

TOWARDS SUSTAINING PROFESSIONAL DEVELOPMENT: IDENTIFICATION
OF ESSENTIAL COMPETENCIES AND EFFECTIVE TRAINING TECHNIQUES
FOR CHAT REFERENCE SERVICES

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ABSTRACT

LILI LUO: Towards Sustaining Professional Development: Identification of Essential Competencies and Effective Training Techniques for Chat Reference Services
(Under the direction of Jeffrey Pomerantz and Claudia Gollop)

This dissertation seeks to determine the essential chat reference competencies and the effective training techniques to deliver them. Two survey studies were conducted to examine chat reference practitioners' perceptions of competencies and training techniques reported in the literature. As a result, prioritized lists of chat reference competencies and training techniques were produced, respectively. The examined competencies could be broken down into four categories: 1). Media-independent core reference competencies; 2). Reference competencies highlighted in the context of chat reference; 3). Reference competencies specific to chat reference; and 4). Reference competencies not as important in chat reference. In terms of training techniques that could deliver the essential competencies, the most effective ones are those enabling practice-based learning.

Findings from the dissertation study can be used as the basis to design and implement training and education programs to professionally prepare chat reference librarians and eventually lead to better performance of the service and better fulfillment of users information needs.

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Chapter I. Introduction

In the past half century, the exponential growth of new technologies has changed library reference services in many ways. The widespread availability of computers, massive storage technology and the Internet not only increases the availability and accessibility of electronic reference resources for library users, but also expands the media through which reference services are provided. Among the recent reference developments nurtured by technological advancement, chat reference has been the focus of attention from both researchers and practitioners. The literature has revealed numerous efforts exploring different aspects of chat reference and this dissertation study makes contributions along that line by examining competencies and training for chat reference practitioners. The transformation that library reference has undergone requires professionals to stay competent and current in order to keep up with the constant changes in the field; and the professional preparation for reference librarians is the pivotal approach to ensure quality performance. Thus, in hope of enhancing the professional development of reference personnel and better preparing them for chat reference service, this dissertation takes an initiative to explore the essential competencies for chat reference librarians and effective training techniques that could deliver these competencies to them.

In this dissertation a validation study for chat reference competencies and an evaluation study for chat reference training techniques are presented, in an attempt to

further the research on the training/education aspect of chat reference beyond the service-specific discussions prevailing in current literature, and explore this topic from a general perspective.

1.1. Study Background

1.1.1. Chat Reference

Dedicated to the mission of providing personalized, value-added professional service to users at the point of their need and to maintaining the enduring values of librarianship (Ferguson & Bunge, 1997; Gorman, 2001), libraries have been striving to reach users by any possible means. Other than the long-standing, well-established face-to-face reference communication, numerous attempts have been made over time to deliver the service through channels of mail, telephone, Teletype, email and online real-time chat (Ryan, 1996; Janes, 2003). These last two examples of the evolution of reference media are enabled by the rapidly growing availability of computers and the Internet, and are generally referred to as digital reference, where human-intermediated assistance is provided through digital media in fulfillment of users' information needs (Pomerantz, 2003). Figure 1-1 provides an overview of the hierarchy of digital reference service.

While email reference only allows asynchronous interaction between users and librarians, online real-time chat reference makes it possible for the two parties to exchange messages in real time so that users can receive immediate assistance from librarians, either through a simple text-based instant messenger, or via fairly complex

commercial chat software that supports page pushing, co-browsing and other advanced functionalities.

However, there has not been a consensus on the terminology of chat reference service so far and a bewildering variety of phrases have been adopted to refer to it, such as real-time reference, live online reference, synchronous online reference, and virtual reference, etc. (Heise & Kimmel, 2003). Despite the confusion of vocabulary, the immediacy and interactive nature of the service are consistent. In this study, the terms *online real-time chat-based reference*, or in short, *chat reference*, will be used to describe this service because, as a well-known term illustrating online communication, “chat” can vividly and descriptively convey the key characteristics of the service.

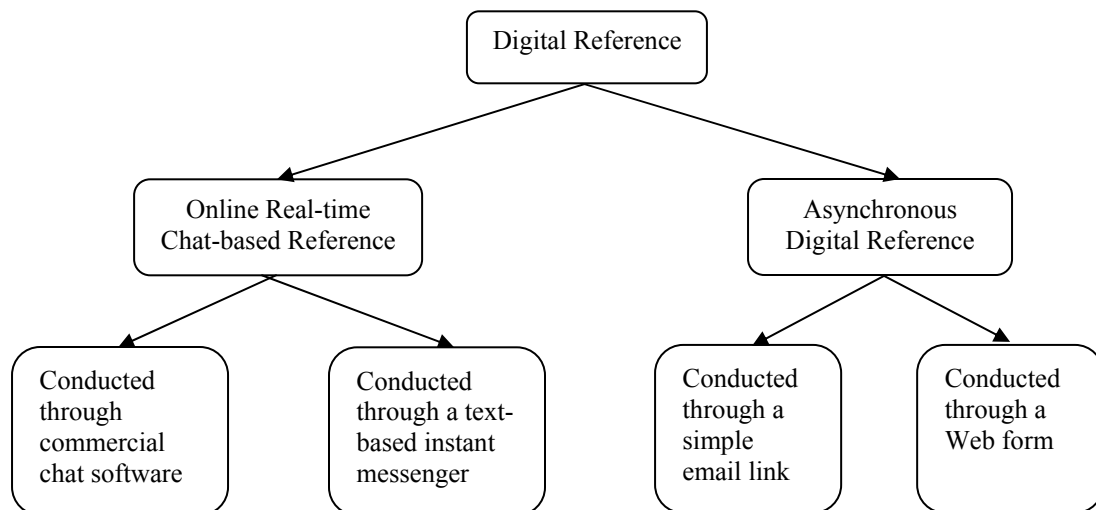


Figure 1-1. Hierarchy of digital reference

Effective provision of reference service requires a certain set of skills and knowledge, or competencies. As in all the other professions, competencies are the essence of librarianship (Jones, 2003). Forcefully stressing the role they have played, Jones (2003) stated that “it is our unique competencies that make our profession

indispensable to our communities, clients and constituencies” (p. 12). This point of view has been well-recognized in the reference literature, which is never short of discussions regarding reference competencies.

Chat reference is a reference conduit completely based on real-time electronic interaction. The fundamental principle stays the same across all reference services – assisting users in fulfilling their information needs. But when it comes to the process of how reference services are conducted, chat reference has set itself apart from email-based or face-to-face reference. In her dissertation study of the comparison between face-to-face, email and chat reference services, Ford (2002) listed the distinguishing features of the three services, concluded that the media have a significant impact on reference service, and suggested the implications of media-specific differences inherent with the three services be taken into serious consideration in conducting library reference work. This conclusion acknowledges the contextual differences associated with reference media, and thus, warrants a closer examination of reference competencies in different contexts. General reference competencies need to be closely scrutinized from a context-specific perspective, and the need for new competencies in a particular reference venue such as chat, has to be keenly recognized as well.

Lankes (2004), in discussing the research agenda for digital reference, proposed four significant conceptual lenses to represent “a set of clear and pressing issues in digital reference (as expressed by researchers and the practice community)” and “broad concerns encompassing a large potential audience of scholars, funding institutions, and practitioners”(p.306). One of the four lenses is “behavior”, and the objectives of professional “behavior” are embodied in competencies. Professional competencies not

only provide performance guidelines and set standards for digital reference, but also constitute the basis for training and education to achieve the expected performance. Thus, it is critical to identify those competencies, devise appropriate education and training programs to deliver them, and incorporate them in service provision.

1.1.2. Competency

Competency and competence both refer to the state or quality of being adequately or well qualified, but they cannot be used interchangeably. Gonczi, Hager and Oliver (1990) proposed three key elements to be included in the definition of competence:

- **Attributes.** Professional competence derives from the development and possession of a list of relevant attributes such as knowledge, abilities, skills and attitudes. These attributes, which jointly describe competence, are often referred to as competencies. Thus, a competency is a combination of the attributes manifesting a particular aspect of competent performance.
- **Performance.** Competence is focused on performance of a role, or in a domain, both of which consist of a multitude of tasks and sub-tasks.
- **Standards.** Competence involves the establishment of appropriate standards that professional performance is expected to live up to.

This definition suggested that competence is a holistic concept and competencies are an attempt to describe it. Harris, Guthrie, Hobart and Lundberg (1995) echoed this point of view by stating that “key or generic competencies are the mortar and play a vital role in creating a solid structure to describe or represent an image of what competence is” (p.25).

Since competency is defined as a combination of attributes describing competent performance, the terms mostly associated with it include knowledge, skills, attitudes, behaviors, and understandings, among others (Friedrich, 1985). A variety of definitions of competency exist in the literature, but the one proposed by Griffiths and King (1986) is adopted as the working definition of competency in this dissertation:

“A competency is a generic knowledge, skill or attitude of a person that is causally related to effective behavior as demonstrated through external performance criteria” (p.123).

Three components were included in this definition (p.31-33):

- **Knowledge.** Knowledge is having information about, knowing, understanding, being acquainted with, being aware of, having experience of, or being familiar with something, someone or how to do something.
- **Skill.** Skill is the ability to use one’s knowledge effectively.
- **Attitude.** Attitude is a mental or emotional approach to something or someone.

For each component, several sub-types are identified to further illustrate the definition. Details of the different sub-types can be found in Appendix I.

1.1.3. Education & Training

Librarians’ possession of competencies can be accomplished through well-designed education or training programs. However, no clear consensus has evolved on the role of education and training in facilitating the learning process. Hauptman (1989) defined reference education by breaking it to five components: formal sequence of courses as part of the master’s degree; on-the-job training; continuing education; evaluation and acquisition of substantive, multidisciplinary knowledge. This definition of

education is a broad umbrella that covers almost every aspect of learning activities of reference librarians, including training.

