pilot study. As new themes or categories appeared within the transcripts, new codes were added to the scheme. When applying labels/descriptions to the categories the researcher tried to use the respondents' own words, and for the larger categories she created new labels in order to group similar themes. The final category scheme is more detailed, expanded and organized than the preliminary category scheme. This was due to the larger number and diversity of the participants in the main study. The focus in the

Table 1: Librarian Profiles and Reference Service Experience

Schools	$n_L{}^a$	**Gender**		$Y_{RefDesk}{}^b$	$Y_{Chat}{}^c$	**Chat H/W**^{d}
1- Bryn Mawr	4	2F	2M	12.75	1.8	2.25
2- Haverford	4	3F	1M	13	1.8	3.25
3- Swarthmore	3	3F	-	8	2	3
4- Carnegie Mellon	5	3F	2M	15	2.5	2
5- Kent State	3	1F	2M	6.5	2	2.3
6- Ohio State	4	3F	1M	16.5	2.5	3
7- Youngstown	4	2F	2M	6	2	2.25
8- Penn State	3	2F	1M	21	2.3	3
9- Univ. of Penn.	4	3F	1M	17.75	2.5	2.7
10-Univ. of Pitt.	6	4F	2M	13.5	1.8	3.3
Total:	40	26F	14M	526.5	84.6	102.2
Means:	-	-	-	13.2	2.1	2.6

^{a}Number of librarians interviewed.
^{b}Mean of the subjects total years of reference desk experience in a given school
^{c}Mean of the subjects total years of chat reference experience in a given school
^{d}Mean of the subjects total chat reference hours per week in given school

pilot study was primarily on successful and less successful chat perceptions together with librarians' suggestions for service improvement. Since there were only five subjects and a smaller number of recorded incidents it was easy to categorize themes under three main categories. However, with 40 subjects the amount of collected data led the researcher to a different path and more categories and themes emerged, forming the final categorization scheme.

The qualitative data analysis software MAXqda, used for the pilot study data, was very helpful in keeping track of the analysis. The interview transcripts were individually imported to MAXqda's document system in rich text format, then the transcript data was coded with the drag-and-drop function of the software. Codes/sub-codes were recorded to the coding system window. The coding system was flexible and it was fairly simple to arrange and make changes on the code-tree.

Six major themes emerged from this study. These are:

1. Characteristics of Chat Reference

2. Attitudes of Librarians and Users

3. Efficiency of Reference Interview and Question Negotiation

4. Service Improvement and Management Issues

5. Training and Review

6. Publicity and User Awareness

The following sections will explore these themes individually with their category schemes, using representative quotes from the interview transcripts.

4.1.1   Theme I: Characteristics of Chat Reference

The definition and characteristics of chat reference comprise one of the main research questions of this study. It was addressed in the research questions as well as in the literature review. In the interviews, librarians were asked to define chat reference from their perspective, and as an outcome of that question as well as throughout the interview session they provided valuable information in defining chat reference characteristics.

All of the librarians provided more than one characteristic of chat reference. Following the category labels, the number of librarians who mentioned each topic is also noted in parentheses. These characteristics were classified as follows:

I Chat Reference Characteristics

    1. Positive Characteristics [This category includes characteristics that librarians identified as advantageous or positive aspects of chat reference.]

        a. Availability over distance (22)[1]

        b. Anonymity offered to users (10)

        c. Allows Synchronous interaction (6)

           i. allows more interaction (2)

           ii. helps student become independent learners (2)

           iii. is a good instruction tool (2)

        d. Software related/useful features

           i. allows co-browsing (11)

           ii. allows page-pushing (6)

           iii. sends transcripts automatically (6)

           iv. provides canned phases (5)

           v. keeps statistics (2)

           vi. allows highlighting (2)

           vii. allows bookmarking (2)

           viii. ability to send out automatic surveys (2)

           ix. ability to save/sort transcripts (1)

    2. Deficiencies [This category identifies characteristics of chat reference which librarians perceived as having a negative impact.]

        a. Technical and/or software related

           i. authentication/sign-in problems (8)

           ii. co-browsing/license problems (8)

           iii. drop-off calls/disconnection problems (7)

---

[1]Number of librarians who mentioned the related topic.

     iv. proxy/connection problems (5)

     v. time-delay problems (4)

     vi. compatibility with all computer platforms (3)

     vii. compatibility with databases (2)

     viii. lack of indication to show an incoming question (2)

     ix. need for a more user-friendly interface (2)

     x. bandwidth problems (2)

  b. lacks audio/visual clues (23)

  c. lacks personal touch (10)

  d. leads to time pressure (8)

  e. acceptance of service may be low (8)

  f. privacy of information (2)

Librarians mentioned numerous features of chat reference service throughout the interview sessions. These characteristics were categorized under two main themes, as "positive characteristics" or "deficiencies" in order to make them easier to interpret. Table 2 gives examples from interview transcripts presenting librarians' statements on chat reference characteristics.

4.1.2 Theme II: Attitudes of Librarians' and Users

The librarians' role in providing quality chat reference service and the users' characteristics as seen through the librarians' eyes are combined under this theme.

II Attitudes of Librarians' and Users

  1. Librarian aspects [This category identifies librarians' perceptions of successful skills and attitudes towards providing chat reference service.]

    a. Knowledge-base and skills

     i. communication skills/strategies (11)

     ii. knowledge of reference work/sources (10)

     iii. comfort level with chat(8)

     iv. broad based education (3)

Table 2: Typical Responses Related to the Chat Reference Characteristics Theme

Positive Characteristics:

"Chat tends to reach out to people that won't come or call the reference desk" (PTE5)[a]

" It might be a benefit with the chat, is that, you are at your keyboard showing them and they can get that information right away and they are at their keyboard and so that they can bookmark it for convenience .. they can get a better flow-full memory because they are actually working on their own computer, flipping through pages." (CL5)

" It's fairly anonymous, they might not worry admitting that they don't know something. So it might work the other way." (SS1)

"You have the chance to show people when we can co-browse, all the resources we have.. you can develop interview where we do at the desk but it takes a lot to do that..." (PTD4)

"And they keep really nice statistics. You can even figure out from what IP the person is coming from.. so we know how many are on campus or off campus." (UPD1)

Deficiencies:

"The other thing that causes huge problems is authentication problems.. I don't know exactly how this works.. I don't know if it would be fixed with a proxy server but that's another thing. It's a little frustrating. I can just guide them to the databases etc. but they cannot get in to them..." (PTS2)

"Losing the patron during the transaction is so disadvantageous because you have been working with them for 10 minutes and all of a sudden they disappear.. you don't know... they might have a bad connection or they are bored, you don't have the feedback and that's enough to make to .. cause you don't know did I do something wrong and they got bored with me, they had to go to class or something." (PSR1)

" It's very text based so it's kind of hard to see, you are missing some dimensions of the other person. You are not seeing the person's face you don't hear the person's voice or even the body language. So there is that aspect of it that you worry about" (BD2)

"You can't be certain that the person is paying attention. It might not be even certain that the other person is actually still there even if they are logged in. That kind of thing is always a little distressing."(HJ1)

"We are offering a service which is not being used much, perhaps we are not there when they need it. We just don't have enough business, I wish we do" (HD3)

---

[a]Codes such as pte5, cl5, upd4 are unique identifiers assigned to individual librarians by the researcher

b. Attitudes

    i. ability to adjust to new format (10)

    ii. ability to deal with the unexpected (10)

    iii. willingness to go back and read transcripts (6)

    iv. willingness to share experiences with colleagues (3)

    v. ability to develop relationship with the user (3)

2. User characteristics [This category identifies users' positive and negative characteristics throughout chat reference interactions by means of librarians' perceptions.]

    a. Successful interactions

        i. familiar/comfortable with chat (10)

        ii. appreciative (14)

        iii. know what they want (8)

        iv. receptive of new knowledge (3)

        v. easy to communicate with (2)

        vi. have research skills (1)

        vii. familiar with library databases (1)

    b. Less Successful interactions

        i. communication difficulties (10)

          – impatient user (6)

          – demanding user (5)

          – frustrated user(4)

          – unengaged user (2)

        ii. knowledge-base of user

          – unable to frame questions (5)

          – does not know the basics (2)

          – does not have technical skills (2)

        iii. questions from other institutions (1)

Two main categories which emerged from "Librarian aspects": "Knowledge-base and skills" and "Attitudes" were based on librarians' perceptions of the requirements for conducting quality chat service.

Librarians provided beneficial information concerning users and their characteristics derived from their chat reference experience, and sessions held. These characteristics are categorized under "Successful interactions" and "Less successful interactions" based on librarian-user interaction during chat reference sessions.

Table 3 highlights common statements from librarians regarding this theme.

4.1.3   Theme III: Efficiency of Reference Interview and Question Negotiation

The reference interview and question negotiation was mentioned emphatically and frequently during the interview sessions. Librarians discussed the challenges of the reference interview in the chat environment, as well as addressing question types which are or are not suitable for chat reference.

III Efficiency of reference interview and question negotiation

1. Characteristics of effective interviews (7) [This category identifies librarians' perceptions of effective chat reference interview.]

    a. find out exactly what they want (12)

    b. verify that you are giving the information that they are looking for (4)

    c. give them choices on how much time they want to spend (1)

2. Librarians' presence (4) [This category related to the importance of librarians' contributions to the chat reference interactions.]

    a. it shouldn't sound like an automated system (1)

3. Question negotiation [This category identifies challenges in chat reference transactions, distinguishes common questions and provides suggestions on resolving several challenges]

    a. Challenges with question types

        i. complex questions (12)

        ii. specialty questions (9)

Table 3: Typical Responses Related to the Librarian and User Attitudes Theme

Librarian knowledge-base and skills:

"Learn how to talk in short sentences so that people aren't waiting for your long answers. Its much better to break that up into short pieces." (PS3)

"First of all, be flexible in considering different sources for answers. You may find the answers in sources which are not standard. Sometimes you have to make up things on the fly. (PSS2)

"Most important thing is the knowledge of reference work resources, techniques that make people open up, its all the same, it doesn't change" (CM3)

"You still need to get to be good on navigating the Web.. you have to know how to work with several windows at a time... to be able to search a few databases..." (OG3)

Librarian attitudes:

"I think that it's certain that you want to be comfortable with the software and I think the software probably has a ways to go..." (HJ1)

"Don't be afraid to say I don't know, hold on a minute this might take a little bit of time, something like that. Yes, just be comfortable and be yourself because it's very helpful."(PTS2)

"Reading the transcripts of other people who have done it is very helpful to me, because I see different people do different types of techniques and I learn from that." (PTS2)

Positive user interactions:

"A lot of these users are really familiar with chat rooms, they use them all the time..." (OL4)

"They are usually very patient." (PTS2)

"It's amazing that a lot of them just need pointing them to the right direction.." (CL5)

"They are so appreciative and all you are doing is your job." (YA3)

Somewhat negative user interactions:

"Hard to understand what they really want over chat especially if the question is detailed, hard to read what [they are] really thinking or put down in words" (CM1)

"She was not oriented at all and I don't think that she has ever been to the library" (KJ2)

"Sometimes I feel like I didn't fully answer the question but the patron does and they would say see you later thank you and they are gone..." (UPS2)

53

"Their questions are so weak that they need so much help.. sometimes you just have to say you need to come to the library."(OA2)

iii. information that is not available (1)

b. Challenges with service location

i. providing chat at reference desk (6)

ii. providing chat from home (4)

iii. providing chat from the office (1)

c. Challenges with other institutions/outside questions (3)

i. different resources/procedures/proxy (6)

ii. study information on other institutions (1)

d. Challenges with serving more than one patron (6)

i. option not to take it/make yourself unavailable (2)

ii. option to have another librarian available to transfer if necessary (1)

e. Common/Routine questions (8)

i. finding article/journal or database related (10)

ii. system related/technical questions (8)

iii. library function related (8)

iv. chat is a better platform for quick reference (3)

As can be seen above, issues which were identified under the category "Efficiency of reference interview and question negotiation" were "effective interview", "librarians' presence", "challenges with answering questions" and "routine questions". Most of the librarians pointed out the difficulties with answering specialty and in depth questions, and made suggestions on how to conduct an efficient interview. Examples related to these categories can be seen in Table 4

4.1.4 Theme IV: Service Improvement and Management Suggestions

Librarians were asked to give comments on how to provide better service on chat reference. This theme emerged from librarians' suggestions for service improvement in general. "Service improvement and management suggestions" were classified as follows:

IV Service improvement and management suggestions

Table 4: Typical Responses Related to the Efficiency of Reference Interview and Question Negotiation Theme

---

Effective interview:

"I think what works best is just a good reference interview. Get them to tell you exactly what they want. How they want to focus on the topic, it's wide open and they have choices and you ask them to make some choices and if they cannot, they don't have any on the top of their head and you can ask if you want to go this direction or that direction..." (PSS2)

"Regularly verifying with the person that I am giving them the information they are looking for, trying to ask patron questions that bring out what they are looking for." (PTM1)

Librarians' presence:

"Human behind the software is the most important element." (CM3)

"We don't want it to sound [like an]automated system" (UPM3)

Challenges with answering questions:

"In-depth reference questions are not good for chat. And we tried to say that briefly what the service is for, but people don't like to read it or don't resist to ask their questions.."(KL1)

Routine questions:

"Its frustrating when it is not your specialty area, you can ask some other librarians but it takes more time to answer it this way..." (CL5))

"And you know if you are on reference desk you have students to worry about." (HJ1)

"And sometimes there is confusion of where people are physically located, they won't realize sometimes that you are not from the same institution that they are...(SM3)

" When you have more than one patron it can get positively nerve wracking if you have two really good questions and especially if you get patrons who seem really nice and really patient. "(PSR1)

"Most of the chat sessions were some kind of library function or routine questions like "how do I do that, how can I find this etc." (BA4)

1. Software related [This category identifies librarians' suggestions related to chat software improvement.]

    a. operate without malfunction (7)

    b. software provider and librarian interaction

    c. should be simple/easy to use (8)

    d. should have manuals for functions/features (5)

    e. video/VOIP to improve interaction (10)

    f. should provide access to certain printed resources (6)

    g. should have a database of questions to share/build knowledge base (2)

    h. should show where students are coming from (2)

    i. should not have download requirement (2)

    j. should push presentations/tutorials (2)

    k. upgrades should be tested (2)

    l. should provide system reliability (2)

    m. should provide quicker response time (1)

    n. should have technical support (1)

2. Team work (2) [This category identifies the importance of joint effort between librarians as well as with library administration.]

    a. get more librarians to participate (4)

    b. evaluate service and use (2)

    c. get support from library administrator (1)

    d. create policy development (1)

3. Enhancement of digital resources (5)[This category identifies the significance of electronic information resources in providing chat reference services.]

    a. aware of what is available (1)

4. Hours of operation (1) [This category comprises suggestions related to chat reference service hours.]

    a. find out best times to reach students (7)

    b. provide more hours (2)

    c. provide late hours (2)

5. Collaboration related (4) [This category suggests improvements related to libraries which provides chat reference service in collaboration with other institutions.]

    a. need better routing of calls (3)

    b. need to have your institutions' own seats (2)

    c. need better question transfer (1)

    d. need shared databases (1)

The category scheme reveals that, most of the service improvement comments were software related. "Team work" (that is, getting more librarians involved in the service, and putting the service in the culture of the organization), "Enhancement of digital resources", and "Hours of Operation" were the other three common topics discussed under this theme. Librarians who are providing chat reference through consortia also provided suggestions on "Collaboration related" issues. Transcript portions relating to this theme can be seen in Table 5.