On the contrary to Hauptman's approach, some other researchers are inclined to distinguish training from education. Snook (1973) defined training as preparing people in a narrow way for a specific job, position, or function, while education involves preparing them for life in a broader and more inclusive sense. Based on a literature review on education history, Harris et al. (1995) concluded that although there has not been a general agreement on how to define education, one distinction between education and training was that the term "education" tended to be associated with general school education and universities, whereas "training" was mostly used in the milieu of technical and vocational colleges, on-the-job training, and in some countries, vocational programs within secondary schooling.

If broadly perceived, education and training can be placed on a continuum ranging from very broad holistic personal development to very narrow and specific development of skills with essential knowledge. Given the practical nature of librarianship, library education inevitably involves the delivery of particular skills entailed by professional positions and the instructional techniques are always intertwined with training approaches. In other words, library education and training share an overlapping area along the aforementioned continuum and cannot be distinctly separated. Thus, in this dissertation, education and training are only defined in a narrower context, where education is associated with formal schooling and delivered through formal courses, and training takes place in the form of workshops or short courses at a vocational setting, such as on-the-job training.

1.2. Problem Statement & Research Questions

The library world's vigorous exploration of chat reference has been manifested in numerous case studies and discussions of emerging standards and best practices, and peaked in a model process proposed by Pomerantz (2005), which can serve as the conceptual framework for future research. Not surprisingly, studies of chat reference competencies and training have a prominent representation in the literature, indicating common concerns and interest in better preparing librarians for the provision of chat reference. However, most of the studies were restricted to a certain context and unable to render any general conclusion that might benefit the entire field. Detailed discussion of the problem of current literature and purpose of the dissertation study is presented below.

1.2.1. Current State of Literature on Chat Reference Competencies

Literature on chat reference competencies can be grouped into three main categories:

- Checklists of competencies created by individual projects or collaborative services to serve as the basis for training or education (Q and A NJ project, 2004; Ontario Collaborative Virtual Reference Project , 2004; Maryland ASKUSNOW, 2003; Florida State University Ask a Librarian, 2004; Kawakami & Swartz, 2003; Tucker, 2003; Hirko & Ross, 2004; Harris, 2004; Salem, Balraj, & Lilly, 2004);
- Competency statements developed by professional organizations or research initiatives in the attempt to outline the competency areas for chat reference (Digital Reference Education Initiative (DREI), 2004; Reference and User Services Association (RUSA), 2004a, 2004b);

- Discussions of competencies in monographs on implementing and managing chat reference service (Ronan, 2003; Coffman, 2003; Meola & Stormont, 2002).

All the above studies focused on competency identification, employing methods from brain-storming of a responsible committee, reviewing existing literature, to eliciting input from experienced chat reference librarians. Needless to say, these earnest competency identification efforts have laid out the groundwork for chat reference competency research, but most of them were discrete and associated with a particular project, such as an individual chat reference service provided at an academic/public library, or a chat reference consortium participated by a variety of libraries.

As it is with face-to-face reference service, the delivery of chat reference service can be affected by multiple variables, such as work setting (e.g., public, academic, health science library), provision venue (e.g., instant messengers, commercial chat software), and service mode (e.g., stand-alone service, collaborative consortium). The existing literature on chat reference competencies is primarily descriptive in nature with a focus on individual cases, lacking exploratory endeavors to examine the relationship between these contextual variables and chat reference competencies. Without taking into consideration effects of the different dimensions, a more thorough understanding of chat reference competencies cannot be achieved.

A few case-independent efforts undertaken by professional organizations or research initiatives (DREI, 2004; RUSA, 2004b) have made an attempt to generate competency statements that indicate behavioral objectives for chat reference librarians in general. However, methods employed in these efforts were either committee

brainstorming or literature reviews, and no empirical research was involved. Whether or not these competency statements are a representative list of chat reference competencies, and whether or not they are of equal importance to the practice of chat reference, are left unanswered. The ultimate goal of competency development is to facilitate training and education, whose precious resources should be allocated to top items on a prioritized competency list. There are two stages of competency research – identification and validation (Griffiths & King, 1986) – and the current literature is abundant with competency identification studies. Little research has been conducted to date on validating competencies identified from various sources in terms of their value to the chat reference profession. Training and education requirements cannot be fully established without chat reference competency research being furthered toward the second stage.

1.2.2. Current State of Literature on Chat Reference Training

One immediate application of chat reference competencies is to incorporate them into training and education programs. The literature on chat reference training is mostly composed of reports of the development of training programs for chat reference service (Tucker, 2003; Kawakami & Swartz, 2003; Martin, 2003; Salem et al., 2004; Elias & Morrill, 2003; Hirko & Ross, 2004; Lipow, 2003; Lipow & Coffman, 2001). A variety of training techniques have been proposed in the literature, but none has been evaluated so far. Undoubtedly, the goal of a chat reference training program is for learners to attain certain specified competencies. The assessment of learners' mastery of these competencies is a reasonable measure to gauge the extent to which the program goal is achieved. However, it does not necessarily have the power to measure the effectiveness of the program. Evaluation of how effective a program is in terms of assisting learners in

mastering competencies cannot be obtained without considering the learners' perceptions of the program design and delivery methods. Or, said in other words, it cannot be obtained without considering the pathways created by the program to lead learners to their objectives. Few studies to date have examined chat reference training from the evaluation perspective, and a thorough understanding of how training helps librarians achieve chat reference competencies call for research that aims to scrutinize current training techniques for their effectiveness.

1.2.3. Study Purpose and Focus

Recognizing what has been missing in the literature, this dissertation seeks to fill the blank by conducting a validation study for chat reference competencies and training techniques. With chat reference competencies identified from the literature as the basis, the study elicits input from a variety of chat reference practitioners regarding the role of these competencies in providing chat reference service. The validation effort results in a list of competencies ranking in the order of essentialness reported by the chat reference practitioners. This prioritized list then leads to the second stage of the study – evaluation of training techniques that could deliver the essential competencies on that list. Chat reference training literature is reviewed to identify currently used training techniques, and chat reference practitioners are asked to evaluate them in terms of their effectiveness in delivering corresponding chat reference competencies. The two stages of the study are presented in the following concept map (Figure 1-2), which delineates the focus and the logic flow of the study, providing an overview of where the study is going and what it aims to accomplish.

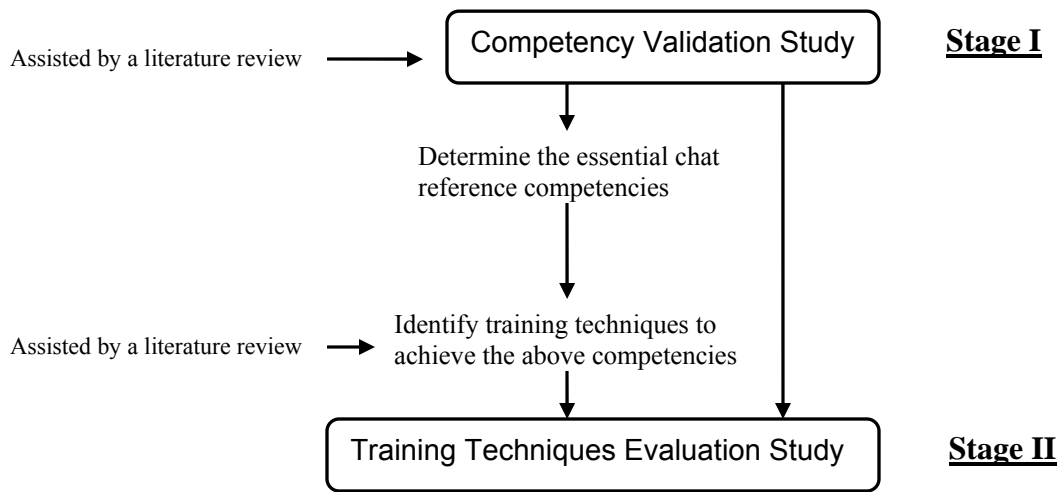


Figure 1-2. Study outline

Getting beyond the current spate of case studies and exploring chat reference competencies and training from an overarching perspective, this research attempts to deepen the professional understanding of chat reference and establish a foundation for general chat reference training and education. As a result, the study produces a framework that encompasses essential chat reference competencies and effective training techniques to deliver them. This framework shall be customizable to meet the needs of professional preparation for chat reference librarians in a variety of contexts.

1.2.4. Research Questions

The study is seeking answers to the following research questions:

- What are the essential competencies that librarians need to master in order to provide chat reference service?
- What are the effective training techniques that could deliver the essential chat reference competencies?

- How do context variables such as service mode, work setting and provision venue, etc., correlate with chat reference competencies/training techniques?

1.3. Theoretical Perspectives

The dissertation study is built upon two theoretical grounds – Griffiths and King’s (1986) competency achievement model; and the educational concept of competency-based education/training (CBE/T).

Griffiths and King (1986) proposed a model to depict the process of how competent professional performances are obtained in an increasingly dynamic working environment. As indicated in Figure 1-3, this process is represented in a five-stage cycle starting from the recognition of competency needs to the demonstration of competency achievement. This model can serve as conceptual context for the dissertation study.