4.1.5 Theme V: Training and Review

"Training and Review" could also be considered a part of service improvement and management issues; however the researcher found it more useful to assess it under a separate category. The categories which emerged from this theme were:

V Training and review

    1. Participate in formal training (12) [This category identifies the importance of training in providing chat reference service.]

        a. real interaction type (2)

        b. librarians pair up (1)

    2. Practice more/hands-on experience (13) [This category identifies the significance of practicing with the software before/when providing the service.]

        a. practice with someone else (2)

        b. provide service on a regular basis (2)

        c. watch someone else doing it (1)

        d. practice before going live (1)

Table 5: Typical Responses Related to the Service Improvement and Management Suggestions

Software related:

"When the software functions properly it's great." (PSR1)

"I think if it works like it should supposed to work it would be helpful."(PTR6)

"There is probably room for improvement at the vendor's end." (PSR1)

"Sometimes audio stream would be beneficial since you have the dialog going on. I personally really wouldn't want video stream, I would feel uncomfortable answering in that kind of format then just like a regular chat. I wonder if the technology is ready? " (CL5)

Team work:

"It is good to get it in the culture of the organization." (KJ2)

"I guess librarians' acceptance of it is important. We shouldn't overlook, how are we going to provide the service to our students ?" (KL1)

Enhancement of digital resources:

"One of the things that anybody who is doing digital reference has to enhance digital products, digital info available, good resources. Otherwise it can be frustrating.."(CM3)

Operation hours:

"Maybe we should provide it on different hours, change the hours and see what will happen.." (UPP4)

System reliability:

"System reliability particularly co-browsing is the single most important thing we can do to improve it." (PS3)

Collaboration related:

"Other enhancement would be better routing of calls, right now it is supposed to route patron to the librarian from that institution and its not always working properly.." (KJ2)

"Transfer is a good thing, when you see a librarian available and the students from their institution or there are more users that you can handle you can just transfer... but if somebody is transferring a call to you (unless it's straight-forward) it's good if someone tells you before forwarding..." (KL1)

3. Follow guidelines/procedures (2)

4. Discuss it within the department (1)

5. Be aware of the upgrades (1)

Most of the librarians attended training sessions before going live on chat reference. As the category scheme suggested, almost half of the librarians commented on the usefulness of practice and hands on experience on chat software as a training tool. Guidelines, in-house discussions and software related knowledge were also found to be helpful in this theme.

4.1.6   Theme VI: Publicity and User Awareness

User awareness and promotion of the service was one of the most discussed topics within service improvement. Most of the librarians mentioned the need to market chat reference service and possible ways to reach users. Below is the classification of "Publicity and User Awareness".

VI Publicity and User Awareness

1. Market it (8) [This category represents librarians' remarks on marketing the service.]

2. Make it visible (5) [This category identifies the issue of accessibility to chat reference service and suggests possible ways to increase service visibility.]

   a. make it accessible from many pages including databases (6)

   b. provide linking on the main Web-page (6)

3. Generate popularity (4) [This category related to the creation of a popular/accepted service.]

   a. provide good/efficient service (4)

   b. importance of 'word of mouth' (1)

4. Use newsletters/posters/table tents/postcards/newspaper articles (5)

5. Provide instruction sessions (3)

6. Reach the advisers/professors (1)

In addition to suggestions for marketing the chat reference service in various ways, visibility and accessibility of chat service from the Web, and behaviors to "generate

popularity" were other topics addressed by librarians. Some examples illustrating the "Publicity and User Awareness" theme can be seen in Table 7

4.2 ANALYSIS OF CRITICAL INCIDENTS

"What are librarians' perceptions of successful chat reference service ?" was one of the research questions of this study (See Section 1.2). The critical incident technique was used in order to resolve the question. This section presents the critical incident analysis, based on the recollected memories of librarians of successful and less successful chat reference interactions. Incident reports were created and a total of 70 usable incidents was collected from 32 librarians. Eight librarians were unable to recall any specific interaction that could be considered successful or less successful, i.e. they could not recall any specific incidents and spoke generally. The researcher did not impose any definition of successful interaction on the librarians, leaving it to their interpretation. Tables 8 and 9 summarize the collected critical incidents.

4.2.1 Themes of Critical Incidents

After the critical incidents were categorized as successful (positive, 'P') and less successful (somewhat negative, 'N'), [2] further analysis was conducted to determine the major themes of the collected incidents. In the categorization of 70 critical incidents, four themes emerged. Although these themes are parallel to the ones in the main category scheme presented in Chapter 3, they are only a subset and are labeled differently. This was done in order to represent the critical incidents more accurately and is limited to the critical incients (CI). The whole category scheme is, however, not limited to CIs and covers the librarians' perceptions of the wider subject of chat reference services.

The emergent four themes which will be explored in details in further sections are:

---

[2]Librarians' assessment of successful and less successful incidents were different from each other. While one librarian refers to a particular incident as successful another might assess a similar incident as not successful. The researcher did not re-assess the incidents and accepted librarian's perceptions during the categorization process.

Table 6: Typical Responses Related to the Training and Review Theme

---

Training and Review

"The most important thing is the training in front of chat software... and usually hands-on is the best way to learn it. It's just a tool and the most important tool is the human who is using it." (CM3)

"Training is essential."(YB1)

"A lot of practice would help out and schedule if you are doing it on a regular basis... to stay in contact and doing the service on a timely basis. " (KT3)

"A comprehensive instructions manual, that's what I want..." (YB1)

Table 7: Typical Responses Related to the Publicity and User Awareness

---

Publicity and User Awareness

"We didn't have the link at the front page and the minute we put it on our statistics got higher... we should put it into more pages... " (YA3)

"We could do a better job with publicity, better job with Web page and having more links everywhere possible. " (HD3)

"We want to do it as fast and efficiently and as good as we can so they will come back." (UPD1)

"Undergrads who come to us right after high school think they can find everything over the web... we have to find a way to reach these kids... somehow we need to market ourselves." (KL1)

"And also I think a word of mouth is helpful a lot of the time. Oh man this is so cool, I chat with someone from the library... I think eventually it will gain popularity." (PTS2)

Table 8: Distribution of Successful and Less-Successful Critical Incidents

Librarians (n=40)	
Successful (P: Positive)	44 (62.8%)
Less Successful (N: Negative)	26 (37.2%)
Total Critical Incidents	70

Table 9: Distribution of Critical Incidents Between Schools and Subjects

School Name	$n_L{}^a$	$n_C I^b$	CI per $\mathbf{L}^c$
Carnegie Mellon University	5	8 (3N+5P)	1.6
University of Pittsburgh	6	13 (5N+8P)	2.16
University of Pennsylvania	4	10 (4N+6P)	2.5
Pennsylvania State University	3	6 (2N+4P)	2
Tri-College	11	12 (5N+7P)	1.09
OhioLINK	11	21 (7P+14P)	2.1

[a]Number of librarians interviewed.
[b]Recorded Critical Incidents.
[c]Number of Incidents per librarian

1. Attitudes: Total of 33 incidents, 14N; 19P [3]

2. Question Negotiation and Resources: Total of 29 incidents, 11N; 18P

3. Technical and Software: Total of 21 incidents, 7N; 14P

4. Location and Service Hours: Total of eight incidents, 3N; 5P

The number of incidents classified above exceeds the total number of reported critical incidents (n=70) since some incidents were categorized into two themes. Figure 3 illustrates the distribution of incidents by theme.

4.2.1.1 Attitudes

Users' and librarians' attitudes/behaviors played a major role in defining critical incidents. Librarians' performance and knowledge in dealing with patrons and their queries, and patrons' behaviors (from the librarians' perspective) during interactions fell under this category.

Successful (P) incidents in this category were mostly related to patrons' "patience", "knowledge of what they want", "engagement level"; and librarians' "confidence", "knowledge" and "familiarity with resources". For example;

> "it was such a **pleasure to talk to** because she **knew what exactly she was looking for** and I had to recognize at the end she was such a pleasure to talk to because we spoke the same language. I think that was the real successful encounter in my opinion because it was so easy talk to her because she knew what I need to know in order to help her... a lot of people just do not... so I think we both got something out of it.." [What else can you think that made this interaction successful?] "She was **very patient**, she told me that **she did chat reference before** and she was into research too much... yes she just, she wasn't using the right keywords and I helped... eventually we got it and she was really happy..." (YB1)

> "I can remember so specifically, it was from someone outside of our university, but they were **savvy** enough to know our school was good in Agriculture and Forestry and they needed to know how much timber would make up... I had no idea because I haven't heard of that before... I immediately panicked and I said **I don't know but I will find out**. Which is my favorite thing to say. There happens to be a calculator on the Web to that and so I was stunned and pleased with that and patron was absolutely thrilled... " (PSR1)

> "I remember I have been asked a question where somebody was like, 'I am using ERIC to try to find something but I really am not finding anything at all' and so I say let me

---

[3]'N' and 'P' indicates number of negative (less successful) and positive (successful) incidents found in a particular category.
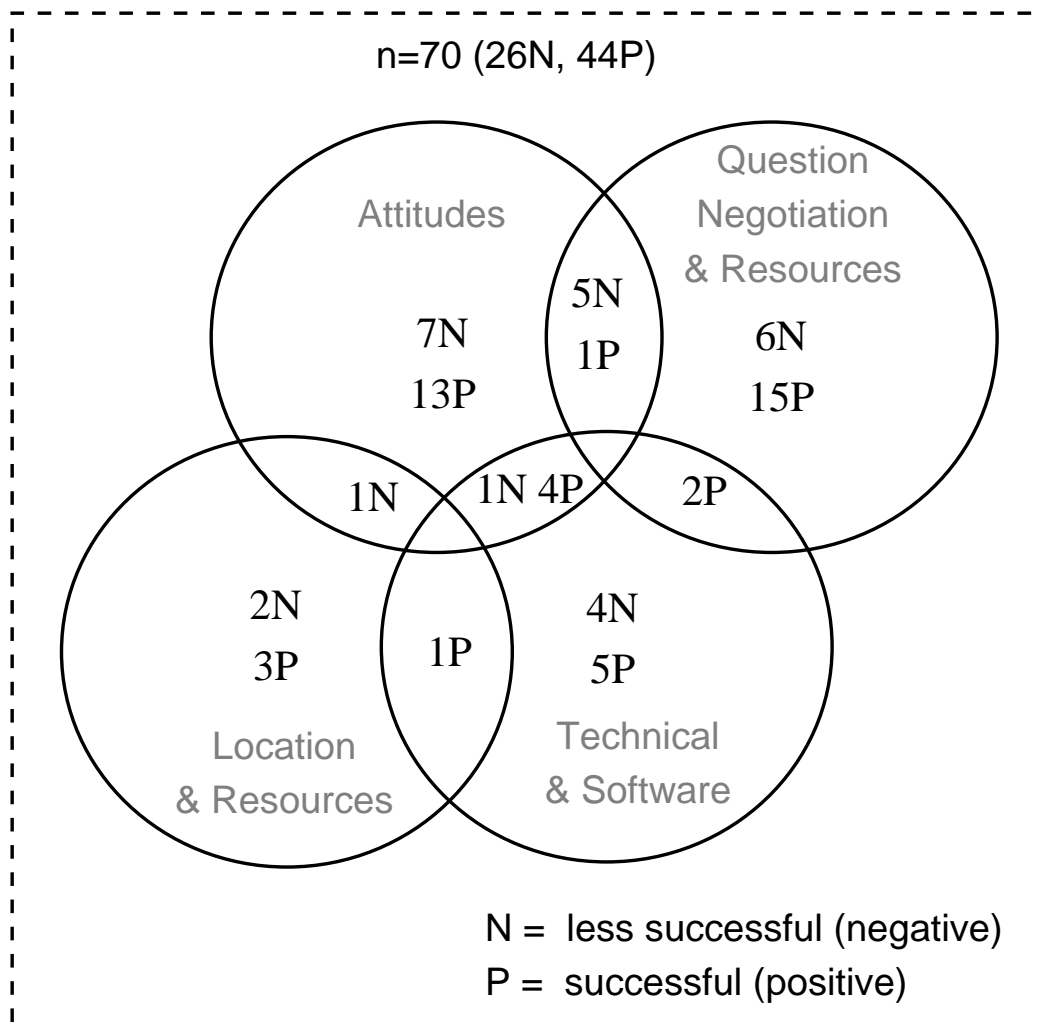
Figure 3: Illustration of the overlap of critical incident themes.

go back a minute and I was like let me check for a minute and I go into a thesaurus and see if there is any subject heading... I had to sort of explain if they know how to use the thesaurus and they say yes so I said try this subject heading and give them a good one to start with if they don't have any in mind and sometimes that's the perfect one to get them going on the right direction and they, they usually **know how to use the database they just need a push** ... that would be an ideal one... or **they kind of understand how to use the databases but they don't know the best one**... I had another person with the Psychology topic and they were just looking at ERIC and I said have you tried such and such and then tried that one and they were ok... I was just telling them different databases... that works very well." (OA2)

The above quotations from three incidents demonstrate that the success of these interactions is directly related to the attitude of the user in relaying their positive characteristics such as knowledge and patience to the librarian.

Less successful (N) incidents, as relayed by the librarians were mostly related with user related behaviors and centered on "communication difficulties", "impatient users", "demanding users", "not-engaged users". For example;

"I had one where the person who had trouble spelling and the terms that he was using I wasn't sure what we were really trying to **communicate** on..." (OG3)

"I was having trouble finding what he was looking for and I finally, there was a **communication problem** and I just couldn't find it. As soon as he logged off I found it! what he was looking for was not exactly what he was saying. He was asking it in a weird way and **somehow I didn't pick up on it**..." (PTS2)

"For whatever reason she'd been **very difficult to deal with** help. She was **impatient** so when I said 'I am looking for this, hold on' we just got disconnected. I really didn't have an answer immediately for her and she was also **very annoyed** by me asking her questions trying to get into her question" (HJ1)

"I had a person who was **not engaged**, it was lunch time that day, she was at work and she was doing school work and she was writing to us and chatting, which is fine you know I am not her boss, it's ok but that explained to me why I was getting **frustrated** on my end... I couldn't get her to clarify, I tried to, sort of understand what the question was, and she would run away in the middle of conversation..." (PTE3)

In cases of the less successful incidents, the negative attitudes led to a negative attitude on the librarian's side as well, so the interactions were perceived as being frustrating.

4.2.1.2 Question Negotiation and Resources

The question negotiation theme refers to the questions asked and librarians' and users'

transactions throughout the chat reference interview process to resolve the user needs. Critical incidents that librarians recalled were related to the type (in-depth, short, specialty) of the questions, quantity of questions, and resources used during the interactions.

Some successful incidents that are representative of this category are;

> "I remember one really good **catalog question**, I think they wanted a book and they thought we didn't have it. But the original question was how to get into **interlibrary loan**... and I said what is the book and they explained it and I was able to find it... we checked it together, it didn't look like we had it... it was actually a chapter in a book... I did a keyword search and it came out... and they learned how to double check keyword search too when the title won't work... I showed them different kinds of searches in the catalog and then they didn't know where the book was located so I directed them with the **directions** to the departmental library. This was very **basic, directional kind of questions** and it comes a lot. Like how many books I can take out, library hours... circulation questions..." (PTS2)

This incident is a good illustration of a good reference interview, question negotiation in which the librarian helped to find the right answer.