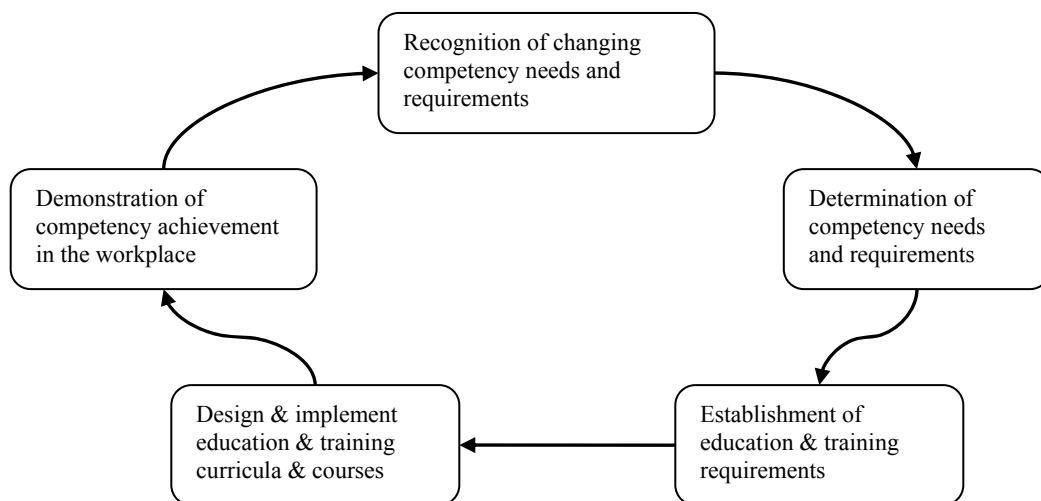


Figure 1-3. Griffiths and King's competency achievement model

The beginning phase of the above cycle, “recognition of changing competency needs and requirements”, has been revealed in the literature. Numerous efforts studying how to better prepare librarians for chat reference service have demonstrated the

increasing need for more exploration of chat reference competencies. Furthering current research by taking a holistic approach to examine chat reference competencies and training, the dissertation study fits into the next two phases, “determination of competency needs and requirements” and “establishment of education & training requirements”. Results of the study constitute a solid basis for the phase of “design & implement education & training curricula & courses”, and eventually lead to the final phase of the cycle, “demonstration of competency achievement in the workplace”.

CBE/T is an approach to developing curricula from an analysis of roles to be filled upon completion of the educational or training program (Wang, 2005). Different from the holistic or humanistic educational approach that concentrates on general personal development, CBE/T represents concepts of education that are defined by “precise outcomes resulting in claimed practical applications of knowledge that are relevant and measurable” (Harris et al., 1995, p.34). It is a behavioristic educational alternative and can be implemented in the training and education for chat reference, given the practical nature of librarianship. The ultimate goal of determining chat reference competencies is to deliver them to librarians. Appropriate education and training programs ought to be established on the conceptual foundation of CBE/T to create an effective delivery conduit. This dissertation research considers CBE/T as the guiding theory when operationalizing the chat reference competency validation and training evaluation studies.

1.4. Significance of the Study

This study makes significant contributions on both the theoretical and the practical level.

Librarianship, as a profession, is partly established on a comprehensive body of knowledge and specialized skills. Such knowledge and skills are mostly acquired through professional preparation – formal education or vocational training. Education is the essential way to obtain requisite qualifications of librarianship, whereas training plays a vital role in continuously preparing librarians with what they need to competently deal with changes occurring in the profession.

Efforts of defining qualifications of librarianship did not begin until 1920s. Prior to that, librarians relied on practical experience such as apprenticeship, inquiry, reading the literature, and sharing of experiences through participation in activities of professional organizations, for their work in libraries (Vann, 1961). The first serious treatment of library education was considered to be Tai's (1925) dissertation. He tackled the problem of lack of a systematic body of knowledge about the qualifications of librarianship and proposed a curriculum based on an analysis of environmental factors that produced libraries and related services. Since then, a considerable number of studies have been conducted to explore the educational needs of librarians, determine qualifications for different levels and different categories of library work, and establish the theoretical basis for curriculum development. These studies have shaped the educational landscape of the profession.

While school education provides basic qualifications for library professionals, vocational training is a critical part of their ongoing career development. Only through up-to-date training can librarians expand their knowledge and refine their skills in response to the changes brought by a series of social and technological development. In discussing the value of library training, Creth (1986a) characterized improved job

training as “an unrealized source for library effectiveness” (p. v). She made a forceful statement to highlight the importance of training (Creth, 1986b):

“Without a planned program of training and development, chaos tends to result as change is continually introduced. This in turn can lead to inadequate services, poor staff morale and high turnover, and eventually a diminished view of the library...”(p. 18-19).

Creth’s acknowledgement of training’s value has been echoed by other researchers. Peters (1990) stated that training is not only necessary to enhance workforce skills, but also an indispensable requirement to guard against a decline of the prevailing skill level. Lee (1993) considered training as an empowering process where librarians learn to do things differently, and hence produce different results that eventually lead to organizational renewal and increased effectiveness.

In addition to the above stated needs for training, avoiding possible technostress is another force driving the training vehicle. Brod (1982) coined the term “technostress” and defined it as a condition resulting from the inability of an individual or organization to adapt to the introduction and operation of new technology. Pitkin (1997) expressed the concern of constant changes in libraries brought by technology advancement being a source of technostress for librarians. Technostress not only caused low staff morale, but also low-quality services that users would ultimately suffer. Thus, providing effective training to librarians in a changing working environment has become the key to maintain a flexible, efficient and productive library workforce.

As a product of Web technologies and reference concept combined, chat reference has posed new challenges to librarians’ skill inventory. Decomposing the learning process of chat reference librarians, this dissertation seeks to explore their competency and training needs, and therefore, provide an in-depth understanding of how to better

prepare librarians in staffing chat reference service. In a practical sense, results from this study could inform chat reference administrators of what kind of training is appropriate to deliver what competencies in what context, so that more effective training programs can be designed for chat reference practitioners. Eventually, chat reference service quality will be enhanced and users will be better served.

In an abstract sense, this study makes contributions to the establishment of training/education models for chat reference. Most of the research on digital reference has involved empirical studies with very few attempts in theoretical development. Within the past few years, a few researchers have noticed the lack of theories in the progression of this field, and have started to propose models of digital reference to offer a high altitude view for this research area (Lankes, 1998; McClenne, 2001; Pomerantz, Nicholson, Belanger, & Lankes, 2004). Pomerantz (2005) furthered these theory building efforts in a specific branch of digital reference -- chat reference. He proposed a model of chat reference process and developed research questions associated with each stage of this process. This model encompassed the domain of chat reference from a macro-level conceptual perspective, and can be complemented by micro-level studies tackling theoretical components of different aspects of chat reference.

Findings from this study can be utilized in building a general training model for chat reference that covers core competencies and corresponding instructional instruments. Meanwhile, the methods employed in this study are generalizable to the educational setting of chat reference, and then lead to the establishment of an education model that could be customized to develop course syllabi in different contexts. The chat reference training/education models, coupled with those in other reference settings, will generate an

inclusive model for reference training/education as a whole. Thus, the current practice of reference training and education will be able to progress with a more complete and up-to-date level of guidance.

Chapter II. Literature Review

In this chapter, literature reviews covering research areas most relevant to the dissertation topic are provided.

The advent of new technologies has brought many advances to library reference services, and the increasing availability of chat reference is one of them. In order to better understand how chat reference has come into being, it is necessary to review the historical context of the progression of reference work influenced by new technologies. Literature on reference evolution under the influence of new technologies is reviewed with special attention paid to the development of digital reference.

CBE/T is an educational concept that focuses on performance-oriented learning outcomes. It is different from the general holistic educational approach that aims at personal development. Competencies determined from the dissertation study will be of no value to the library profession unless they are delivered to librarians through education or training programs. Thus, CBE/T is an appropriate approach to establish these programs. Literature on the historical and conceptual context of CBE/T, characteristics of CBE/T programs, and applications of CBE/T in the field of library and information science (LIS) is reviewed to cover the basis of this educational concept and introduce how it has been embraced by LIS educators.

The goal of the dissertation study is to determine essential competencies and effective training approaches to benefit the practice of chat reference in particular and

digital reference in general. Thus, a literature review of the status quo of digital reference training and education is presented to facilitate the understanding of how results from this study can be incorporated in the establishment of training or education programs to provide better professional preparation for librarians. Literature on digital reference training and education programs is examined respectively given the fact that training and education are defined differently in this dissertation.

Methodological design is a key component of any research study. A number of competency validation studies have been reported in the literature of LIS and the research methods employed in those studies can inform the methodological design of the dissertation research. Thus, a thorough literature review is provided on methodologies of previously published efforts on competency validation, in the attempt to lay the groundwork for the dissertation's methodological plan.

The chapter is organized in the following order:

1. Reference Evolution under the Influence of New Technologies;
2. Competency-based Education/Training;
3. Digital Reference Training;
4. Digital Reference Education; and
5. Methodologies of Competency Validation Studies.

2.1. Reference Evolution under the Influence of New Technologies

The evolution of library reference services have been greatly influenced by the advent of new technologies, such as computing, electronic mass storage and networking technology. From online commercial database searching entering the library world in

mid-1970s, to synchronous Web-based chat reference appearing at the turn of this century, reference services have migrated from the solely print resource oriented services limited in a certain physical space, to a diversified service portfolio that could reach more people with more resources and less restriction of time and space.

In retrospect of the development of library reference services in the past half century, two primary changes resulting from the application of new technologies can be identified, as indicated in Figure 2-1. One is the increase of the availability and accessibility of electronic resources; another is the expansion of the media through which reference services are provided. In this literature review, literature reflecting these two changes will be examined.