> "I had a question that was business related and I just **called the business library** and I was on the computer and I called the business librarian on the phone and I asked if they have the resource that that person needed whether it was available online or if he really needed to be there in person... and they said he needed to use a printed resource so I **sent him to the business library**. That worked pretty well, successful ...". (OA2)

Even though the librarian did not directly answer the query, she was able to refer the user to the resource which was available in another format. This was perceived as a successful negotiation since the librarian felt accomplished.

> "Someone wanted, they were trying to determine differences in voting patterns between men and women for a specific election ... It was like a **very general question**... they were trying to get information on selection and they **got more and more in depth**. They wanted exit polls, differences between men and woman and they wanted to know if woman and men were affected by political propaganda... it was a lot of fun...**I made phone calls** to the government document department and gave the patron some of the e-mail addresses of the librarians. I was able to find something, I tried to answer it." (PTS2)

This incident is a perfect example of the librarian answering questions outside his specialty area which is perceived as a great satisfaction. This was mentioned by many librarians interviewed, and simply being able to try to answer such a specialized question gave them pleasure. Some librarians, however, indicated that this led to some form of panic

and frustration, that they felt as if they were forced to answer questions outside their area. This is further illustrated as a less successful incident.

> "I remember, I was able to allow **two chat sessions** at one time... so I was getting back and forth between two making sure everybody is happy, what is happening ... but somehow I... both interviews if I remember that correctly, I may have one, 'I am working with another person right now are you able to hang on for a while'... What I would do if I were asking the question, I would have another window open I will be checking my e-mail while waiting for the reference librarian to respond to. **Multiple windows multi-tasking** is something that lot of us do, I can imagine folks **willing to wait** so we have an experience... I haven't had anybody get frustrated and leave."(HD3)

This incident is again perceived as successful because the librarian is able to answer two questions at one time. She was able to negotiate the process with the users without any frustration since online chat reference allowed the user to multi-task at the same time as the librarian. It also gave them a feeling of efficiency.

Less-successful incidents mainly focused on the in-depth or specialty questions and difficulty answering them in the chat environment, lack of resources and its influence on chat reference and so on. Below are quotations from collected incidents that illustrate this category:

> "She had this really difficult question, which **chat is not really a good platform for in-depth questions**, I mean you know your basic questions, books on the topic or articles on a topic but when it gets, you know it is some kind of very unique kind of question, which is **difficult or hard to get interaction**... You just really **need to talk to them**... so I can't think of what her topic was, but it was, she needed statistics on some health problem... it was **very specific**... and I asked her to repeat her question to me and I started to check around and you know health sciences are **not my background**... (KL1)

> "But then I also had a question that was much more you know, that was much broader. I think it was either Caribbean literature or Afro-Caribbean literature. How can I find out about such and such, in that case you really need a variety of resources shown and explained and **doing it with chat is more awkward, slower**" [How did you deal with it?] "I told them please describe... this was before we have the **ability to push pages** so I couldn't do that but I could say if you looked at MLA you would find these articles about blah blah and if you looked this encyclopedia blah blah... This **broad question** really didn't work as well as it would have at the reference desk, I think it would have been different. They would have been better prepared or they would have understood what the options were more clearly[4]". (HM4)

---

[4]This interaction is also classified as a less successful one under "Attitudes".

"They were looking for statistics about women in Pakistan, United Arab Republic, Taiwan and some other countries... doesn't matter which... and they need statistics about maternity or something, I don't remember what exactly it was but it was really **in detail stat question**, so that kind of question I would say is a **real challenge on chat**." (UPD1)

In these cases, as many librarians also indicated, the form of the interaction played the greater role in their perception. Online chat reference did not provide the right environment to carry out an in-depth negotiation. Therefore, they preferred face-to-face interactions.

"They wanted to find out a kind a resolution about... for the official state language and they had some information online but you want to verify if the information is accurate and get other information... And so we looked into couple of legal sites, asked her if she can identify or be able to actually verify what she had. And it turned out that the **information was about 10-12 years old** and it's **not available online** or we didn't have it under any of our databases. **No print resources** either. So after 25-30 minutes online eventually we ended the session and I did some research later on and sent her some results by e-mail..." (CP4)

"I had a guy, he was looking for some reports on statistics, and he found the 1990 report and he was looking for a current one... I looked everywhere and found something on the web on the development of something so they had 1994-1997 or something... so I told him what I have found... you know I also e-mail the person of the coordinator of this project and see if they have any more information than that... they didn't because the project was funded for 5 years and once the funding ends they couldn't go further... it was still a success, I found him some information and he knew it... I said here this is the only one available and they didn't continue doing it... we had a **definitive answer** at least...". (OL4)

Under this category, even though the librarian was ultimately able to answer the questions, these incidents are considered to be less successful. It took a long time for the negotiation to reach a point where the librarian understood that the user was looking for a resource that was not available. It is a combination of the problems in negotiation as well as the availability of resources.

4.2.1.3 Technical and Software

Technical and software related incidents were occasionally reported by librarians. As the interview data suggested, librarians perceived interactions to be successful when the

"software works without failure", and helps to interact better with the users with certain features such as "co-browsing" and "page-pushing".

Below are some quotations which represent successful critical incidents which relate to the "Technical and Software" theme;

> "Last night one comes to my mind initially, is another transaction' there are some very general reference questions, quickly being able to resolve **technical problems** I get a lot of satisfaction from realizing that some system is down where remote users are trying to get in to. And because we are here we can instantly contact the appropriate people who are running that system and get it back up within a minute. If we weren't here people would never know that the remote users are having problems until the next morning when everybody gets an e-mail message. I mean it's very satisfying to know that you can get the system up and running again... obviously it didn't have to be us but it is us... nobody is answering the phone at the computer center that has to ... server or something but we are the alternative." (PS3)

> "There was one very basic one, one student was having problems **getting into one of the databases** but that was because, I figure this out pretty quickly and in this case I think the chat reference almost, it let us to figure out the problem quicker that if you would have come to the reference desk... because she was on her computer at one of the computer labs... and asked the questions... and the database that she wanted to use was at the library downstairs... I just asked what computer are you using and she said I am in the lab and right away I respond. So that one it was actually an advantage to use the chat..." (PTR6)

These two cases illustrate the empowerment that the librarians gained via chat reference since they were able to use one technology (chat reference) to resolve other technological problems more efficiently than if the user had to come to their desks.

> "I can remember one off the top of my head, when someone was looking for the style guide there is a link to many style guides through our web page. Which is kind of hard to find, so basically what we did was try to find it together and so **co-browsing was really helpful** on that. They see it was not like magic, like I know where the page was. They saw how I found it... it was just hard to find and they didn't think that they missed it... I was able to guide them to it eventually... and they were so happy, I remember that." (PTS2)

In this case, the librarian was able to use a feature of chat reference (co-browsing) as a teaching tool. The user saw exactly how the librarian went through different steps. This was another common theme among the reported incidents.

Less-successful incidents regarding this theme are generally related to "software or technology failures" and "proxy and connection problems". Even though these problems

69

were beyond the librarian's control, the resulting sessions were perceived as less successful interactions. Below are two quotations illustrating this category:

"I remember many instances in which I was **frustrated with the technology** and ended up having the person to call me or sending me an e-mail, or saying that it's an incomplete answer, if you want more details and I would do that ..." (UPM2)

"We have recently, someone when one of my colleagues was on chat and he got a call, a student was having a problem with his **wireless connection**... so it turned out that she was in her office doing chat and the student was at the ground floor and he got off from his laptop, went to a public computer, called in to chat and complained about the problem... and librarian said where are you and he said I am at... now he could have gone to the service desk, he could have taken his laptop with him... It turned out that he told him to meet her at the reference desk to figure out whether it was a '**connection problem**'. I was amused by the fact that he did that... I just thought that this is funny[5]". (UPM3)

4.2.1.4   Location and Service Hours

According to librarians, location of the service (home, office, reference desk) as well as users' location, and service hours also affect chat reference success. This theme ranked fourth and not many incidents were recorded in this category.

Successful incidents generally considered the "virtual" aspect of chat reference as an advantage as well as its extended hours, for example;

"I had one recently from a **student overseas**, she had a question about building resources for some publication, she was a researcher over there and wanted to use our resources, business resources, she was kept saying how good it was to have such a service, it went well. I was able to provide her some information on how to use **our proxy and databases**[6]". (UPP4)

In this case, even though chat reference was physically located elsewhere it was accessible from everywhere. The location of chat reference can be characterized in the "virtual world". Here this became a significant advantage due to the user's location (overseas).

"We had somebody... We do **late night chat**, and the call, somebody was from the **Fine Arts Library** and you can tell from the IP address whether or not they are at campus... he was looking for books on an artist.. and the person who was on with her looked up some call numbers and she got off from her machine, went to the stacks and got

---

[5]This is further classified under "Location and Service Hours"
[6]This is further classified under "Technology and Software"

the book and said I have them in my hands thank you... that was really nice... because there is not a librarian in the Fine Arts Library 11 o'clock at night... so that was really nice..." (UPP4)

For this incident, the location of the user (a library without a librarian) is coupled with extended service hours to enable to user to reach a librarian for help.

"There was one very basic one, one student was having problems **getting into one of the databases** but that was because, I figure this out pretty quickly and in this case I think the chat reference almost, it let us figure out the problem quicker than if you would have come to the reference desk.. because she was on her computer at one of the computer labs and asked the questions.. and the database that she wanted to use was at the library downstairs.. I just asked what computer are you using and she said I am in the lab and right away I respond. So that one it was actually an advantage to use the chat[7]..." (PTR6)

In this case, the location of the reference service in the "virtual world" saved the user from an extra trip since the reference librarian was able to provide the correct location of the resource.

Most of the libraries provided night hours chat reference from librarians' homes and a few librarians mentioned the disadvantages of being home (e.g. no access to the library building, and some of the resources). The incident below describes a librarian's frustration that he had no control about the situation since he was at home:

"I did have someone, logon to chat last week or a week before, **they were here in the library**, **I was at home** and apparently there was some disturbance up in the area of the stacks where they were, and I think they were really frustrated about it.. there was really nothing I could do other than tell them you have to go down to the guard... I mean that was frustrating because there was really nothing I could do." (UPM2)

4.3 OVERALL SUMMARY OF CRITICAL INCIDENTS

The research data reveal 44 (62.8%) successful and 26 (37.2%) less successful incidents. A majority of librarians were comfortable sharing their experiences as long as their memory allowed. As mentioned in earlier sections, librarians' assessment of "success" differed from

---

[7]This is further classified under "Attitudes"

person to person; however, since the researcher was interested in librarians' own perceptions, she did not intervene by imposing a subjective definition of "success".

A majority of the successful incidents were related to the users' positive characteristics (e.g. familiarity with chat/technology, appreciativeness), the good performance of software (e.g. when its features works without a glitch), and librarians' knowledge and skills.

The less successful incidents were focused on shortcomings of chat reference in addressing in-depth questions which required more interactions. Communication difficulties were emphasized often as the main obstacle in carrying out these interactions adequately. Due to the ease of being behind the computer rather than being in the social setting of the face to face interaction, some users behaved in a way that was perceived to be unreasonably demanding.

Section 4.2.1 demonstrated the reported Critical Incidents with examples of librarian's responses under four different categories. The whole category scheme of the emerging critical incidents is illustrated below.

Critical Incidents Category Scheme

1. Attitudes
   a. Librarian Attitudes and Skills
      i. Knowledge-base
         - knowledge of reference work/sources
         - broad based education
      ii. Communication skills/strategies
         - ability to make quick decisions
         - ability to keep patron engaged
         - confidence and comfort level
   b. User Attitudes and Characteristics
      i. Successful Interactions
         - familiar/comfortable with chat
         - patient/willing to wait
         - appreciative

- know what they want

- just need pointers

- receptive of new knowledge

- easy to communicate with

- have research skills

- have database skills

   ii. Less-successful interactions

- communication difficulties

     – no basics knowledge/ technological skills

     – inability to frame the question

        * weak question

        * questions with no answer

- users who log off before you finish your answer

- users who wants you to do the work

- impatient users

- demanding users

- frustrated users

- unengaged users

- outside users

2. Question Negotiation and Resources

   a. Question types

     i. Challenges with Complex/specialty questions

- chat is not a good platform

- hard to perform in-dept reference interview

- recommend to come in/call

- refer to subject specialist

- call & ask subject librarians/collaborate

- get them started

- follow up

     ii. Routine questions

- easier to answer

   iii. types of common questions

- finding article/journal or database related

- system related/technical questions

- library function related

   iv. Non-academic questions

   v. Other institutions/outside questions

- need to learn different resources/procedures/proxy

- must learn other institutions libraries

- some are difficult to deal with

b. Serving more than one patron

   i. must have an option to make yourself unavailable

   ii. must have a transfer option/another librarian available

c. Inadequate resources

d. Questions with no answer

3. Technology and Software

a. Positive Characteristics

   i. available over distance

   ii. allows synchronous interaction

   iii. helps students become independent learners

   iv. is a good instruction tool

- allows co-browsing

- allows page-pushing

b. Deficiencies

   i. authentication/sign-in problems

   ii. proxy/connection problems

   iii. lost patrons/dropped calls problems

   iv. incompatible with databases

   v. lack of audio/visual clues

- hard to understand what they really want

- typing is time consuming

- face to face interaction is preferred

4. Location and Hours

   a. Advantages of remote accessibility

      i. availability of virtual reference desk

      ii. ruling out the location barriers

   b. Disadvantages due to the service location

      i. at reference desk

- priority issue

      ii. at home

- have to rely on digital resources

- no access to physical library/resources

- isolation from other librarians - no collaboration

   c. Hours

      i. should provide night/late hours

      ii. should provide more hours

4.4   RELIABILITY TEST

After sorting the critical incidents into categories, the reliability of categories was tested by using two different approaches. Four additional reviewers provided the analysis. Two librarians (A and D) and two research assistants in the Library and Information Sciences field (B and C) were asked to analyze a subset of this data. This was essential since the coding and sorting process is subjective and the element of bias can be avoided by using more than one person to code the data (Allen and Reser, 1990).

For the first test, reviewers A and B (C and D did not participate) were provided with a sample of 22 (30%) transcripts with the coding scheme and related explanations on the selection of categories , and were asked to redefine, make suggestions, or agree on the selected

categories. There was 81% (18 out of 22 total incidents) agreement with Reviewer A and 91% (20 out of 22 total incidents) with Reviewer B on an initial sort.

Reviewer A needed more information on four incidents in order to sort them properly. Her main concern was the definition of "successful" and "less successful" concepts rather than the categories. After the researcher explained her reasons, and clarified the fact that she did not define the concepts and that the recorded incidents were "perceptions" of the subjects, the reviewer changed her comments. Reviewer B, on the other hand, disagreed with the researcher on the categorization of two incidents. The disagreement on one of the incidents was mainly based on a misunderstanding of the written transcript by the reviewer and after a short discussion and clarification, the reviewer changed her comments and agreed with the researcher. For the other incident, on which reviewer A had also made suggestions, the researcher made relevant changes to the category. Discussions and clarifications resolved the differences between researcher and the reviewers and agreement level changed to 95%.