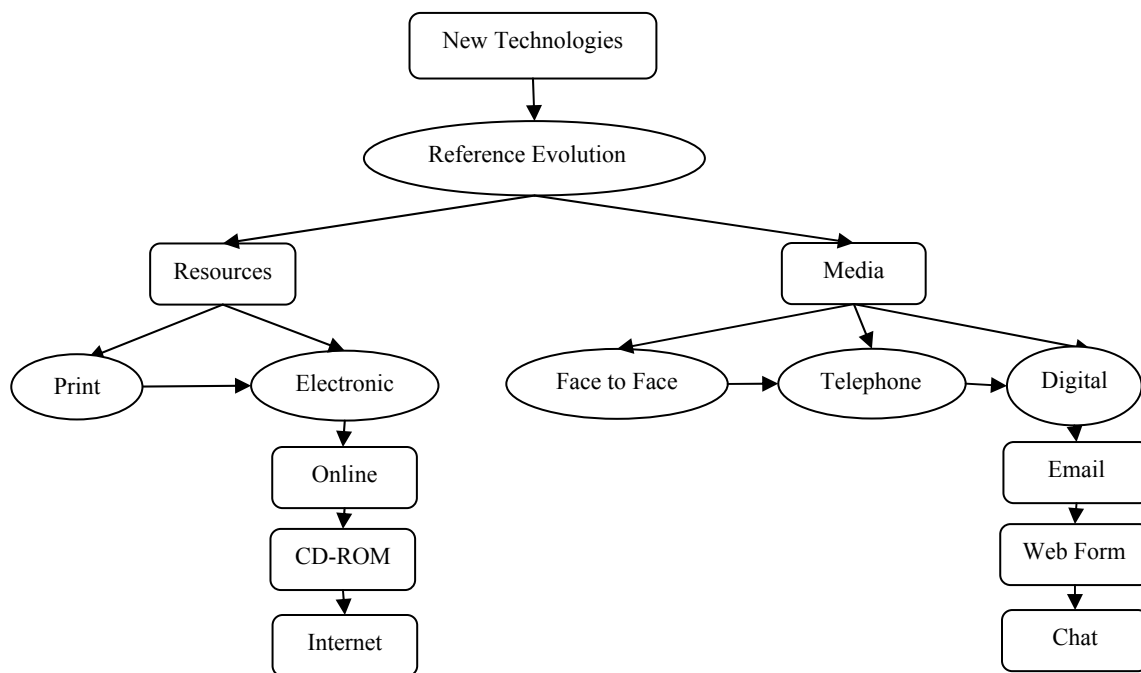


Figure 2-1. Reference evolution under the influence of new technologies

2.1.1. Increase of the Availability and Accessibility of Electronic Resources

The development of electronic resources for libraries to use in reference services has gone through three stages: online commercial databases, CD-ROM, and the Internet.

2.1.1.1. Online

Online databases, including both bibliographic and ASCII full-text databases are the first generation of electronic resources. In early 1970s, the development of hard disc storage systems made it possible for computers to handle random access to data and multi-user sessions, which expanded the potential user pool of bibliographic databases and directly led to the subscription to online database services in libraries in the mid-70s (Straw, 2001; Neufield & Cornog, 1986). Online databases were provided by vendors such as DIALOG, ORBIT, BRS, and Lexis-Nexis, where multiple databases were mounted in “databanks” and accessed through dial-in from telecommunicating terminals (Hahn, 1996; Straw, 2001). However, online searching did not become popular until 1975 when the first packet-switching networks such as Tymnet were put into use, which ended the days of long-distance calls (Tenopir, 1993).

As the first tide of electronic resources was widely accepted by libraries, online databases were not only hailed by library users (Straw, 2001; Arnold & Arnold, 1997), but also enhanced reference services in a variety of ways. Unruh (1983) listed three important advantages of online databases:

- Facilitating retrieval: the use of operators such as OR, AND, or NOT allows multiple concepts to be linked in a logical statement for retrieval;
- Expanding resources: the limit of the physical collections in a library is offset by the availability of more complete online indexes and periodicals; and

- Enhancing the image of reference librarians: the sophisticated skills needed in navigating online databases increase the public's perception of librarians and their appreciation of the profession.

While the advent of online databases freshened up library reference services, reference librarians had to deal with the problems that were inherent in the use of them. The effective searching of online databases demanded complex and special skills that could only be achieved through considerable training. Not all reference librarians would master the skills of online searching. The searching tasks were usually delegated to a separate department, bibliographers or subject specialists, or certain reference librarians. They formed a new profession of “online searcher” that was dedicated to handling electronic information seeking in libraries of the late 1970s and early 1980s. (Straw, 2001; Williams, 1978; Neufield & Cornog, 1986; Moore, 1998a; Stevens, 1983)

A statement from Straw (2001) vividly described the scenario of online database searching:

“A patron hoping to find something online had to seek the services of a librarian with knowledge of a unique and powerful computer. The patron's request needed to be translated into a special language that could be understood by the computer. When the language was put into the computer, a strange information alchemy produced something that hopefully would be of relevance and value to the patron” (p.5).

The domination of professional searchers in the field of online databases came to an end in early 1980s when IBM introduced microcomputers. Online vendors started promoting end-user searching systems such as CompuServe, BRS/AfterDark, and DIALOG'S Knowledge Index (Tenopir, 1993), which demystified online databases to the general public and turned to a new page of the accessibility of electronic resources.

However, sophisticated online searching skills are not the only problem faced by reference librarians. Another issue that had been hovering along the entire online age was fee. Online commercial services imposed expensive fee structures for searching the databases, which were so expensive that libraries could not single-handedly absorb all the cost but have to transfer some of them to users (Straw, 2001; Williams, 1978; Hauptman, 1983). The zealous debate of whether libraries should charge users for online database searching was documented in numerous publications in late 1970s and early 1980s. (Waldhart & Bellardo, 1979; Weaver, 1983)

The complexity of searching and the concern of fees resulted in limited use of online databases. Terminals for online searching were usually placed in an isolated area for the delegated online searcher(s) to process users' requests (Tenopir, 1987). Brunelle and Cuyler (1983) thought this was "especially unfortunate because online databases contain a wealth of the kind of hard data that is appropriate to more traditional reference services" (p.93). They suggested that online database searching should be incorporated into regular desk reference work. This proposal was echoed by Havener (1990), whose study showed that online was more efficient and more effective than print in searching information to answer conceptual ready reference questions, whereas there were no major differences between the two in searching for factual questions.

Online databases prevailed as the only electronic resources in libraries until mid-1980s when the development of technologies brought another choice to libraries: the CD-ROM.

2.1.1.2. CD-ROM

CD-ROM stands for Compact Disc Read Only Memory, which is a victory of mass storage technology. An enormous amount of data can be stored in a 4.72-inch CD-ROM. (Straw, 2001) The huge capacity for digital information storage quickly gained popularity for CD-ROM among both users and librarians (Salomon, 1988), but this popularity could not be achieved without the introduction of IBM's personal computers, or PC, which marked a new era of personal computing (Lenck, 1991). The combination of PC and CD-ROM expanded libraries' options for electronic resources and added more diversity to library reference services.

Databases stored on CD-ROM were first introduced by Silver Platter in 1985 (Tenopir, 1989; Straw, 2001). Quickly, non-bibliographic material like dictionaries, encyclopedias, directories, and other reference works were also taking advantage of this new mass storage technology. In late 1980s, resources available on CD-ROM even expanded to full text and graphic images (Straw, 2001; Melin, 1986). People started having more and more options of electronic content after CD-ROM made its way to libraries.

Like online commercial databases, libraries' adoption of CD-ROM was also warmly greeted by the general public (Roose, 1988; Tenopir, 1988). However, unlike online databases, CD-ROM no longer fell under the privilege of certain librarians who used to assume the exclusive role of "online searcher". Every library user could access CD-ROM resources through a workstation, which unleashed an unprecedented wave of end-user searching. When discussing the first few CD-ROM versions of databases, Rietdyk (1988), the vice president of Silver Platter in the 1980s, pointed out that "from the beginning of the product design it was stressed that this product should be able to be

used directly by the true end user of the library and not only by the experienced searcher.”(p. 58)

One important reason for end-user searching to become popular was the fee structure imposed on CD-ROM resources had changed. Libraries only needed to pay a fixed amount of subscription fee for unlimited use of the CD-ROM resources. Without the concern of keeping track of searching time to control cost, CD-ROM users could conduct as many searches as they want. (Tenopir, 1988; Roose, 1988; Rietdyk, 1988; Straw, 2001).

According to Straw (2001), freedom from monetary concerns was not the only change that motivated the growth of end-user searching in libraries, “the searching technology was often simpler and more intuitive than those offered by online services” (p. 7). On one hand, the easier searching interface allowed users to search independently instead of completely relying on intermediaries; on the other hand, users did not have much knowledge and experiences with CD-ROM resources and needed help from librarians on which database to choose and what search terms to use. With the advent of CD-ROM and growing number of end-users, the role of librarians had changed from intermediary searchers to instructional teachers. They assumed more responsibility in providing one-on-one assistance to users and teach them how to operate workstations and use CD-ROM resources (Straw, 2001; Dyson & Kjestine, 1993; Tenopir, 1988; Boye, 1996; Rietdyk, 1988).

This new responsibility incurred a big change in reference work (Tenopir & Neufang, 1992). Expertise on CD-ROM resources was no longer the business of only a few, but all reference librarians. Everyone was expected to be able to assist users on CD-

ROM searching whenever there was such a request. Rettig (1996) claimed that “the hallowed reference desk has diminished in importance as the demands of CD-ROM users for assistance have grown and have increasingly taken the reference librarian away from the desk”(p. 80). However, being familiar with the electronic resources was only part of the increased knowledge requirement. Reference librarians also had to learn about computer software and hardware, including operating systems, printing, and general computer troubleshooting techniques, in order to help users when they had difficulty using the computers (Straw, 2001; Dyson & Kjestine, 1993; Tenopir, 1988; Boye, 1996; Moore, 1998a).

In a study of CD-ROM’s impact on reference services, Tenopir and Neufang (1992) found a change in users’ attitude about the library and about the research process – “End-user options fit right into the new generation’s expectations and experiences.... . Users are making more demands on librarians, providing more challenges to reference work and often leading to enhanced services” (p. 58).

While CD-ROM, touted as the “new papyrus”, was becoming a promising electronic resource in libraries, it was not perfect. There was no standard retrieval software and both librarians and users had to learn a particular search interface for different products. Lack of data currency limited the use of CD-ROM to some extent, and investment in hardware and software became a big burden on library budget. (Rietdyk, 1988; Straw, 2001; Moore, 1998a; Tenopir, 1989)

The presence of CD-ROM did not make online commercial databases obsolete since both of them had their own advantages and disadvantages. But many libraries witnessed the diminished usage of online searching after the introduction of CD-ROM

(Straw, 2001; Lancaster, Elszy, Zeter, Metzler & Low, 1994), especially when single-CD-ROM-loaded workstations were connected by Local Area Network for multi-user access, which, according to Tenopir (1997), made CD-ROM “a practical alternative for online searching even at large university or public libraries” (p. 129).

2.1.1.3. Internet

In early 1990s, a new networking technology, which was originally developed in Defense Department to connect computers for defense-related research, became available in the public domain. This technology allowed isolated computers to be connected in an enormous network, known as the Internet. Basically, the Internet provided an infrastructure for electronic information stored in individual computers to flow around the entire network. Greatly enhancing the availability and accessibility of electronic resources, the Internet quickly gained popularity among libraries (Straw, 2001).

In a nation-wide survey conducted by Tenopir (1995) in 1994, 77% of surveyed university libraries and 84% of large public libraries reported offering Internet access to their users in the library. Not only could users have access to resources on the Internet, they could also use Internet applications such as email management software installed in libraries’ computers (Tenopir, 1995; Straw, 2001).

However, the potential of Internet resources was not fully mined until after the advent of the graphical World Wide Web (WWW, or the Web) in 1993. The Web is a platform that runs on the Internet, by presenting the resources through a multi-media and hyper-linked interface and locating them by Uniform Resource Locators (URLs). Based on the Web, Internet resources can be accessed and viewed through an application called the Web Browser. The arrival of the Web greatly facilitated the growth of Internet

resources and Internet usage among the general public (Straw, 2001; Naughton, 2000). Libraries started embracing the Web as the standard framework to mount locally-created resources such as library Web sites, online catalogs, Internet reference resources and instructional materials for remote users. Database producers also veered to the Internet and developed Web-based databases targeting end-users, which were less intimidating because the search interface took the form of Web pages and users were no strangers to Web pages (Tenopir & Ennis, 2001; Tenopir, 1995; Tenopir, 1996; Tenopir, 1997; Straw, 2001; Moore, 1998a). A statement from Tenopir (1994) precisely embodied the changes the Internet has brought to database resources – “The Internet is important as a conduit – a less expensive way to reach commercial systems through a telnet connection; as an alternative or first choice – a less expensive way to reach certain materials; and as a force for change – as commercial online services, database producers, and searchers react to the first two and change the way they do things because of it” (p. 32).

The arrival of the Internet and its exponential growth, not only expanded the choices of electronic resources, revamped the old ways of database and catalog searching, but also reinforced the instructional role of reference librarians. Unlike well-structured database resources, the enormous amount of information available on the Internet is neither critically scrutinized nor carefully organized. Moore (1998a) described the Internet as “a library with all the books tossed on the floor” (p.117). Thus, in order to help users navigate the overwhelmingly intricate resources on the Internet without being misled by deceptive and biased information, reference librarians had to spend more time teaching them how to access the Internet, how to locate information on the Internet, and

how to evaluate located information and then utilize them (Straw, 2001; Moore, 1998a; Hope, Kajiwarara & Liu, 2001).

Apparently, the Internet has been a ground-breaking force in reshaping libraries' reference services. Straw (2001) believed that "the Internet is transforming the nature of reference work" (p. 9). In this section, only part of the transformation brought by the Internet has been discussed: the unprecedented increment on accessibility and availability of electronic resources. The influence of the Internet is more than that. In the next section, another aspect of the Internet's power will be examined to review how the way reference assistance is provided has been transformed by the Internet.

2.1.2. Expansion of Reference Service Media

Ever since Samuel Green (1876) defined the relations between librarians and library users, human-intermediated assistance provided by reference librarians has been considered a pivotal function of reference departments for over a hundred years. The essential part of reference work is to help users find information to fulfill their information needs by every possible means.

The media of the provision of reference services have evolved in the past century. At first, reference service could be only delivered inside the library where librarians and users communicated in the face-to-face fashion. Then, remote reference came into the picture when the use of mail, telephone and Teletype were incorporated in designing reference services (Ryan, 1996; Janes, 2003). As computing and networking technologies (especially the Internet) were adopted by libraries in 1980s, remote reference was brought to a new level, where digital media started becoming a popular choice to deliver reference services to reach a far wider audience. Email and online real time interaction

are the two primary types of such reference services. Users can send their queries by email, or by filling out a Web form, and then receive answers by email; or engage in an online interactive session where they can communicate with librarians synchronously and receive immediate help from the librarians.

There has not been a consensus on the term used to describe digital-media-based reference services. Most of the time, they are referred to as either “digital reference services” or “virtual reference services”. As the professional association of reference and user service librarians, RUSA (2004) chose to use “virtual reference” for the new service and defined it as the “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. Communication channels used frequently in virtual reference include chat, videoconferencing, Voice over IP, co-browsing, e-mail, and instant messaging” (n. p.). Lipow (2003), while acknowledging the mixed use of these two terms in current literature, preferred to use “virtual reference” in the context of “live, interactive, and remote services” (p. xx), instead of in the broader sense conveyed in RUSA’s definition. The use of “virtual reference” dedicated solely to online real-time chat reference services was also exemplified in the works of Meola and Stormont (2002), Coffman (2003), and Ronan (2003).

Another popular term used in naming the digital-media-based reference services, “digital reference”, also has multiple definitions:

- “the use of digital technologies and resources to provide direct, professional assistance to people who are seeking information, wherever and whenever they need it” (Janes, 2003, p.29)

- “human-intermediated assistance provided to users via electronic media in fulfillment of users’ information needs” (Pomerantz, 2003, p.36)
- “Internet-based question-and-answer services that connect users with experts and subject expertise” (VRD, 2003, n. p.)
- “the use of human intermediation to answer questions in a digital environment” (Lankes, 2005, p.321)

All the above definitions captured the crucial components of “digital reference”: human-intermediated assistance and digital media. Although some researchers tend to incorporate digital/electronic resources in “digital reference” as well (Tenopir, Ennis, 1998, 2002), RUSA (2004) clarified this distinction by stating that “while online sources are often utilized in provision of virtual reference, use of electronic sources in seeking answers is not of itself virtual reference”. Thus, resources created and distributed in digital means are not considered part of “digital reference”.

Since “virtual reference” is still debatable in terms of scope, for the purpose of this literature review, “digital reference” will be used as the term to describe the digital-media-based delivery of human-intermediated assistance, either through email, online real-time interaction, or any other viable digital technology.

2.1.2.1. Email Reference Service

The application of email was adopted by libraries as an extension of reference desk as early as 1980s (Schardt, 1983; Kittle, 1985; Howard & Jankowski, 1986; Weise & Borgendale, 1986; Bonham, 1987; Roysdon & Elliott, 1988; Hodges, 1989). These early email reference services were mostly provided through email systems linked to OPACs or campus-wide information networks (Ford, 2002). A survey conducted by ARL

in 1988 indicated that 20% of ARL libraries offered email reference services by then (Still & Campbell, 1993). One decade later, this number rocketed up to 96%, due to the widespread availability of the Internet and personal computers (Ford, 2002; Goetch, Sowers & Todd, 1999; Coffman & McGlamery, 2000).

Email reference services are provided either through a link of email address to which users can send their questions, or through a Web form that users can fill out to submit their questions. In both ways users will receive the answer to their questions by email (Lankes, 1998a; Lagace, 1999; Janes, Carter & Memmott, 1999; White, 2001). While libraries were making email reference services available for their users, some independent Internet-based services, usually called “AskA” services, also started offering email reference services to answer questions from the general public (Bushallow-Wilbur, DeVinney, and Whitcomb, 1996; Philip, 1997; Lankes, 1998a). These services are mostly subject-specialized (Pomerantz, 2003), for example, “Ask Dr. Math” focuses on mathematics, “Ask the Space Scientist” answers questions about astronomy and space science, and “Ask A Linguist” helps people seek information related to language and linguistics, etc.

Like other remote reference options, email reference service has freed users from the geographic limitations, making it possible for them to ask questions wherever they are as long as they have Internet connection. Not only so, users could ask questions whenever they have one (Bushallow-Wilbur et al., 1996). However, the immediacy of being able to ask questions does not guarantee an immediate response from the librarians since email is an asynchronous communication means. The lag of time is a prominent characteristic of email reference, which has both its advantages and disadvantages. While it gives

librarians more time to compose the answer, it inevitably prevents them from conducting in-depth reference interview with users (Still & Campell, 1993; Ryan, 1996; Hulshof, 1999; Janes & Hill, 2001; Philip, 1997; Hahn, 1997; Lankes, 2000; Moore, 1998b; Schwartz, 2003; Coffman, 2003). Although Abels (1996) proposed several approaches for email reference interview, the interview process could be lengthy. As Straw (2000) pointed out, it might take weeks to conclude a reference negotiation conducted through email exchanges.

One remedy for the lack of interactivity inherent in email reference services is to use well-designed Web forms to elicit users' information needs (Lagace & McClennen, 1998; Janes & Hill, 2001; Stemper & Butler, 2001). Haines and Grodzinski (1999) suggested that a structured Web form might force users to submit pertinent information that may have otherwise been left out but useful for librarians to answer their questions. However, Carter and Janes (2000), in discussing the Web form used by Internet Public Library, stated that "users seem to have difficulty in assigning subject categories to their question, and to determine whether they are factual or require sources for assistance, and these decisions were often overridden by question administrators" (p. 251). The effectiveness of Web forms could be undermined by users' inappropriate understanding of the items on the form.