A second test was conducted in order to ensure that the 95% agreement level was not introduced by asking the reviewers to assess the researcher's categories. In this approach, Reviewers C and D were provided with a sample of 22 transcripts and asked to categorize these transcripts (with a maximum of two categories for each incident) by using the provided coding scheme provided.

After comparing the reviewers' and researcher's categories, there was an 81% (18 out of 22 incidents) agreement level with Reviewer C and a 75% (16.5 out of 22 incidents) agreement level with Reviewer D for the initial sort.

The primary categories of 21 transcripts sorted by Reviewer C matched those of the researcher. However, there were differences in secondary categories with seven transcripts. For four of the incidents, the reviewer placed them under one category while the researcher placed them under two categories. With the remaining three incidents, it was the reviewer who categorized the incident under two themes while the researcher only categorized them under only one theme. Changes were made accordingly on the researchers side and the final agreement level with Reviewer C was recorded as 90%.

Reviewer D sorted two of the incidents into different categories than the researcher. Following careful discussions and considerations, the researcher changed one of these

Table 10: Illustration of Reviewers and Researcher Agreement Level

Reviewers	Agreement Level	
	Initial	**After Discussion**
A	81%	95%
B	91%	95%
Mean	86%	95%
C	81%	90%
D	75%	82%
Mean	78%	86%
TOTAL MEAN	**82**%	**90.5**%

categories and other one remained the same. Similarly, Reviewer D and the researcher had differences in sorting seven of the incidents to secondary themes. After discussion, the final agreement level with Reviewer D was recorded as 82%. After the resolution of the differences through discussion, this level of agreement is taken to be sufficient.

5.0   DISCUSSION

This Chapter discusses the major findings from the study through a synthesis of the findings of the previous chapters. After outlining the general observations along with the interviews, the findings are discussed in greater detail. The research questions identified at the beginning of this research study are addressed in the context of the findings from the study. Finally, the limitations of the study are indicated and suggestions for further research are made.

5.1   MAJOR FINDINGS

Before the research questions are considered, some general comments on the data will be presented. First, it was noted that librarians tended to recall more successful incidents than less successful ones (See Figure 3). This is in keeping with prior findings. While it is common to ask subjects to report on a positive incident first, in order to begin the interview in a constructive way, this may lead to a greater emphasis on positive incidents. In his seminal article on the critical incident technique, Flanagan (1954) noted that subjects would commonly share %10 more incidents when they were asked about positive incidents first.

Often, it was hard to differentiate successful interactions from less successful ones using any external criteria. An interaction which one librarian considered successful might seem very comparable to one considered less successful by other librarian. From the external viewpoint of the researcher, the designations 'successful' and 'less successful' were sometimes hard to justify. Nevertheless, the sorting was made according to the librarians' own perceptions, which has been suggested to be an integral part of the critical incident technique (Flanagan, 1954) in order to avoid researcher bias in understanding the participants' own

perceptions. For example, sometimes the incident was perceived to be of a disadvantageous nature in the beginning but at the end, since the librarian's work was ultimately helpful to the students, it was perceived to be a successful interaction due to the user's satisfaction. At other times, even though the librarians were clearly helpful, as understood from their statements, they concluded that the interaction was less successful. These less successful incidents were mostly results of outside influences like software related problems or user related difficulties as opposed to the librarians' attitudes. Some other librarians, however, have set very high standards for their personal level of service and this may be the underlying reason that their personal perception superseded the perception of the satisfied user.

Overall, the findings suggest that most of the incidents fell under "attitudes" and "question negotiation" themes.

Attitudes of the librarians and the users played an important role in the librarians' perceptions of interactions as successful or less successful. User characteristics and their attitudes to the librarians or to the system, their experience with the chat environment or with online resources, were the topics of many incidents. According to the librarians, the success of the interactions depended primarily on users' positive attitudes and skills. Librarians' knowledge base and skills also play a role in increasing the probability of success of the interactions. In general, librarians thought that this was comparable to their experience in traditional reference service.

Most of the librarians felt comfortable doing chat reference and considered it be another format of reference service which was necessary in order to reach remote users. This indicated that they were receptive to the new technology and were able to adapt to it reasonably well. However, some librarians were not as comfortable as others and several of them brought up their age as an issue. They thought it was an obstacle dealing with new technology and the chat service. Nevertheless, this research does not have data to support the suggestion that age is a variable in the ability to offer successful chat reference service. On the contrary, there were more senior librarians in this study who had over 20 years of reference experience and who were as comfortable as the junior librarians on offering chat services, than there were those who expressed discomfort. This perception suggests that experience was more important than age or generational difference in the level of comfort with chat reference. In

support of the role of experience, a number of the librarians mentioned the importance of training and practice in offering the service, and presented tips for other librarians who will begin performing chat reference service. As shown in Table 11, the categorization of the interviews brought out this aspect clearly.

The second most frequent theme for the librarians was "question negotiation and resources". Here, the importance of a good reference interview was discussed in detail. Librarians considered the interview in chat reference similar to the traditional reference interview and offered some advice for an effective interview —for example, "find out exactly what they want", "verify that you are giving the information that they are looking for", "give them choices on how much time they want to spend". The subjects also talked about challenges with types and forms of the questions asked. They considered chat reference to be a good source for routine, short answer questions but not a good environment for dealing with in-depth, specialized reference questions. Possibly, this was inter-related to other issues such as training, technological obstacles and other aspects peculiar to chat reference service. The librarians also mentioned the obstacles they faced in dealing with questions in areas other than their specialty area, but on the other hand, some librarians enjoyed the challenge and mentioned how satisfying it was to answer these questions.

Since it is also possible to allow more than one question on chat reference, some librarians mentioned this challenge and their ability to deal with these multi-question sessions as well. Most of the time they indicated that they were able to manage more then one user if the question was routine and did not require much effort. They also mentioned the advantage of having the option not to take more than one question, and to be able to transfer a second user's question to another librarian. This can be done by having more than one librarian on duty. However, some librarians complained about the low volume of questions and questioned the practicality of the service in terms of wasting time and staff on a service which is not frequently used. This difference in opinion could, in some way, be related to the size of the institution since from the interviews it appeared as a difference between small colleges and large universities. Membership in a consortium further increased the ability of the librarian to transfer questions to his/her peers and chat reference was a good medium for such transfers. However, some librarians in institutions which belonged to a consortium

Table 11: Extract from categories which act as advice for reference librarians new to chat reference.

- **Knowledge-base and skills**
    1. Develop communication skills/strategies (11)
    2. Have a general knowledge of reference work/sources (10)
    3. Enhance the comfort level with chat(8)
    4. Have a broad based education (3)
    5. Participate in formal training sessions for chat reference service (13)
    6. Practice doing it with someone else (2)
    7. Watch someone else doing it (1)
    8. Provide service on regular basis (2)
    9. Follow guidelines/procedures (2)
    10. Discuss it with other colleagues (1)
    11. Be aware of the upgrades (1)
- **Attitudes**
    1. Adjust to a new format (10)
    2. Be able to deal with the unexpected (do not panic, be comfortable)(10)
    3. Go back and read others' transcripts (6)
    4. Share your experiences with colleagues (3)
    5. Develop a relationship with the user (3)

---

complained that they had to deal with users from other institutions which sometimes required specific knowledge about the resources available in other libraries, which complicated the service. Some institutions within the consortium had enough personnel to "dedicate seats" to questions within their own institution. Dedicating seats allows flexibility in servicing local patrons, and institutions within consortia may purchase their own seats which reserves a space on the server for their librarians at all times. Creation of more such seats was suggested by some librarians.

Even though "technology and software" issues did not feature in as many critical incidents as did the two top ranked themes, they were discussed in every interview. Since the chat reference service is directly related to technology and its benefits as well as its shortcomings, the librarians expressed their thoughts in both positive and negative ways. The librarians often considered an interaction to be less successful for reasons related to the technology; for instance some schools had problems with chat software because of problems with proxy servers and connections. The proxy service, which allows the users remote access to resources which are not otherwise accessible outside the school computers led to frequent questions. Even though it offers a major advantage in increasing accessibility to resources, it was often mentioned as a disadvantage since sometimes the software did not function the way it should, and the librarian had to offer technical support as well as the reference service. Unfortunately, the software is still in its infancy and some important functions, particularly co-browsing, which should allow the librarian to escort the user through the process, do not operate well. This problem was reported in about half of the schools.

Almost all librarians mentioned that chat reference lacks audio/visual clues and a personal touch when compared to the traditional face-to-face reference transaction. They felt that these clues were important in carrying out their work. When they mentioned this point, they were asked if the presence of Voice over Internet Protocol (VoIP) or Video would help to improve the interaction; however, they were pessimistic in their replies. Most of the librarians liked the idea of VoIP since it would allow them to talk with the user and avoid time spent typing, but they were not very positive about the role of Video. The main reason they used to explain their lack of enthusiasm was that the technology is not ready/capable for it, along with other issues related to privacy and personal preference. However, when

they were asked about the future of these services and possible improvements, many of the subjects mentioned that chat reference will soon be ready to introduce VoIP or Video to the service. The technology is developing to meet the expectations of the librarians that they will be able to operate in an environment similar traditional reference, i.e. to "re-create face-to-face encounters". Along with the above mentioned technical advances, the need for improvements in speed, availability and bandwidth were also mentioned.

"Hours and Location of the service" was another emergent subject. The main advantage perceived was the breaking of the distance barriers. The users could access the information anywhere without having to go to the library. Some librarians perceived that today's students are reluctant to use traditional methods and more inclined to use technological solutions; therefore, the main way to reach them is through the use of chat services. This technological advance also made the librarians question the service hours. Some thought better and/or more extended hours would make the service more efficient. However, the location of the service created some problems. In some instances, when the librarians provided the chat service from the reference desk, they had to deal with walk-in patrons at the same time as the chat patrons which became a problem. Since the walk-in patron was not aware of the chat patrons waiting in line and vice versa, the priority of the service had to be regulated by the librarian. In a similar vein, answering chat questions from home also created some problems, mainly because the resources available for use were limited to those which were online, and sometimes technology was a barrier in terms of accessing the library resources. For example, some subjects mentioned that the proxy service or their home computers were slower than those at the library.

The teaching aspect of chat reference was very important as indicated by the number of positive incidents in which this was involved. Data suggested that the librarians perceived that novice students who were being helped or users who were just being introduced to new data or sources such as electronic journals were very appreciative. Hence, the librarians got a greater sense of satisfaction. Here, the technology was used for their advantage. Both parties, the user and the librarian, involved in a chat reference interaction had hands-on experience. The subjects stated that, in a traditional reference service, it is the librarian who does most of the work and the patron who receives the information. However, the chat

reference service got the patrons involved in the retrieval process which helped them to learn and recall the tools involved. They could even save the transactions for future reference, a feature which is not available in the traditional reference interaction.

This section has examined the general perceptions of the academic librarians in the study toward chat reference service. In the following sections, these findings are further discussed in light of the research questions of the study.

5.1.1 Results Related to Research Questions One, Two and Five

After the study was conducted, it was apparent that some research questions could be handled together in a coherent manner since the findings had common characteristics. The initial group of related research questions are related to the evaluation process of the study and are as follows:

1 How much of the experience from traditional reference service evaluation can be transferred to the evaluation of digital reference services?
2 What are the defining characteristics of Digital Reference Services and how can we use them in measuring quality in chat reference services?
5 What evaluation criteria and methods should be used for chat reference services?

The first two questions were answered through the literature. The literature on Reference Interview, DRS and Reference Service Evaluation was discussed in Sections 2.2 and 2.4 suggested that the traditional reference experience is similar to the digital reference experience (Abels, 1996; Janes and Silverstein, 2003; McClure and Lankes, 2001; Whitlatch, 2001; Mitchell et al., 2001). Studies suggested that the traditional research methods on evaluation can be utilized effectively in the digital reference environment but the question of "how much experience can be transferable" still remains unanswered. Table 12 illustrates the common characteristics of reference evaluation measures which were divided into four categories (?Whitlatch, 1990; Allen, 1995; Whitlatch, 2000; Mitchell et al., 2001; McClure and Lankes, 2001): Quality of Answer, Efficiency, User Satisfaction and Cost.

"Quality of Answer" refers to the productivity of the service, which includes the extent to which correct or prompt answers are provided, the librarian's instructive abilities,

Table 12: Literature on Traditional vs. Digital Reference Services Evaluation Measures

Measures:	Quality of Answer	Efficiency	User Satisfaction	Cost
Traditional:	correct answers prompt answers instruction given assistance provided	resource coverage resource quality staff performance	information need library skills improved knowledge	service collection staff
Digital:	accuracy interactivity instructiveness	accessibility timeliness service extensiveness staff training service review privacy publicity	accuracy timeliness staff behavior technical aspects facilities	session infrastructure staffing

interactivity and the amount of assistance provided during the interactions. This category covers the evaluation of the reference interaction itself.

"Efficiency" of the service refers to a service process measure. Accessibility of the service, availability of resources, timeliness and clear communication in responding questions, and extensiveness of service by means of percentage of questions answered as well as availability and nature of staff training, marketing issues and the overall evaluation of the service fall within this category.

"User Satisfaction" is considered to be the hardest aspect to measure. It is evaluated using outcomes measures. Here, the satisfaction of users that their information needs have been meet may be established by looking at the extent to which their library skills and knowledge have been improved. The main indicators of satisfaction have been identified as the engagement level and behavior of the user and the staff, accuracy and the timeliness of the service provided (Gross et al., 2001).

"Cost" is an economic measure which refers to the financial ability to acquire resources and provide the service. Cost effectiveness of digital reference includes the cost to conduct a digital reference service session, the infrastructure needed to support quality digital services and the impact of these costs on other library expenditures, measured against the benefits achieved.

The defining characteristics of chat reference, that it is available online and delivered through software which is able to save session transcripts, can make it easier to evaluate the service. By using and evaluating these transcripts, "quality of answer" and "service efficiency" can be measured. While it is possible to make a comparable evaluation of traditional reference service by using observations or using tape or video recordings, this kind of measurement is intrusive and would be relatively difficult compared to use of transcripts in evaluation of digital reference service.

Most of the chat reference software has the ability to send automatic (or optional) surveys to the users right after the chat interaction. This kind of survey also makes it easier for the libraries to assess user satisfaction through the evaluation of these survey results.

5.1.1.1 Chat Reference Evaluation Criteria and Measurement: The previous section and Table 12 provided an introduction to the reference services evaluation criteria based on the literature. This study attempted to create a evaluation criteria list for successful chat reference services by comparing the findings from the literature with the findings of this study from the 40 interviews. A criteria checklist for successful chat reference service was created under three areas:

  I Librarians' personal criteria for measuring performance

 II Librarians' evaluation of chat reference software

III General service publicity and user awareness criteria

A set of evaluation criteria for providing successful chat reference service is outlined below:

I Librarians' Personal Criteria for Measuring Performance

    1. My general knowledge-base and skills

a. Are my communication skills/strategies adequate?

    i. When dealing with an impatient user

    ii. When dealing with a demanding user

    iii. When dealing with a frustrated user

    iv. When dealing with an unengaged user

    v. When dealing with an unexpected question

b. How comfortable am I using chat reference service?

    i. Am I aware of the available capabilities

    ii. Am I following the guidelines/procedures

    iii. Am I discussing it within the department

c. Did I participate in formal training for chat reference?

d. Am I participating in ongoing chat reference training sessions?

e. Did I practice it adequately/did i get enough hands on experience?

    i. Did I practice it with someone else?

    ii. Did I provide/practice service using on regular basis?

    iii. Did I watch someone else doing it?

f. Am I using the chat reference service experience to improve myself?

    i. Do I go back and read transcripts?

    ii. Do I share my experiences with colleagues?

    iii. Do I get good feedback from the colleagues?

    iv. Do I get good feedback from the users?