As technologies advance, the issue of reference interview is no longer an objection to digital reference services. The application of online real-time interactive technologies in libraries allows librarians and users to interact synchronously in a digital reference session. The following section will provide an overview of the other primary digital reference option: online real-time interactive reference service.

2.1.2.2. Online Real-time Interactive Reference Service

Reference services provided via the online real-time interactive mode were rarely presented in the literature until mid-1990s (Ford, 2002). Real-time technologies, such as videoconferencing, were only being experimented in libraries to provide synchronous reference services to users during 1990s. Using a videoconferencing system, librarians and users can see each other through Web cameras installed in both of their computers, have a conversation through microphones, and even communicate by exchanging typed messages. While several videoconferencing-based reference projects were implemented in mid- and late 1990s (Bilings, Carver, Racine & Tongate, 1994; Pagell, 1996; Dent, 2000; Folger, 1997; Lessik, Kjaer & Clancy, 1997; Morgan, 1996), the technological shortcomings such as poor video transmission quality, limited bandwidth, limited access to the supporting infrastructure made it difficult for “a critical mass of users” (Sloan, 1997) to develop for the services.

The rather cumbersome videoconferencing technology was not the only resort for online real-time interactive reference. Libraries also tapped other online real-time applications to provide chat-based reference services, or in short, chat reference services, where librarians and users can “chat” with each other by exchanging written messages. In this scenario, visual and audio information does not exist anymore and the communication is only achieved by typing messages back and forth.

Ronan (2003), in his book “Chat reference: A guide to live virtual reference services”, provided a comprehensive summary of the systems supporting chat functionality that have been used in libraries for online real-time services. According to Ronan (2003), although some libraries developed in-house software for chat reference services, most libraries chose to use software already available on the market. There are

two major categories of such systems, one is simple text-based chat applications, and another is more advanced, full-fledged commercial software with features like page-pushing or white-boarding.

Simple text-based chat applications

Internet Relay Chat (IRC), MOO (Multi-User Domain Object-Oriented), and Instant Messaging (IM) are the popular technologies for text-based chat reference services. They are appealing to libraries because the software is mostly free or inexpensive. But some of these technologies require users to have a client installed on their computers in order to benefit from the services, and most of the systems support no other features than simple text messaging.

Commercial chat software

Commercial chat software allows librarians and users to do more than simply exchanging text messages, such as page pushing, file sharing, and co-browsing. Some libraries use online real-time interactive features of courseware to provide chat reference services, but it can only reach a small portion of users that have account names (Ronan, 2003). A more popular and widely-accepted option is call center software, or web contact center software (Francouer, 2001).

Call center software was originally developed to facilitate customer services on business websites. It has been adapted to accommodate the needs of library services. For example, the two popular systems among libraries, LSSI's Virtual Referent Toolkit (now purchased by Tutor.com), and Metropolitan Cooperative Library System's 24/7 Reference (now merged with OCLC's QuestionPoint) were both created based on eGain, a commercial call center software.

Since call center software is usually hosted on the vendor's server, what libraries need is only a log-in name, and users can access the service simply through a browser window. In a chat session activated by the call center software, librarians are able to push pages, send files, prescript messages to save time, and escort users in the information searching process by co-browsing Web pages with them. These features make it easier for librarians to transmit electronic information to users and guide them in the navigation, given the fact that digital reference services utilize electronic resources extensively in answering questions (Lankes, 1998b, Bry, 2000; Janes, Hill, and Rolfe, 2001; Tenopir & Ennis, 2001). At the end of each chat session, a transcript of the reference transaction will be emailed to users for future reference.

Chat reference services are currently the predominant mode of online real-time interactive reference services in libraries. One distinct advantage of this service mode is that it enables the synchronous interaction between librarians and users, and hence the capability to conduct reference interview (McGlamery & Coffman, 2000; Smith, 1999; Yue, 2000). However, since the medium has changed, chat reference cannot completely model the reference interview in the face-to-face reference setting. Concerns over the difficulty in question negotiation with users in a chat session have been frequently expressed in the literature.

- No verbal or visual cues are available in chat reference, which not only makes it hard for librarians to evaluate users' responses, but also requires them to have a thorough understanding of chat-based online communication fashion to better interact with users (Janes, 2002; Stormont, 2001; Broughton, 2001;

Smith, 1999; Francoeur, 2001; Koyama, 1998; Straw, 2000; Viles, 1999; Ronan, 2003);

- Time pressure is also a challenge faced by librarians during the transaction. Users might become impatient when librarians take time to search information for them because, unlike in the face-to-face reference setting, users do not understand what is happening at the other end of the communication and might get tired of waiting if there are no constant responses. Librarians have to reassure users by sending short messages like “I’m doing the search now” to keep them engaged in the interaction (Stormont, 2001; Francoeur, 2001; Boyer, 2001; Trump & Tuttle, 2001; Oder, 2001; Brandt, 2000; Peters, 2000; Schneider, 2000);
- Vanishing users are another problem that librarians have to deal with, where users disappear in the middle of a chat session without any notice. It could be an abrupt technical problem that disconnects the user, or he/she gets impatient and closed the window, or he/she happens to find the answer to his/hers question somewhere else and did not need the service any more (Francoeur, 2001; Janes, 2002).

Despite the above limitations, chat reference services make it possible for users to get reference help remotely, immediately and interactively, as long as they have a computer connected to the Internet. The elimination of the restriction of “mortar and brick” not only extends the service to remote users, but also enables longer service hours. Some of the chat reference services are even available around the clock. This convenience of service hours is brought by the possibility that comes with chat reference

services – collaboration in the form of consortium. For the first time reference responsibilities can be shared among various libraries to serve a larger number of users for a longer period of time (Stahl, 2001).

2.1.2.3. Digital Reference Consortia

Reference collaboration among libraries has been brought to a new level by digital reference. In desk or telephone reference settings, inter-library collaboration happened when users of one library were referred to the resources or services at another library, or reference librarians of one library contacted (by telephone) another library or service for information (Pomerantz, 2006). When digital reference made its way to libraries, forming consortia, the collaboration mode that used to exist only in areas like cataloging, database purchasing, and interlibrary loan, started becoming a viable option for libraries to share resources and expertise in reference work.

The advantages of a digital reference consortium have been well discussed in the literature (Eichler & Halperin, 2000; Smith, 1999; Stormont, 2000; McGlamery & Coffman, 2000; Yue, 2000; Stahl, 2001, Pomerantz, 2006). When digital reference services are provided in the asynchronous form, such as email, the purpose of a consortium is to create a mechanism for the members to “swap out-of-scope and overflow questions, so that if one service received a question that it could not or would not answer for some reason, it could be forwarded to another service in the consortium that could answer it” (Pomerantz, 2006, p. 48). Virtual Reference Desk (now discontinued due to lack of funding) for AskA services and QuestionPoint for library-affiliated email reference services are two well-known consortia of this kind.

The purpose of consortia formed among synchronous digital reference services, such as chat reference services, is to share resources and manpower between libraries by members taking turns in staffing the services and answer questions from users of all participating libraries. Some of these consortia are established among libraries using the same chat application; some are formed by libraries within a certain geographic region. A case study of NCknows, a consortium of libraries in North Carolina, indicated that “for a comparatively minimal investment in supporting users outside of their primary user communities, these chat services increased several times over the volume of transactions that they were able to handle during their hours of service, in addition to dramatically expanding the number of hours that chat-based reference service could be offered to their primary user community” (Pomerantz, 2006, p. 49).

The possibilities to participate in digital reference consortia not only allow libraries to make more efficient use of scarce resources such as materials, time and money, but also, as Pomerantz argued, provide them with the potential benefits from “network effects”, where the value of a consortium increases as the number of members of that consortium increases.

According to Pomerantz (2006), “in order for digital reference services to be able to provide answers to their users, it is increasingly important that services collaborate, sharing knowledge as any other resource might be shared” (p. 53). Undoubtedly, the thriving digital reference consortia have proved this point.

2.1.3. Summary

This literature review examined the evolution of library reference services under the influence of new technologies by pointing out two directions the reference

development has followed. One is the increasing availability and accessibility of electronic resources; another is the expanded media for reference services. The purpose of such an overview is to provide a larger background for the context of the study – chat reference.

2.2. Competency-Based Education/Training

Competency-based education and training (CBE/T) is an educational alternative to deliver competencies to learners through instructional systems. In this section, literature on CBE/T is examined to provide an introduction of this particular education/training concept, and features and characteristics of competency-based programs.

2.2.1 Historical & Conceptual Context

CBE/T is an approach to developing curricula from an analysis of roles to be filled on completion of the educational or training program (Wang, 2005). In a typical CBE/T program, an agreed-upon level of competency is communicated through the use of specific, behavioral objectives, and for these objectives, criterion levels of performance are established to measure learning outcomes (Klingstedt, 1973).

The rise of CBE/T started out as an education reform movement seeking a more effective and practically useful curriculum in early 1970s, in response to increasing societal needs for highly skilled and competent employees to perform job responsibilities to an internationally competitive standard. It has a strong historical base dating back to the industrial revolution when both technological development and international competition put pressure on education and eventually led to the introduction of Morrill

Act of 1862 in the United States. Morrill Act aimed to promote liberal and practical education of industrial classes and spawned the land grant universities designed to impart practical skills required in different professions (Wang, 2005; Harris, Guthrie, Hobart, & Lundberg, 1995). One consequence of these activities was a long-standing tension that still exists today, described by Harris et al. as the tension “between concepts of education that are defined by general personal development that is holistic and that goes beyond any comprehensive statement of intended outcomes, and concepts of education that are defined by precise outcomes resulting in claimed practical applications of knowledge that are relevant and measurable” (p. 34). The former educational concept reflects a holistic or humanistic perspective of education, whereas the latter concentrates on a behavioristic educating approach, which constitutes the conceptual context of competency-based systems.