2. My chat reference interview performance

a. Am I finding out what exactly they want effectively?

b. Am I verifing that the information given is what they are looking for?

c. Am I giving them choices on how much time they want to spend?

d. Am I being instructive?

    i. Am I helping users become independent users?

    ii. Am I guiding them through their research?

    iii. Am I providing them more hands on experience?

II Librarians' Evaluation of Chat Reference Software

1. Does it have essential features?

    a. Does it allow co-browsing?

    b. Does it allow page pushing?

    c. Does it send/save transcripts automatically?

    d. Does it generate of statistics?

    e. Does it send automatic surveys?

2. Do its technical capabilities meet the following criteria?

    a. Operates without malfunction

    b. Does not require any download

    c. Is free of authentication/sign-in/license problems

    d. Is able to re-connect the user when disconnected

    e. Is simple/easy to use

    f. Has user-friendly interface

    g. Is compatible with all computer platforms

    h. Is compatible with databases

    i. Has a clear indication of an incoming question

    j. Has manuals for functions/features

    k. Shows where students are connecting/coming from

    l. Provides a reliable system

    m. Provides quick response time

    n. Upgrades are reliable

    o. Has technical support

    p. Has capabilities to improve interaction

        i. Has video/VOIP

        ii. Provides access to sufficient printed resources

        iii. Has a database of questions to share/build knowledge base

    q. Is able to use software collaboratively

        i. Has good routing of calls

        ii. Has a good question transfer mechanism

        iii. Provides institutions their own seats

III General Service Publicity and User Awareness Criteria

    1. Is the service visible?

        a. Is it accessible from many pages including databases?

        b. Is it linked on the main Web-page?

    2. How well is it marketed/how popular is it?

        a. Are newsletters/posters/table tents/postcards/newspaper articles being used?

        b. Has it been mentioned in library instruction sessions?

        c. Are advisers/professors aware of it/using it?

        d. Is it spreading by 'word of mouth'?

This criteria set created as a result of the interviews and the CI reports of this study and based solely on the subjects of this study. It could form a basis of a self-evaluation method which could be adopted as a checklist by the librarians and libraries.

Measuring service quality in reference services is subjective in nature and this remains true in the digital reference environment. Table 13 shows the evaluation methodologies used in traditional and digital reference services and some applications used to assess the services (Whitlatch, 2000; Novotny, 2001; Kawakami and Swartz, 2003).

Even though the techniques look similar, we can argue that the chat reference technology has an advantage over traditional reference in terms of evaluation. Today, the characteristics of digital reference services, the use of chat software in particular, allow libraries to keep more data on digital reference services (e.g. saved transcripts, usage statistics etc.). Kawakami and Swartz (2003) also suggest that appropriate steps for DRS evaluation are analysis of session transcripts, examination of user comments, and librarian and user focus groups. Therefore, libraries have more opportunity to evaluate their reference services and measure the quality of their services than in traditional reference evaluation.

The librarians in this study were asked for their suggestions for improving the quality of the chat reference service during the interview sessions. The data related to this question were recorded in Section 4.1.4. Librarians also provided opinions on evaluation when they were asked to define chat reference and its characteristics (Section 4.1.1).

Privacy was another subject that emerged during the interviews. Even though many librarians mentioned the usefulness of reading other librarians' transcripts, some still did

Table 13: Evaluation Techniques for Traditional vs. Digital Reference

	Evaluation Techniques-Methods	Applications
Traditional Reference	Surveys	questionnaires, user observations
	interviews	perform telephone, electronic, personal, focus-group interviews with users and/or service prviders
	statistical sampling research	Analyze user population, totals/averages, number/type of questions received
	case studies	peer review and librarian discussion groups
	cost benefit analysis	service cost (resources, staffing, time) vs. benefits (service outcomes) analysis
Digital Reference	surveys	questionnaires, automatic surveys to users (at the end of sessions), user/librarian observations by using session transcripts
	interviews	perform electronic, personal, telephone, focus-group interviews with users and/or service providers
	transcript analysis	accuracy of answers, question types, user types
	Web server log analysis / statistics	Collect automatic statistics: user population, number of questions, service hours (analysis of questions received by the time of the day)
	case studies	peer review and librarian discussion groups
	usability studies	observations and interviews on Web page design and usability

not feel comfortable with the idea that they can be observed by other librarians during the evaluation process.

Librarians also spoke about chat characteristics and software features as an advantage of chat in the evaluation process. Two librarians (one in an administrative position and another a service supervisor) also mentioned that they personally want to conduct research on measuring service effectiveness.

Although these techniques are generally applicable to all reference services, a lot of experience has been gained in evaluating traditional reference services. The transition to the evaluation of digital reference services and consideration of the new tools and challenges that it brings have not been done in a well-planned and analytical fashion. It is important to re-assess the different measures that need to be evaluated in a digital reference service, and some preliminary work has been done on this subject.

As Whitlatch (2001) suggested, traditional research methods can be utilized effectively in the electronic reference environment, basically by taking existing methods, determining the methods which best fit into the digital context and using them to determine the best means of providing DRS. In conclusion, a great deal of the experience from the traditional reference services is transferable.

Chat reference services, furthermore, provide advantages with the potential to improve the evaluation process. Although, this study was not able to develop comprehensive evaluation criteria for all aspects digital reference service evaluation, it has taken a step in providing a chat reference evaluation criteria checklist from a practical level through the librarian's perceptions using a well established qualitative analysis tool.

5.1.2 Results Related to Research Questions Three and Four

The second group of questions was at the practical level and formed the core of the study. These were the third and the forth research questions of the study as follows:

3 What are librarians' perceptions of successful chat reference service ?

4 To what extent do librarians' perceptions and the results of research on quality chat reference service identify common characteristics?

Librarians' perceptions of successful chat reference services were explored in detail in Sections 4.2 and 4.1.4. Results from the study are compatible with the literature on digital reference quality characteristics (Kasowitz et al., 2000; McClure et al., 2002; Lankes et al., 2003) and the RUSA (Reference and User Services Association) guidelines which were prepared by the MARS Digital Reference Guidelines Ad Hoc and MOUSS Management of Reference Committees (RUSA, 2004a,b). The comparison between the findings of this study and the literature is summarized in Table 14.

The most frequently mentioned quality characteristics in this study were related to the performance guidelines. Since the subjects were asked mainly to focus on interactions they gave many examples of the reasons for successful and less successful interactions. Performing a good reference interview by listening to users and inquiring about their needs, keeping them engaged, performing a good search through the resources by using chat reference features (e.g. co-browsing, page pushing, sending links and transcripts, etc.) were strongly identified.

When the librarians were asked about their suggestions contributing to the improvement of chat service, they pinpointed the significance of training for chat reference and gave examples from their institutional experiences. Marketing was another commonly suggested criterion. Librarians were concerned about user awareness of the service and they were eager to attract more users, and therefore they suggested marketing options.

The librarians considered accessibility of the service as important as the marketing issue. The librarians usually discussed service accessibility issues within marketing and service promotion. The visibility of the "chat reference link" within the library Web page was important to the librarians and they gave suggestions on the improvement of linking to the service.

There were a few issues that are discussed in the literature for which this study did not return any supportive data. For example, the issue of "repeat users" is mentioned in the literature. This study, however, did not ask the librarians to go back to the transcript records and specifically avoided asking them to remember the identities of the users. In this type of perception-related, interview-based study, the question of "repeat users" cannot be addressed in detail. "Courtesy" and "Approachability" were other such issues. Although user friendliness, accessibility and ease-of-use emerged as important topics, and librarians at

some level implied these topics, they were not specifically mentioned. This could be handled in a future study by adding an explicit question for the interviews. One could assume that most users are familiar with using computers for library access and that courtesy for chat and traditional reference may therefore be similar. Approachability on the other hand, presumably deals with how comfortable users feel in approaching a human at the reference desk, as opposed to embarking on a fairly anonymous chat reference interaction. Some of the subjects mentioned the advantages of anonymity and they thought that the chat reference service would attract shy users since they do not need to come to the reference desk personally. While there may be significant differences in approachability from the user perspective, this can probably only be determined from a study which surveyed or interviewed users. However, this is not explicitly supported by the data from this study. Finally, the issue of "cost" was addressed only peripherally in this study. The researcher did not consider cost as a factor that the librarians would be able to answer in detail and therefore did not question them about it. Financial issues did arise indirectly, however, as some librarians talked about service value and discussed its worth in terms of the service offered and the demand for it. The librarians themselves may or may not have been involved in the financing of this relatively new service, and since the issue was not raised directly by the researcher, they may not have felt obliged to consider it when describing their perceptions. Overall, these issues are related to the way this study was conducted.

5.2 CONCLUSIONS

Librarians' perceptions provide important information on evaluation and ways of improving the quality of digital reference services. This research used a new technique to look into librarians' values in detail and compare these to what had been previously reported in the literature. Valuable comments were provided by the subjects and illustrated in this study.

This research pointed out the importance of the librarian in the reference interaction, and interviewed librarians offering chat reference service in order to explore their perceptions of successful service. The interviews were conducted using a Critical Incident Technique (CIT)

Table 14: Comparison Between Literature on DRS Quality and Study Findings

	Literature	Study Findings
(Lankes et al., 2003)	Courtesy	Develop relationship with users (3), follow-up(6), adjust to new format (10)
(McClure et al., 2002)	Authoritive/Accuracy	Librarians' knowledgebase, experience, educational background and skills. (32)
RUSA Guidelines for Virtual Reference Service (RUSA, 2004a)	Accuracy	Find out what they really want and make sure they they get their want (12). Check transcripts later for accuracy (6)
	Satisfaction	Appreciative comments (14), feedbacks (2)
	Repeat Users	No supportive data on "repeat users"
	Awareness	Marketing (8), accessibility (12), publicity (5), instruction sessions (3), provide good/efficient service (4)
	Cost	No supportive data on "cost"
	Accessibility	Visible button (11), linking on Web-page (6)
	Staff Training	Participate in formal training (12) and practice/hands on experience (16) is essential
	Evaluation	Ongoing assessment on service and its usability (2) is needed
	Privacy	Anonymity offered to users is important (10), Privacy of user and librarian should be protected (2), Transcripts should held privately (2)
RUSA Guidelines (Service Behavior)	Approachability	Avoid library jargon (1), develop relationship with the users (3), learn chat language/emotions etc. (1)
(RUSA, 2004b)	Interest	Keep patron engaged (5), develop relationship with user(3), make comments that you are interested (2)
	Listening/inquiring	Good reference interview (7), find out what they really want (12), ask related questions/verify their questions and answers given (4)
	Searching	Guide through resources, Be instructive (4): use co-browsing (12), page pushing (6)
	Follow-up	Use e-mail to follow up (6), suggest library visit (10), refer to subject librarian (19)

94

in order to ask the participants to discuss their successful or less successful experiences with chat reference services. Librarians were cooperative in sharing their experiences. It was found that CIT was helpful in terms of collecting librarians' perceptions of chat reference service.

Most of the librarians considered chat reference services similar to traditional reference services in terms of questions received and the reference interview. According to the findings of this study, "Attitudes" of librarians and users (the main focus was on users' attitudes during the interactions) play an important role in the success of the chat reference interaction. The importance of "attitudes" in traditional reference interaction was also suggested in Radford's 1996 research, in which she focused on the role of communication theory in the reference encounter.

This study identified technology as both the reason for the main advantages of chat reference but also as the reason for its shortcomings. The main advantage was its remote availability to reach users in the time and location of their convenience. The features of chat which are not available for traditional reference were other factors, for example, the availability of session transcripts for the users to save for future reference. However, many shortcomings due to problems with the technology, such as problems with software, were found. The librarians interviewed were, however, optimistic about the future of DRS and thought that it would be more popular in the coming years.

5.2.1   Limitations of the Study

In addition to being limited by the issues described in Chapter 1, this study was limited in its focus on chat reference services taking place in academic library settings. The sample of librarians in the study was recruited from college libraries and university libraries within the states of Pennsylvania and Ohio. The study sample is limited to 10 academic libraries and 40 chat reference librarians from these institutions. Therefore, generalization is limited to the research participants and the academic libraries.

In order to counteract this limitation, a diverse sample of libraries from small colleges to large universities was selected. A consortia which serves over 85 different academic

institutions was also included in the sample of this research in order to increase the diversity of the institutions included.

Subjects of the study were volunteers, hence self selected. This potential limitation was unavoidable since the research was carried out in many libraries where the researcher was an outsider and had to rely on volunteers who were informed about the study via their DRS supervisors. However, it is clear that volunteers may differ from non-volunteers or from the general population; for instance they may choose to participate in the study because they have strong points of view, either positive or negative. Mitigating this effect is the information richness represented amongst the subjects who volunteered for this study. As shown in Table 1, the participants came from a wide range of institutions and had varied reference experience, as well as a range of subject backgrounds and areas of specialization.

This study offers a snapshot of chat reference services, and librarians' perceptions in late 2003 and 2004. Since digital reference services are continuing to evolve, this type of evaluation-based study should be updated at regular intervals. In particular, the technological limitations identified in this study are related to the state of development of the hardware and software at this particular time.

This study does not involve users of chat reference services and relies on librarians' statements and their perceptions of users. Therefore, the emphasis is on the integration of the librarian's point of view and no perceptions of the service were obtained directly from users.

The study is based on qualitative research methods and is relatively subjective in nature. It concerns librarians' perceptions of successful and less successful chat reference interactions.

5.2.2   Suggestions for Further Research

The findings from this study suggests several areas for further research.

A multi-aspect study that is nation-wide could be designed based on the results of this work. It could be extended to include the user's perceptions or independent observer's perceptions (e.g. researchers posing as users) to either neutralize or remove the service provider/patron bias. However, it is not feasible to conduct such research via oral interviews

96

only and it should be based on a combination of oral interviews, electronic interviews, surveys and other methods and measures suggested in Sections 5.1.1, 5.1.2.

Chat reference offers an opportunity to analyze librarian-user interactions through the transcripts within the system. Some studies have analyzed chat reference transcripts (White and Abels, 2004; Radford and Thompson, 2004) in order to assess answer quality or better understand communication over chat reference services. This study is based on second hand information collected from the interviews of the librarians' perceptions and not involve direct observations of the interactions. Therefore, transcript analysis studies are suggested since transcripts would allow researchers to observe/analyze data directly using first hand information.

Other local versions of this study which are more detailed could be of great value to the individual institutions. Such a study could be very comprehensive on both the user and provider side. This includes further research examining chat reference service, based on library type and size. Some differences were found between the samples of this study (e.g. small colleges vs. ARL libraries vs. consortia) and based on this fact additional research is recommended.

Due to the limited focus of this study, chat software related issues are not comprehensively analyzed. However, the effect of software on the service is noticeable and recorded in the results of this study. Further studies of chat reference software which investigate the usability of the software and related communication problems are suggested.

One finding of this study was that it is not possible to develop comprehensive evaluation criteria that fit all libraries in general. Instead, it has taken a step in providing a template-like chat reference evaluation criteria checklist on a more practical level. This is considered practical because it is based on the concerns and perceptions of the practitioners, i.e. the librarians who provide the service. A well established qualitative analysis tool was used for this purpose and was shown to be of great value. Further studies based on this work could be carried out to generalize the findings.