2.2.2. Education and Training

The tension discussed above is not the only indicator of the controversial nature of CBE/T. Another debate closely associated with it is the contrast between concepts of “education” and “training”. Snook (1973) defined training as preparing people in a narrow way for a specific job, position, or function, while education involves preparing them for life in a broader and more inclusive sense. Based on a literature review on education history, Harris et al. (1995) concluded that although there has not been a general agreement on how to define education, one distinction between education and training was that the term “education” tended to be associated with general school education and universities, whereas “training” was mostly used in the context of technical

and vocational colleges, on-the-job training, and in some countries, vocational programs within secondary schooling.

Given the above distinction, some people considered competency-based approaches to be only appropriate for training. They removed the word “education” and labeled this learning system only as “competency-based training”. Other antagonists of CBE/T are more extreme and totally reject this approach because they believe all learning should lead to broader development of the person and that can never be achieved by competency-based programs (Harris et al., 1995).

These types of thinking have prohibited the implementation of competency-based systems in higher education. Most of the impact of competency-based approach has been on the sector of vocational education and training. However, the situation is changing as more and more university courses such as medicine, law and engineering, are designed for professional performance and highly influenced by occupational needs. In this sense, the line between education and training has become blurred. No fundamental difference exists between these two concepts. Harris et al. (1995) argued that in practice full human development requires both education and training although education has been the only one that gets all the credit most of the time. Protagonists of CBE/T believe that “many of the broader general outcomes that are associated with education can be described in competency terms, measured, and effected through appropriate learning experiences” (Harris et al., 1995, p. 16). This point of view justifies the competency-based approach as an effective learning system to be placed in either context: to serve educational purpose for personal development, or to meet training needs to perform manipulative skills.

The relationship between education and training, and how competency-based approach fits in both settings are summarized and presented in Figure 2-2. Education and training are two parts of a continuum ranging from broad holistic personal development to narrow and specific development of skills with essential knowledge. The boundary between them is not distinctly clear and the competency-based learning system can be applied along the continuum wherever it is necessary. As for the settings where education and training occur, education is mostly associated with formal schooling and delivered through formal courses, whereas training takes place in the form of workshops or short courses at a vocational setting, such as on-the-job training.

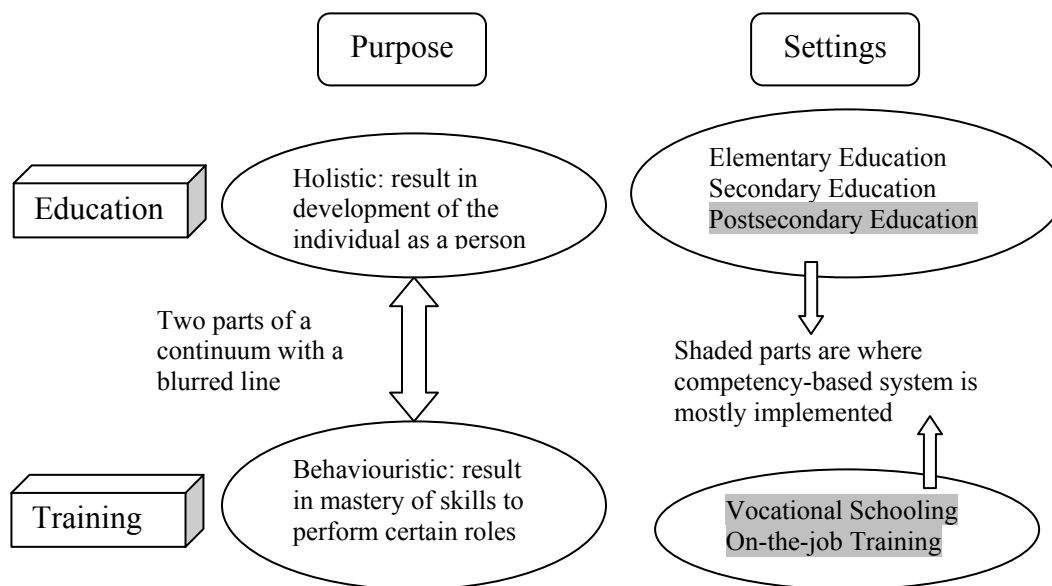


Figure 2-2. Relationship between education and training

2.2.4. Features of CBE/T Programs

The literature has revealed many efforts in defining what makes an education or training program competency-based. Hermann and Kenyon (1987) identified twenty-one features inherent with competency-based vocational education; Foyster (1990) derived

six essential and ten desirable characteristics of a CBE/T program from the analysis of two case studies; the TAFE National Center for Research and Development in Australia (1990) developed seven criteria in its national inventory of TAFE competency-based programs; Bowden and Masters (1993) summarized six principles and intentions in their study of the implications of CBE/T for higher education. The different sets of characteristics may lead to different types of training system, but they share a common feature that is the key to a CBE/T system – “certification based on attainment of competency rather than time-based completion of a course or training program” (Harris et al., 1995 p.25).

Harris et al. (1995) conducted a thorough literature review on CBE/T and singled out five basic features of competency-based programs covering the conception, design, delivery, assessment and management of these programs. The identified features presented a collective view of CBE/T program:

- A specification of learning outcomes in measurable terms;
- The prior determination of these outcomes through the analysis of the arena and context in which they are to be demonstrated (such as an occupation or occupational area);
- The measurement of these outcomes being the criteria of the success of the learning process;
- A learning process that emphasizes the attaining of the specified outcomes to the stated standard rather than the length of time or mode of learning; and
- The recognition of prior learning by crediting the learning rather than demanding a repetition of it (p.30).

The features summarized above demonstrated that CBE/T is outcome-focused. The determination and specification of outcomes derive from the careful development of competency standards based on the analysis of occupational practice. Identifying competencies is the first step in designing a CBE/T program. Then competency standards are translated into well-specified learning objectives to guide learners to acquire these competencies through a variety of learning techniques. Design of the learning techniques also serves the goal of competency achievement and thus ensures the learning process to be flexible and even individualized for all the learners. Length of time is not a concern and learners can take alternative pathways to arrive at the same end points as long as they are appropriate to their individual needs. As for the assessment, acquiring specified competencies is the primary criterion in measuring learning outcomes.

Goals, learning process and assessment are three essential components of any education or training programs. Figure 2-3 provides a general representation of the three components of a CBE/T program to demonstrate its key features.

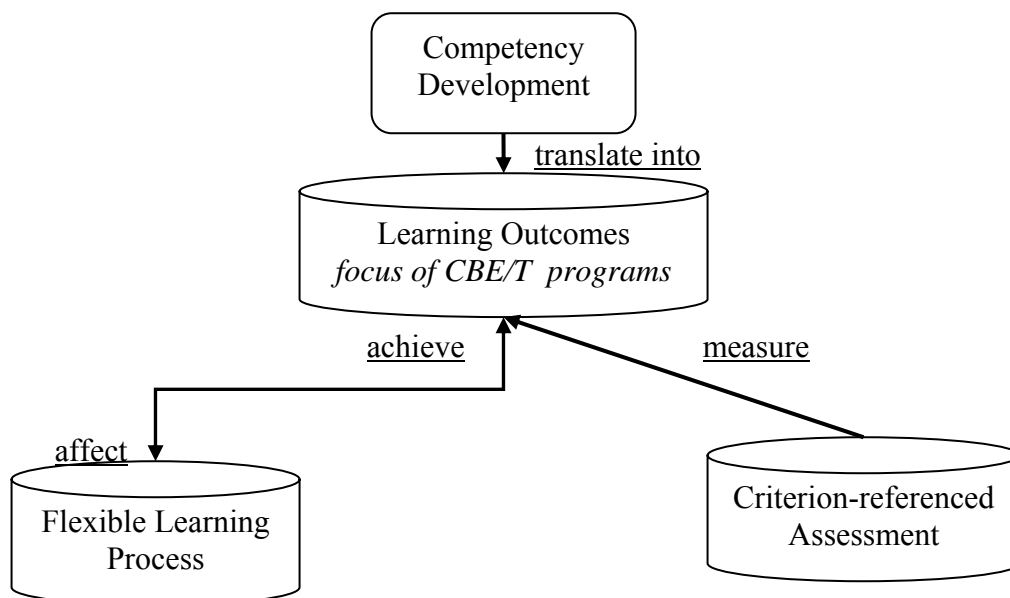


Figure 2-3. Basic features of CBE/T programs

The competency-based approach was first adopted in the field of teacher education. It soon evolved into other areas and library and information science is one of them. In the next section, a literature review is presented to show how this education concept has been embraced in the field of LIS.

2.2.5. CBE/T in Library and Information Science

Recognition of the benefits of competency-based approaches has been well-represented in LIS literature. Strongly suggesting that library schools should plan curricula based on careful examination of educational priorities, Goldhor (1971) stated that one advantage of a competency-based educational experience is considered to be “the development of aware, knowledgeable, competent librarians able to exercise sound judgment and to adapt swiftly and soundly to the changes which their broad education enables them to perceive” (p.128). Ever since CBE/T was introduced in the field of LIS in 1970s, educators, researchers and practitioners have contributed earnestly to the incorporation of the competency-based approach in LIS education and training systems.

2.2.5.1. Competency Development

During the process of implementing a competency-based program, the first step is to identify competencies indicating performance levels that learners are expected to achieve upon completion of the program. There have been constant efforts reported in the literature in determining competencies associated with different aspects of LIS.

Competencies related to a profession consist of both generic and specific ones (Griffiths & King, 1986; Kemble, 1975; Resnick, 1977). Generic competencies refer to those that are common and essential for a variety of performance situations in this profession, whereas specific competencies are those demanded by a particular job or task.