BIBLIOGRAPHY

Abels, E. G. (1996). The e-mail reference interview. *RQ*, 35:345–358.

Allen, B. (1995). Evaluation of reference services. In Bopp, R. E. and Smith, L. C., editors, *Reference and Information Services : An Introduction*, pages 208–229, Englewood, Colorado:. Libraries Unlimited.

Allen, B. and Reser, D. (1990). Content analysis in library and information science research. *Library & Information Science Research*, 12(3):251–262.

Auerbach, C. F. and Silverstein, L. B. (2003). *Qualitative Data: An Introduction to coding and analysis*. New York University Press, New York.

Boyer, J. (2001). Virtual reference at north carolina state: The first one hundred days. *Information Technology And Libraries*, 20:122–128.

Bradley, J. (1993). Methodological issues and practices in qualitative research. *Library Quarterly*, 63(4):431–449.

Breeding, M. (2001). Providing virtual reference service. *Information Today*, 18(4):42–44.

Bristow, A. (1992). Academic reference service over electronic mail. *Research Libraries News*, 53(10):631–633.

Caplan, P. (2000). Oh what a tangled web we weave: Opportunities and challenges for standards develvelopment in the digital library arena. *First Monday*, 5(6). Retrieved from: http://firstmonday.org/issues/issue5_6/caplan/index.html (3 July 2002).

Childers, T. A. (1970). *Telephone Information Service in Public Libraries: A Compariosn of Performance and the Descriptive Statistics Colleted by the State of New Jersey*. PhD thesis, Rutgers University, The State University of New Jersey, New Brunswich, New Jersey.

Coffman, S. (2001). We'll take it from here: Further developments we'd like to see in virtual reference software. *Information Technology And Libraries*, 20:149–153.

Coffman, S. (2004). To chat or not to chat: taking another look at virtual reference. *Searcher*, 12:38–47.

Ellis, L. and Francoeur, S. (2001). Applying information competency to digital reference. In *67th IFLA Council and General Conference*, Boston. Retrieved from: `http://www.ifla.org/IV/ifla67/papers/057-98e.pdf` (10 December 2002).

Fisher, S. and Oulton, T. (1999). The critical incident technique in library and information management research. *Education for Information*, 17:113–125.

Flanagan, J. C. (1954). The critical incident technique. *Psychological Bulletin*, 51(4):327–358.

Folger, K. M. (1997). The virtual librarian: Using desktop videoconferencing to provide interactive reference assistance. In *ACRL Conference Proceedings*. Retrieved from: `http://www.ala.org/acrl/paperhtm/a09.html` (25 May 2001).

Ford, C. E. (2002). *An exploratory study of the differences between face-to-face and computer-mediated reference interactions*. PhD thesis, Indiana University.

Francoeur, S. (2001). An analytical survey of chat reference services. *Reference Services Review*, 29(3):189–203.

Gatten, J. N. and, C. J. R. (2001). Assessing reference behaviors with unobtrusive testing. In Wallace, D. P. and Fleet, C. V., editors, *Library Evaluation: A Casebook and Can-Do Guide*, pages 105–115, Englewood, Colorado. Libraries Unlimited.

Gorman, G. E. and Clayton, P. (1997). *Qualitative research for the information professional: a practical handbook*. Library Association Publishing, London.

Gray, S. M. (2000). Virtual reference services: Directions and agendas. *Reference & User Services Quarterly*, 39(4):365–375.

Griffiths, J. and King, D. W. (1991). *A Manual on the Evaluation of Information Centers and Services*. AGARD, Neuilly sur Seine, France.

Gross, M., McClure, C. R., and Lankes, D. (2001). Assessing quality in digital reference services: Overview of key literature on digital reference. Retrieved from: `http://quartz.syr.edu/quality/VRDphaseIILitReviw.pdf` (March 10 2002).

Hernon, P. and Altman, E. (1998). *Assessing Service Quality: Satisfying the Expectations of Library Customers*. American Library Association, Chicago.

Hernon, P. and Whitman, R. J. (2001). *Delivering satisfaction and service quality : a customer-based approach for libraries*. American Library Association, Chicago.

James, A. S. and Butler, J. T. (2001). Developing a model to provide digital reference services. *Reference Services Review*, 29:172–188.

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

Janes, J., Carter, D., and Memmott, P. (1999). Digital reference services in academic libraries. *Reference & User Services Quarterly*, 39(2):145–149.

Janes, J., Hill, C., and Rolfe, A. (2001). Ask-an-expert services analysis. *Journal of the American Society for Information Science and Technology*, 52(13):1106–1121.

Janes, J. and Silverstein, J. (2003). Question negotiation and the technological environment. *D-Lib Magazine*, 9(2). Retrieved from: http://www.dlib.org/dlib/february03/janes/02janes.html (20 March 2003).

Jennerich, E. Z. (1980). Before the answer: Evaluating reference process. *RQ*, 19(4):360–366.

Kasowitz, A., Bennett, B., and Lankes, R. D. (2000). Quality standards for digital reference consortia. *Reference & User Services Quarterly*, 39:355–363.

Katz, W. A. (1997). *Introduction to Reference Work*, volume II: Reference Services and Reference Process. McGraw-Hill, Boston.

Katz, W. A. (2002). *Introduction to Reference Work*, volume II: Reference Services and Reference Process. McGraw-Hill, Boston.

Kawakami, A. and Swartz, P. (2003). Digital reference: training and assasment for service improvement. *Reference Services Review*, 31(3):227–236.

Kawakami, A. K. (2003). Real-time digital reference. In Drake, M., editor, *Encyclopedia of Library and Information Science*, pages 2463 – 2474, New York. Marcel Dekker, Inc. Second Edition.

Kibbee, J., Ward, D., and Ma, W. (2002). Virtual reference, real data: Results of a pilot study. *Reference Services Review*, 30(1).

Kimmel, S. and Heise, J. (2001). Being there: Tools for online synchronous reference. *Online*, 25(6).

King, D. W. and Griffiths, J. (1991). Five years' research: New pieces of the information puzzle. *Bulletin of the American Society for Information Science*, 17(2):11–15.

Kresh, D. N. (2000). Offering high quality reference service on the web: The collaborative digital reference service (cdrs). *D-Lib Magazine*, 6(6). Retrieved from: http://www.dlib.org/dlib/june00/kresh/06kresh.html (20 August 2001).

Lam, R. E. (1988). The reference interview - some intercultural considerations. *RQ*, 27:390–395.

Lankes, R. D. (1998). Aska's - lesson learned from k-12 digital reference services. *Reference & User Services Quarterly*, 38:63–71.

Lankes, R. D. (2000). The birth cries of digital reference. *Reference and User Services Quarterly*, 39(4).

Lankes, R. D., Gross, M., and McClure, C. R. (2003). Cost, statistics, measures, and standards for digital reference services: A preliminary view. *Library Trends*, 51:401–413.

Lessick, S., Kjaer, K., and Clancy, S. (1997). Interactive reference services (irs) at uc irvine: Expanding reference service beyond the reference desk. In *ACRL Conference Proceedings*. Retrieved from: http://www.ala.org/acrl/paperhtm/a10.html (10 March 2001).

Markham, M. J., Stirling, K. H., and Smith, N. M. (1983). Librarian self-disclosure and patron satisfaction in the reference interview. *RQ*, 22:369–374.

McClure, C. R. and Lankes, R. D. (2001). Assesing quality in digital reference services: A research prospectus.

McClure, C. R., Lankes, R. D., Gross, M., and Choltco-Devlin, B. (2002). *Statistics, measures, and quality standards for assessing digital reference library services : guidelines and procedures*. Information Institute of Syracuse, School of Information Studies, Syracuse University; School of Information Studies, Information Use Management and Policy Institute, Florida State University, Syracuse, N.Y. : Tallahassee, FL.

McGlamery, S. and Coffman, S. (2000). Moving reference to the web. *Reference & User Services Quarterly*, 39:380–386.

Meola, M. and Stormont, S. (2002). *Starting and Operating Live Virtual Reference Services: A How-To-Do-It Manual for Librarians*. Number 118. Neal-Schuman Publishers Inc., New York, London.

Mitchell, E., Barker, J., Caldwell, C., Cruse, T., Hanson, J., Horn, J., Langston, L., Lessick, S., and Tahir, P. (2001). Expanding reference service for the university of california: A white paper on the relevance of digital reference service to the uc libraries. Technical report. Retrieved from: http://www.slp.ucop.edu/sopag/DigitalReference.pdf (12 December 2002).

Mitchell, G. and Harris, R. M. (1987). Evaluating the reference interview - some factors influencing patrons and professionals. *RQ*, 27:95–105.

Morgan, E. L. (1996). See you see a librarian final report. Technical report, The University of California, Berkeley. Retrieved from: http://sunsite.berkeley.edu/~emorgan/see-a-librarian (09 May 2002).

Morse, J. M. and Richards, L. (2002). *Readme first for a user's guide to qualitative methods*. Sage Publications, Thousand Oaks, California.

Novotny, E. (2001). Evaluating electronic reference services: Issues, approaches a nd criteria. *The Reference Librarian*, 74:103–120.

Pagell, R. A. (1996). The virtual reference librarian: Using desktop videoconferencing for distance reference. *Electronic Library*, 14(1):21–26.

Patterson, R. (2001). Live virtual reference: More work and more opportunity. *Reference Services Review*, 29:204–209.

Patton, M. Q. (1990). *Qualitative evaluation and research methods.* Sage, Newbury Park, California, 2nd edition.

Peters, T. A. (2000). Current opportunities for the effective meta-assessment of online reference services. *Library Trends*, 49:334–349.

Pomerantz, J., Nicholson, S., Belanger, Y., and Lankes, R. D. (2004). The current state of digital reference: validation of a general digital reference model through a survey of digital reference services. *Information Processing & Management*, 40:347–363.

Radford, M. and Thompson, J. (2004). Yo dude! y r u typin so slow? interpersonal communication in chat reference encounters. Presentation at the 6th Annual VRD Conference. Retrieved from: http://www.vrd2004.org/proceedings/YoDudePart1.htm (10 January 2005).

Radford, M. L. (1993). *Relational aspects of reference interactions: A qualitative investigation of the perceptions of users and librarians in the academic library.* PhD thesis, Rutgers, The State University of New Jersey.

Radford, M. L. (1996). Communication theory applied to the reference encounter: An analysis of critical incidents. *Library Quarterly*, 66:123–137.

Ross, C. S. (2003). The reference interview: Why it needs to be used in every (well, almost every) reference transaction. *Reference & User Services Quarterly*.

RUSA (2004a). Guidelines for behavioral performance of reference and information service providers. *Reference and User Services Quarterly*, 44(1):14–17. Retrieved from: http://www.ala.org/ala/rusa/rusaprotools/referenceguide/guidelinesbehavioral.htm (18 October 2004).

RUSA (2004b). Guidelines for implementing and maintaining virtual reference services. *Reference and User Services Quarterly*, 44(1):9–13. Retrieved from: http://www.ala.org/ala/rusa/rusaprotools/referenceguide/virtrefguidelines.htm (18 October 2004).

Ryan, S. (1996). Reference service for the internet community: A case study of the internet public library reference division. *Library & Information Science Research*, 18:241–259.

Seidman, I. (1998). *Interviewing as qualitative research: A guide for researchers in education and the social sciences.* Teachers College Press, New York.

Shaw, E. (1996). Real-time reference in a moo: Promise and problems. Retrieved from: http://www.ipl.org/div/iplhist/moo.html (20 August 2003).

Shwartz, D. G. and Eakin, D. (1986). Service standards, performance criteria, and evaluation. *The Journal of Academic Librarianship*, 12:4–8.

Sloan, B. (1998). Electronic reference services: Some suggested guidelines. *Reference & User Services Quarterly*, 38:77–81.

Sloan, B. (2001a). Evaluating digital reference: The script. Retrieved from: http://alexia.lis.uiuc.edu/~b-sloan/evaldigref.htm (16 May 2001).

Sloan, B. (2001b). Ready for reference: Academic libraries offer live web-based reference. preliminary report. Retrieved from: http://www.lis.uiuc.edu/~b-sloan/ready4ref.htm (10 March 2002).).

Smith, J. (1995). Semi-structured interviewing and qualitative analysis. In Smith, J. A., Harre, R., and Langenhove, L. V., editors, *Rethinking Methods in Psychology*, pages 1–26, London ; Thousand Oaks, Calif. Sage.

Smith, L. L. (1991). Evaluating the reference interview - a theoretical discussion of the desirability and achievability of evaluation. *RQ*, 31:75–81.

Still, J. and Campbell, F. (1993). Librarian in a box: The use of electronic mail for reference. *Reference Services Review*.

Stormont, S. (2001). Going where the users are: Live digital reference. *Information Technology And Libraries*, 20:129–134.

Straw, J. E. (2000). A virtual understanding - the reference interview and question negotiation in the digital age. *Reference & User Services Quarterly*, 39:376–379.

Sutton, B. (1993). The rationale for qualitative research: A review of principles and theoretical foundations. *Library Quarterly*, 63(4):411–430.

Vavrek, B. F. (1971). *Communications and the Reference Interface*. PhD thesis, University of Pittsburgh, Pittsburgh, PA.

Von Seggern, M. (1987). Assessment of reference services. *RQ*, 26:487–496.

VRD (2000). Facets of quality for digital reference services. virtual reference desk. Version 4.

VRD (2003). Facets of quality for digital reference services. virtual reference desk. Version 5.

Ware, S. A., Fannewald, J., Moyo, L. M., and Probst, L. K. (2003). Ask a penn state librarian, live: Virtual reference service at penn state. *The Reference Librarian*, 38(79/80):281–295.

Watson, K. D. (2001). Evaluating reference and information services. In Wallace, D. P. and Fleet, C. V., editors, *Library Evaluation: A Casebook and Can-Do Guide*, pages 79–104, Englewood, Colorado. Libraries Unlimited.

Weingand, D. E. (1997). *Customer Service Excellence: A Concise Guide for Librarians.* American Library Association, Chicago.

Weise, F. O. and Borgendale, M. (1986). Ears: Electronic access to reference service. *Bulletin of the Medical Library Association*, 74(4):300–304.

Westbrook, L. (1994). Qualitative research methods: A review of major stages, data analysis techniques, and quality controls. *Library & Information Science Research*, 16(3):241–254.

White, M. D. (1981). The dimensions of the reference interview. *RQ*, 20:373–381.

White, M. D. (1985). Evaluation of the reference interview. *RQ*, 25:76–84.

White, M. D. (2001). Digital reference services: Framework for analysis and evaluation. *Library & Information Science Research*, 23:211–231.

White, M. D., Abels, E., and Kaske, N. (2003). Evaluation of chat reference service quality: Pilot study. *D-Lib Magazine*, 9(2). Retrieved from: http://www.dlib.org/dlib/february03/white/02white.html (20 February 2003).

White, M. D. and Abels, E. G. (2004). Relationship between interaction characteristics and answer quality in chat reference service. Presentation at the 6th Annual VRD Conference. Retrieved from: http://www.vrd2004.org/proceedings/White_Abels_Agresta.htm (10 January 2005).

Whitlatch, J. B. (1990). Reference service effectiveness. *RQ*, 30:205–220.

Whitlatch, J. B. (2000). *Evaluating Reference Services: A Practical Guide.* American Library Association, Chicago.

Whitlatch, J. B. (2001). Evaluating reference services in the electronic age. *Library Trends*, 50:207–217.

Wilson, M. C. (2000). Evolution or entropy? changing reference/user culture and the future of reference librarians. *Reference & User Services Quarterly*, 39:387–390.

Woolsey, L. K. (1986). The critical incident technique: An innovative qualitative method. *Canadian Journal of Counselling*, 20(4):242–254.

EXAMPLE TRANSCRIPT FOR CHAT REFERENCE

Irene Tencinger's Virtual Reference Transcript from the Scott Library, York University (Toronto, Canada).

Winner LSSI's Samuel Swett Green Award for Best Virtual Reference Transcript, June 21, 2003.

(http://vrhome.virtualreference.net/greenaward/greenwinner6-21.htm)

All personal information has been removed to protect the privacy of the patron –

Patron: I have a research paper due on Monday. I have an idea of the topic but I can't find any resources related to it. Our Prof wants 6 scholarly journal articles. I'm not sure if I'm using the right index. I was using E-journal quick search

System: A librarian will be with you momentarily. Please review the information on the left to familiarize yourself with this service.

[..... a library staff member, is coming online...please wait.]

Librarian: Welcome to your virtual reference session. I'm looking at your question right now. I will be just a minute.

Librarian: Hi ...., what topic are you researching?

Patron: violence, and political corruption in Jamaica

Patron: oh, as well the economic instability

Librarian: ok and what course is this for? The reason why I ask is the indexes are organized according to subject.

Patron: social science

Patron: do you want to know the name of the course?

Librarian: no that is not necessary

Patron: ok

Librarian: There are a few indexes you can turn to for information. Unfortunately our shared browser is not working...

Librarian: Have you accessed the indexes before?

Patron: is the index the E journal

Librarian: No an index is a source that tells you what journals have articles that might be of interest on a particular topic.

Patron: would that be like the sociological abstracts

Librarian: An index usually gives you a citation and an abstract in some cases full text might be available. Yes sociological abstracts is an index.

Librarian: Are you familiar with using AND/OR?

Patron: oh, I've been there a couple of times but I forgot how to do it

Patron: I'm familiar with using And

Patron: but not OR

Librarian: ok I am going to try a preliminary search in social sciences abstracts.

Patron: thanks

Librarian: OR is a means to expand your search it instructs the index to look for either term. For example (violence or crime) will look for either term in the record

Patron: oh ok

Patron: how do I get to the indexes

Librarian: I did a preliminary search in the index I typed jamaica and violence and pulled up 15 records.

Librarian: We have a link on the library homepage under the eresources heading "find articles by subject"

Patron: ok, I used the same terms when I tried searching in the Expanded Academics Asap but nothing relevant came up

Librarian: For this topic you could then click on sociology and that will bring up a list of indexes most useful for that subject area

Librarian: Because you are looking at such a specific geographic location it is important to keep your search broad.

Patron: ok, when it says citation how can I pull it up

Librarian: In some indexes like Expanded Academic and social sciences abstracts it is possible to restrict your search to peer reviewed journals...

Librarian: To find the journal once you have the citation you would search on the journal name in the library catalogue.

Patron: what is a peer reviewed journal, and does it count as a scholarly source

Patron: what if it doesn't appear

Librarian: Peer reviewed is very scholarly. It means that in order to be published the article was reviewed by other experts in the field and approved it for publication.

Librarian: If no record appears in the catalogue it means we do not subscribe to the journal.

Librarian: Once you type the journal name be sure to click on the periodical button in the catalogue. If you click on title the catalogue thinks you are looking for a book.

Patron: what else can I look for in the E journal besides EXPANDED ACADEMIC

Librarian: In some indexes like social sciences abstracts and sociological abstracts the index will have holdings information at the bottom of the record. It will give you a call number for the journals we have.

Librarian: I would recommend sociological abstracts, social sciences abstracts...

Patron: are some available online

Librarian: the African studies index may also have articles that are useful. Some of the journals may be available electronically.

Patron: journals I mean

Librarian: In the indexes I just mentioned if a journal is available electronically there will be a link at the bottom of the record...

Librarian: I.R. it will say electronic journal "click here"

Patron: ok, and if not then it's print right

Librarian: if it is not available electronically we might have it in print, but we don't have all the journals that are indexed in the indexes.

Librarian: I am going to try a preliminary search in sociological abstracts to see what records I get.

Librarian: In sociological abstracts the search jamaica and violence pulled up 36 records... now the question is what kind of violence are you interested in. You also mentioned political corruption as well. What is the paper about?

Patron: the paper is about how the politicians are inter related with the gang leaders, and the violence I'm talking of, would be gang violence

Librarian: ok that would affect how I would do the search. I want to adjust it because the records don't look that promising.

Patron: that's what I had trouble with, but then no term I used were helping much

Patron: what terms would you use?

Patron: I found articles regarding my topic but no scholarly articles

Librarian: ok I am going to try a preliminary search. The index is a bit slow. I am going to try jamaica and politic* and (violence or corrupt* or gang*)

Patron: I found like newspapers

Patron: why the asterisks?

Librarian: the * looks for variant spelling after that point so corrupt* looks for corruption corrupted etc

Patron: oh ok

Librarian: I did that search in sociological abstracts and pulled up 15 records.

Librarian: they look promising.

Patron: ok, so I guess I'll try that

Patron: thanks a lot, you've been a big help

Librarian: to adjust the search you can look at the descriptors at the bottom of the record...

Patron: would that be like the subject

Librarian: for example to expand the search I can use those terms... yes it is like subject. Those words have been used in that index to identify that record...

Patron: ok

Librarian: if I use those words in my search I will pull up similar records to adjust the search I recommend....

Librarian: jamaica and politic* and (crime or gangs or violence or corrupt*). Crime is one of the descriptors as well as political change and political culture.

Patron: ok

Librarian: You will capture records that have political culture or political change through the politic*

Patron: alright, so is there anything else I need to know?

Librarian: I think that covers the basics. The key thing to remember is that AND narrows your search and OR expands it. Because you are looking at a specific geographic location it is best to keep the search broad.

Patron: ok, great thanks a lot

Librarian: If you find a journal article you like and the index does not contain holdings information check the catalogue the index is not always accurate.

Librarian: you are welcome

Patron: ok

Patron: thanks again

Librarian: if you have trouble or need further assistance you can always log back on.

Librarian: you are welcome have a good evening.

Patron: you can count on it

Patron: you too, bye.

Librarian: bye.

APPENDIX B

EXAMPLE WEB BASED QUERY FORM

IPL Ask A Question Form

Need an answer fast? Hundreds of our most popular questions and answers are listed on our Frequently-Asked Reference Questions pages.

* required information

Name*	[ ]	Be sure to give your complete e-mail address (example: fluggly@aol.com) so that we can reply. If you have parental or mail controls turned on, please add iplref@ipl.org to your allowed mail list.
E-mail*	[ ]	
Confirm e-mail*	[ ]	Enter the same e-mail address here that you did above. This helps to ensure that we have your correct e-mail address, and that you will receive a reply as quickly as possible.
Where do you live?	[ ]	Knowing where you live helps us recommend resources that are relevant, and accessible, to your area.
Deadline for reply*	[ ] (mm/dd/yy)	If you need an answer in less than three days, please consider these other resources instead of the IPL.
Subject*	[select... ▼]	Understanding the context and scope of your information needs helps us to deliver an answer that you will find useful.
How will you use this information?*	[ ]	
Is this for a school assignment?	○ Yes ○ No	

109

Are you a...
- [ ] librarian?
- [ ] teacher?
- [ ] businessperson?

Your question*

[text box]

A human being will read your question, so please use complete sentences. The more you tell us, the better the answer will be. What do you already know about your subject or question?

Type of answer preferred

○ A brief factual answer
○ Resources to explore:
- [ ] internet sources
- [ ] print sources
- [ ] either/or

Sometimes the information you want isn't available on the Internet, but might be available through a library near you. We can almost always get you started, at least.

Sources already consulted

[text box]

Knowing where you've already looked will help us keep from sending you someplace you've already been.

[Submit Question]

110

APPENDIX C

INFORMED CONSENT FORM

My name is Eylem Ozkaramanli and I am a doctoral student at the University of Pittsburgh, School of Information Sciences. Right now, I am working on my dissertation research and I am in the stage of data collecting. To collect my data, I am conducting interviews with the librarians who are performing chat reference services in Academic Libraries. The main aim of this research is to study librarians' perceptions of Digital Reference Services and create a criteria set for successful digital reference interaction.

The duration of this interview will be 30-45 minutes. Questions will be based on your experience on chat reference services and I will be asking you some general questions on chat reference as well as questions based on your experience which would involve you remembering some interactions held during your sessions. You will not be asked to reveal the identity of library patrons involved in these cases.

I deeply appreciate your participation to this research. Before we start this interview, I would like to inform you about your rights as a participant in this research.

- Your participation in this interview is voluntary, you are free to refuse to answer any question at any time and you are free to step aside from the interview at any time.

- This interview will be recorded and the tapes will be kept confidential and be used only for scholarly research.

- Interviews will be collected and recorded in a manner that subjects cannot be identified through identifiers linked to the subjects by use of special numbers.

- Your name or any personal information will not be used in any publications or presentation that may result from this study.

- This research does not create any risks to you.

If you have further questions, don't hesitate to contact me at eyo1@pitt.edu or (412)606-0519.

Could you please sign this form to show that I have read you its contents and that any questions you have have been answered to your satisfaction..

name and signature... date ....

APPENDIX D

LIBRARIAN PROFILE FORM

1. Date of the interview: ....

2. Time of the interview: ....

3. Place of the interview: ....

4. Sex: ....

5. Degrees held:

    B.A./B.S. .... year ....

    M.L.S. ....year ....

    other ....year ....

    other ....year ....

6. Present position: ....

7. Name of the institution of present position: ....

8. Hours per week providing chat reference service:...

9. Number of years/months experience in chat reference service:.............................

10. Number of years/months on overall traditional reference desk experience ....

APPENDIX E

INTERVIEW QUESTIONS

1. How do you define chat reference service?

2. Can you compare the interview in digital reference service to the traditional face-to-face reference one? By means of:
   - their similarities..
   - their differences..
   - their advantages/disadvantages over each other..

3. Thinking back, can you recall a chat interaction that you would consider particularly very successful.
   - Can you please describe it.
   - What were the particular elements that you think made it very successful?

4. Thinking back, can you recall a chat interaction that you would consider particularly less successful?
   - Can you please describe it.
   - What were the particular elements, that you think, made it less successful?

5. Do you have any suggestions on how to improve the quality of chat reference service?

MAIN STUDY CATEGORY SCHEME

I Chat Reference Characteristics
   1. Positive Characteristics
      a. Availability over distance (22)
      b. Anonymity offered to users (10)
      c. Allows Synchronous interaction (6)
        i. allows more interaction (2)
        ii. helps student become independent learners (2)
        iii. good instruction tool (2)
      d. Software related/useful features
        i. allows co-browsing (11)
        ii. allows page-pushing (6)
        iii. sends transcripts automatically (6)
        iv. provides canned phases (5)
        v. keeps statistics (2)
        vi. allows highlighting (2)
        vii. allows bookmarking (2)
        viii. ability to send out automatic surveys (2)
        ix. ability to save/sort transcripts (1)
   2. Deficiencies
      a. Technical and/or software related
        i. authentication/sign-in problems (8)
        ii. co-browsing/license problems (8)
        iii. drop-off calls/disconnection problems (7)
        iv. proxy/connection problems (5)
        v. time-delay problems (4)
        vi. compatibility with all computer platforms (3)
        vii. compatibility with databases (2)

viii. lack of indication to show a coming question (2)

  ix. need more user-friendly interface (2)

   x. bandwidth problems (2)

  b. lacks audio/visual clues (23)

  c. lacks personal touch (10)

  d. have time pressure (8)

  e. acceptance of service may be low (8)

II Attitudes of Librarians' and Users

  1. Librarian aspects

    a. Knowledge-base and skills

      i. communication skills/strategies (11)

     ii. knowledge of reference work/sources (10)

     iii. comfort level with chat(8)

     iv. broad based education (3)

    b. Attitudes

      i. ability to adjust to new format (10)

     ii. ability to deal with the unexpected (10)

     iii. willingness to go back and read transcripts (6)

     iv. willingness to share experiences with colleagues (3)

     v. ability to develop relationship with the user (3)

  2. User characteristics [This category identifies users positive and negative characteristics throughout chat reference interactions by means of librarians' perceptions.]

    a. Successful interactions

      i. familiar/comfortable with chat (10)

     ii. appreciative (14)

     iii. know what they want (8)

     iv. receptive of new knowledge (3)

     v. easy to communicate with (2)

     vi. have research skills (1)

    vii. familiar with library databases (1)

    b. Less Successful interactions

      i. communication difficulties (10)

       – impatient user (6)

       – demanding user (5)

       – frustrated user(4)

       – unengaged user (2)

     ii. knowledge-base

        – unable to frame questions (5)

        – does not know the basics (2)

        – does not have technical skills (2)

     iii. questions from other institutions (1)

III Efficiency of reference interview and question negotiation

    1. Characteristics of effective interviews (7)

       a. find out exactly what they want (12)

       b. verify that you are giving the info that they are looking for (4)

       c. give them choices on how much time they want to spend (1)

    2. Librarians presence (4)

       a. it shouldn't sound like automated system (1)

    3. Question negotiation

       a. Challenges with question types

         i. complex questions (12)

         ii. specialty questions (9)

         iii. information that is not available (1)

       b. Challenges with service location

         i. providing chat at reference desk (6)

         ii. providing chat from home (4)

         iii. providing chat from the office (1)

       c. Challenges with other institutions/outside questions (3)

         i. different resources/procedures/proxy (6)

         ii. study information on other institutions (1)

       d. Challenges with serving more than one patron (6)

         i. option not to take it/make yourself unavailable (2)

         ii. option to have another librarian available to transfer if necassary (1)

       e. Common/Routine questions (8)

         i. finding article/journal or database related (10)

         ii. system related/technical questions (8)

         iii. library function related (8)

         iv. chat is better platform for quick reference (3)

IV Service improvement and management suggestions

    1. Software related

       a. operate without malfunction (7)

       b. software provider and librarian interaction

       c. should be simple/easy to use (8)

   d. should have manuals for functions/features (5)

   e. video/VOIP to improve interaction (10)

   f. should provide access to certain printed resources (6)

   g. should have a database of questions to share/build knowledge base (2)

   h. should show where students are coming from (2)

   i. should not have download requirement (2)

   j. should push presentations/tutorials (2)

   k. upgrades should be tested (2)

   l. should provide system reliability (2)

   m. should provide quicker response time (1)

   n. should have technical support (1)

2. Team work (2)

   a. get more librarians to participate (4)

   b. get support from library administrator (1)

   c. create policy development (1)

3. Enhancement of digital resources (5)

   a. aware of what is available (1)

4. Hours of operation (1)

   a. find out best times to reach students (7)

   b. provide more hours (2)

   c. provide late hours (2)

5. Collaboration related (4)

   a. need better routing of calls (3)

   b. essential to have your own seats (2)

   c. need better question transfer (1)

   d. need shared databases (1)

V Training and review

1. Participate in formal training (12)

   a. real interaction type (2)

   b. librarians pair up (1)

2. Practice more/hands on experience (13)

   a. practice with someone else (2)

   b. provide service on regular basis (2)

   c. watch someone else doing it (1)

   d. practice before going live (1)

3. Follow guidelines/procedures (2)

4. Discuss it within department (1)

5. Be aware of the upgrades (1)

VI Publicity and User Awareness
1. Market it (8)
2. Make it visible (5)
    a. make it accessible from many pages including databases (6)
    b. provide linking on the main Web-page (6)
3. Generate popularity (4)
    a. provide good/efficient service (4)
    b. importance of 'word of mouth' (1)
4. Use newsletters/posters/table tents/postcards/newspaper articles (5)
5. Provide instruction sessions (3)
6. Reach the advisers/professors (1)

CRITICAL INCIDENTS CATEGORY SCHEME

I Attitudes
  1. Librarian Attitudes and Skills
    a. Knowledge-base
      − knowledge of reference work/sources
      − broad based education
    b. Communication skills/strategies
      − ability to make quick decisions
      − ability to keep patron engaged
      − confidence and comfort level
  2. User Attitudes and Characteristics
    a. Successful Interactions
      − familiar/comfortable with chat
      − patient/willing to wait
      − appreciative
      − know what they want
      − just need pointers
      − receptive of new knowledge
      − easy to communicate with
      − have research skills
      − have database skills
    b. Less-successful interactions
      − communication difficulties
        ∗ no basics knowledge/ technological skills
        ∗ inability to frame the question
          · weak question
          · questions with no answer
      − users who log off before you finish your answer

          – users who wants you to do the work
          – impatient users
          – demanding users
          – frustrated users
          – unengaged users
          – outside users

II Question Negotiation and Resources
    1. Question types
        a. Challenges with Complex/specialty questions
          – chat is not a good platform
          – hard to perform in-dept reference interview
          – recommend to come in/call
          – refer to subject specialist
          – call & ask subject librarians/collaborate
          – get them started
          – follow up
        b. Routine questions
          – easier to answer
        c. types of common questions
          – finding article/journal or database related
          – system related/technical questions
          – library function related
        d. Non-academic questions
        e. Other institutions/outside questions
          – need to learn different resources/procedures/proxy
          – must learn other institutions libraries
          – some are difficult to deal with
    2. Serving to more than one patron
        a. must have an option to make yourself unavailable
        b. must have a transfer option/another librarian available
    3. Inadequate resources
    4. Questions with no answer

III Technology and Software
    1. Positive Characteristics
        a. available over distance
        b. allows synchronous interaction

      c. helps student become independent learners

      d. is a good instruction tool

         – allows co-browsing

         – allows page-pushing

  2. Deficiencies

      a. authentication/sign-in problems

      b. proxy/connection problems

      c. lost patrons/drop calls problems

      d. incompatible with databases

      e. lack of audio/visual clues

         – hard to understand what they really want

         – typing is time consuming

         – face to face interaction is preferred

IV Location and Hours

  1. Advantages of remote accessibility

      a. availability of virtual reference desk

      b. ruling out the location barriers

  2. Disadvantages due to the service location

      a. at reference desk

         – priority issue

      b. at home

         – have to rely on digital resources

         – no access to physical library/resources

         – isolation from other librarians - no collaboration

  3. Hours

      a. should provide night/late hours

      b. should provide more hours

APPENDIX H

CHAT REFERENCE EVALUATION CRITERIA AND MEASUREMENT

I Librarians' Personal Criteria for Measuring Performance
  1. My general knowledge-base and skills
      a. Are my communication skills/strategies adequate
          i. When dealing with an impatient user
         ii. When dealing with a demanding user
        iii. When dealing with a frustrated user
         iv. When dealing with an unengaged user
          v. When dealing with an unexpected question
      b. How comfortable am I using chat reference service
          i. Am I aware of the available capabilities
         ii. Am I following the guidelines/procedures
        iii. Am I discussing it within the department
      c. Did I participate in formal training for chat reference
      d. Am I participating in ongoing chat reference training sessions
      e. Did I practice it adequately/did i get enough hands on experience
          i. Did I practice it with someone else
         ii. Did I provide/practice service using on regular basis
        iii. Did I watch someone else doing it
      f. Am I using the chat reference service experience to improve myself
          i. Do I go back and read transcripts
         ii. Do I share my experiences with colleagues
        iii. Do I get good feedback from the colleagues
         iv. Do I get good feedback from the users
  2. My chat reference interview performance
      a. Am I finding out what exactly they want effectively
      b. Am I verifing that the information given is what they are looking for
      c. Am i giving them choices on how much time they want to spend

      d. Am I being instructive
         i. Am I helping users become independent users
        ii. Am I guiding them through their research
       iii. Am I providing them more hands on experience

II Librarians' Evaluation of Chat Reference Software

  1. Does it have essential features
     a. Does it allow co-browsing
     b. Does it allow page pushing
     c. Does it send/save transcripts automatically
     d. Does it generate of statistics
     e. Does it send automatic surveys
  2. Do its technical capabilities meet the following criteria
     a. Operates without malfunction
     b. Does not require any download
     c. Is free of authentication/sign-in/license problems
     d. Is able to re-connect the user when disconnected
     e. Is simple/easy to use
     f. Has user-friendly interface
     g. Is compatible with all computer platforms
     h. Is compatible with databases
     i. Has a clear indication of an incoming question
     j. Has manuals for functions/features
     k. Shows where students are connecting/coming from
     l. Provides a reliable system
     m. Provides quick response time
     n. Upgrades are reliable
     o. Has technical support
     p. Has capabilities to improve interaction
        i. Has video/VOIP
       ii. Provides access to sufficient printed resources
      iii. Has a database of questions to share/build knowledge base
     q. Is able to use software collaboratively
        i. Has good routing of calls
       ii. Has a good question transfer mechanism
      iii. Provides institutions their own seats

III General Service Publicity and User Awareness Criteria

1. Is the service visible
   a. Is it accessible from many pages including databases
   b. Is it linked on the main Web-page
2. How well is it marketed/how popular is it
   a. Are newsletters/posters/table tents/postcards/newspaper articles being used
   b. Has it been mentioned in library instruction sessions
   c. Are advisers/professors aware of it/using it
   d. Is it spreading by 'word of mouth'

APPENDIX I

SCREEN SHOT OF THE PENNSTATE 'ASK' E-REFERENCE PAGE
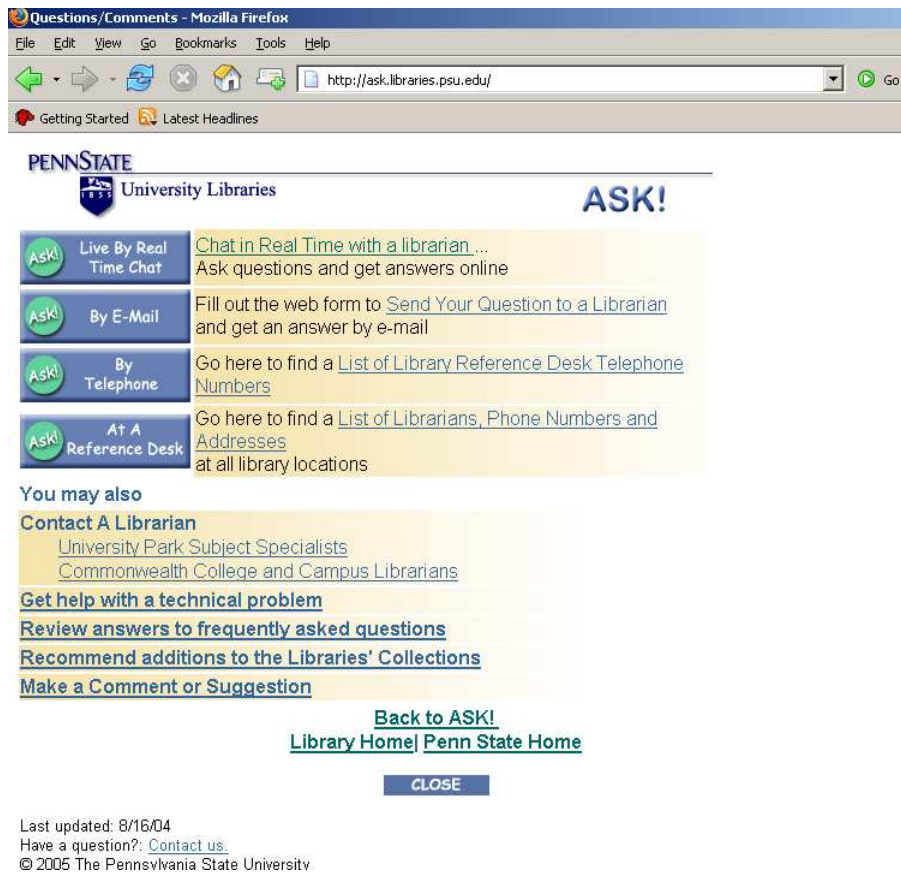
APPENDIX J

SCREEN SHOT OF THE PENNSTATE
VIRTUAL REFERENCE SERVICE ENTRY PAGE
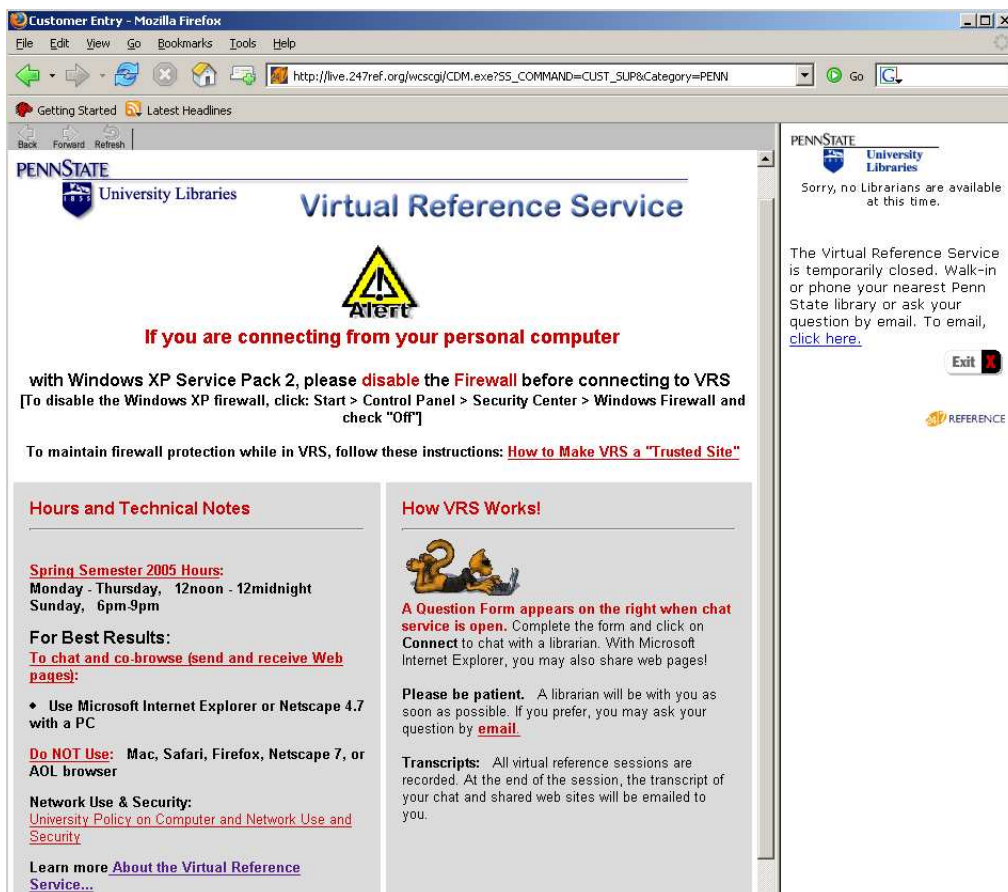
APPENDIX K

SCREEN SHOT OF THE OHIO STATE UNIVERSITY
'ASK A QUESTION' MAIN PAGE
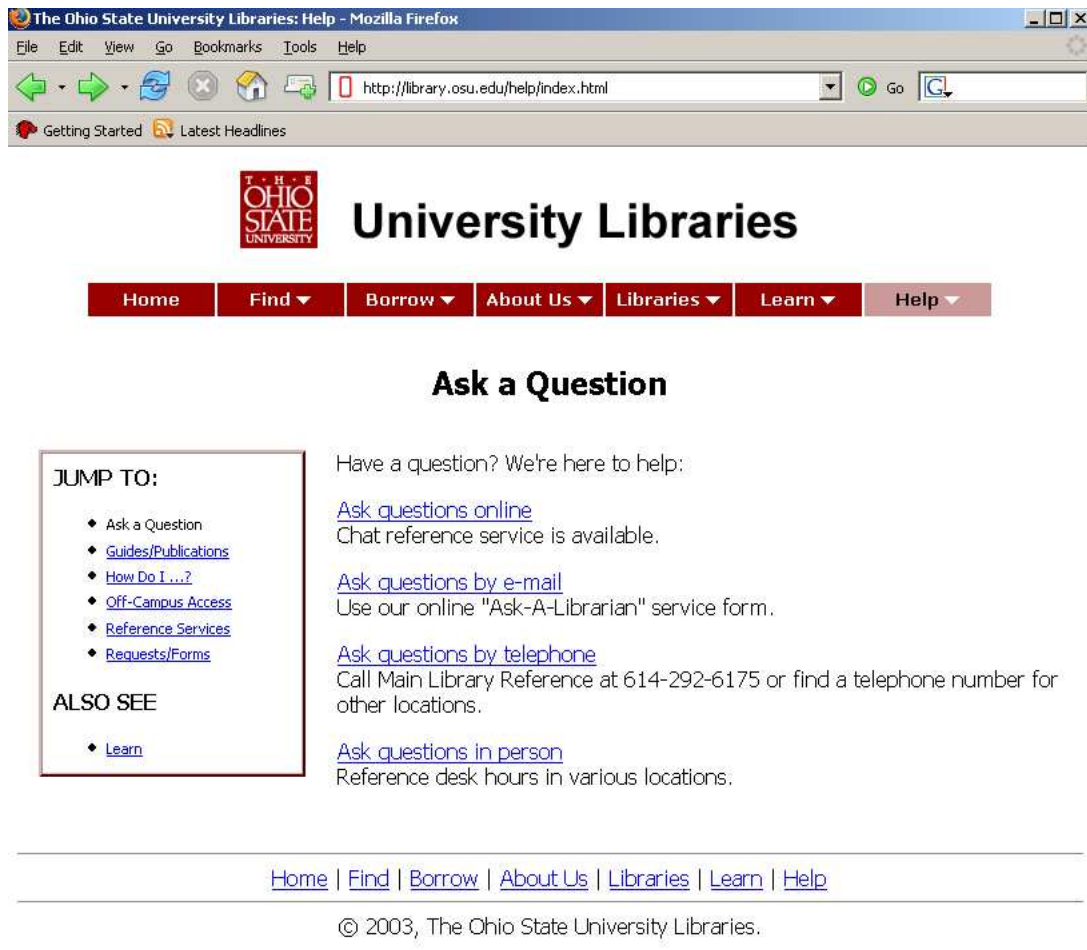
APPENDIX L

SCREEN SHOT OF THE OHIOLINK INSTITUTION SELECTION FORM

APPENDIX M

SCREEN SHOT OF THE OHIOLINK AUTHENTICATION FORM