The exploration of generic competencies in library science started as early as early 1970s. Horn (1971) proposed a model for a library education program aiming to ensure students to graduate with basic competencies needed for successful professional practice. Seven areas of competencies were suggested by Horn based on current practice and the literature. A few years later, a Syracuse University Task Force, in studying the need to improve ALA accredited library education programs, employed a variety of methods including visits to seventeen universities in an attempt to determine competencies required by future service priorities (Stone, 1973). Three basic types of competency were identified and a more complete list of nine competency areas was defined to serve as guidelines for development of library education programs.

Friedrich (1985) conducted a Delphi study to elicit LIS experts' opinions on the most important competencies generic to the entire information profession in the next decade. The results of this study suggested that "information professionals working in diverse settings are united by broader professional commitment to the transfer of information for the benefit of society" (p. 125), and library and information curriculum offerings should be integrated and provide common-ground-based core courses for students to achieve competencies required by both tracks of this field.

Buttlar and Mont (1989, 1996) undertook two surveys among library school alumni regarding the value of including various competencies in an MLS program. The findings indicated that competencies of a particular kind of work, such as reference, were affected by the characteristics of work settings, such as public or academic library. Thus, suggestions were made to include setting-based education LIS programs.

In the project of “New Directions of Library and Information Science Education” led by Griffiths and King (1986), competencies required at several professional levels and within several areas of professional specialization in LIS field were identified through interviews with administrators and professionals from a sample of advanced information organizations, and validated with the help of volunteer information professionals. This project was a nation-wide effort in determining both generic competencies common to all work settings of the profession and specific competencies required by particular job functions. In this study, generic and specific competencies were explored according to a three-level hierarchy, as represented in Figure II-4.

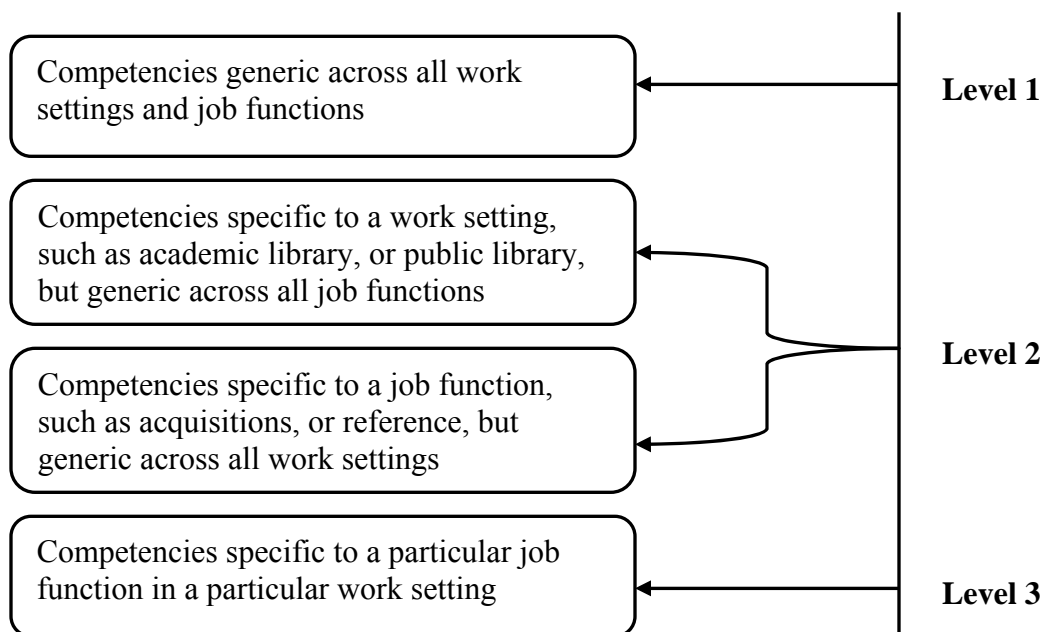


Figure 2-4. Levels of competencies in the New Directions Project

Competencies identified from this project were carefully analyzed, yielding results with implications for a number of different aspects of the educational/learning process in library and information profession. The findings suggested that “in considering information professional competencies required in the workplaces, there are some competencies that can be acquired through formal programs of education, some that can

be acquired through continuing education, some that can be acquired through training and yet others that can only be acquired on the job” (p. 246). Detailed requirements for these different educational venues were presented and new directions in LIS education were discussed in terms of how the educational community could respond to the changing needs and characteristics of the information profession and the individuals within it.

While identifying generic competencies of the profession can benefit LIS education at the macro-level, there also have been studies aiming at competencies required in a specific field with the hope to shed light on education or training in that field. School librarianship is such a field that abounds in research on incorporating competency-based approach in its education and training system.

The earliest effort to determine competencies of school media professionals for educational purposes dated back to late 1960s, when American Association of School Librarians initiated School Library Manpower Project (1970) to improve the preparation and utilization of school library personnel. The project developed in two phases: phase I was to identify occupational definitions and competencies through task analysis of school media positions, and phase II was to design educational programs based on the findings from phase I. A task analysis survey was conducted in phase I to determine what tasks should be performed by a variety of school library media personnel to meet the personnel requirement of the 1969 Standards for School Media Program, and develop occupational definitions for four primary positions in this field. These definitions were later analyzed by the Curriculum Content Committee of the project, based on which major areas of competencies for the education of school library media specialist were identified and set as the basis for the educational programs developed in phase II.

In addition to the national effort to determine competencies for the profession of school librarianship, individual researchers also actively contributed in this regard. In order to revise the library curriculum to gear toward a more competency-based system, Crowe (1973) surveyed library school graduates from Edinboro State College on their perceptions of their mastery and value of competencies stated in the curriculum. Based on the results, several guidelines were developed to “provide focus and definition for restructuring of course content and teaching techniques designed to build competencies necessary for effective performance in school library media positions” (p.132). In the study conducted by Liming (1981) to determine the relationship between professional media staff and the instructional use of library media program, the results were also suggested to be useful for the education community in developing effective curriculum of school library media programs. Turner (1981) investigated the status of competencies of a particular component of school librarianship – instructional design, as being taught in school library media specialist programs across the country by conducting a survey about the requirement and availability of, and attitude toward 13 instructional design competencies in these programs. The findings indicated a general positive attitude toward having instructional design competencies incorporated in the curriculum. As a result of comparing three groups’ perceptions of full-time school district media directors’ competencies, Krent (1986) made a recommendation for library schools to provide courses in information retrieval through a variety of resources.

Obviously, a considerable amount of research has been contributed to the area of school librarianship in terms of identifying competencies to benefit the education or training systems. Although not as productive as the field of school librarianship, other

LIS fields also explored the opportunity of CBE/T and had a few competency identification studies reported in the literature.

Todaro (1984) conducted an attitudinal assessment of competencies of children's librarians, and based on the results, several recommendations were made for library educators to revise curricula to respond to the changing needs of children's librarian, such as providing an area of specialization for interested specialists, and developing advanced internships in outstanding systems for those at advanced levels in their career for in-depth learning, etc. Seeking to provide a source of information for curriculum planners and offering library and information studies educators a better understanding of the educational needs of law librarians, Chandler (1995) conducted a Delphi study among experts of law librarianship and a survey among private law librarians to identify the most important professional preparation competencies. The author suggested that competencies of greatest importance determined by both groups should be added to the American Association of Law Libraries' "Guidelines for Graduate Programs in Law Librarianship", and existing curriculum should be examined and revised to address the competencies identified in this study.

2.2.5.2. Curriculum Development

Determining competencies is only the first step in incorporating the competency-based approach into the education/training system. Most of the studies reviewed above, were research studies attempting to shed light on LIS education by identifying competencies, generic or specific, in related LIS fields. The immediate goal of these studies was not to transfer the competencies into detailed course objectives in a competency-based program, but make general recommendations for the educational

community in terms of how to revise curriculum to meet the changing professional needs. In order to examine how a competency-based approach has actually been implemented in LIS learning systems, a literature review is presented in this section on studies that went a step further to develop competency-based course/training programs in the field of LIS.

School Library Manpower Project (1970), after identifying the primary areas of competencies and instructional objectives in phase I, developed six experimental educational programs in carefully-selected institutions in phase II with the goal to establish general guidelines for school media programs. In the phase II project proposal, it was pointed out that the six experimental programs were expected to “serve as models for the advancement of school library media education and hopefully have impact for innovation and educational change in the total field of librarianship” (p.106).

Unfortunately, no follow-up publications were available to discuss the details of the implementation of the programs and any possible assessment.

The benefits of the identified competencies in the School Library Manpower Project are not limited to the six experimental programs. Educators like Christine (1980) also took advantage of them and designed a course devoted to only one aspect of the competencies: curriculum design competencies, for people preparing for careers in school librarianship as well as to enrich the capabilities of those already in the field. Three course objectives translated from the competencies were clearly and behaviorally phrased and six instruction units were constructed with the inclusion of many delivery venues. Details of how key components of curriculum design competencies were manifested throughout this course were reported.

Daniel and Ely (1977) organized and coordinated an effort to gather a group of media professionals to develop a competency-based program in Syracuse University for the preparation of school media specialists. A consortium was formed to complete four tasks in designing this program (p. 4):

- Development of a conceptualization of the role of the media specialist;
- Identification and agreement on the competencies required to assume that role
- Development of the educational packaging and administrative mechanisms to translate the competencies identified into a viable program; and
- Development of an organizational framework for continuing program evaluation and modification.

Realizing the challenges of incorporating a competency-based approach in graduate education, the consortium left enough space for refinement, as indicated in the fourth task above. In a later article summarizing the lessons learned from developing the program, Daniel and Ely (1983) stressed the point by stating that “graduate level CBE/T is designed more to protect the client of the graduate program (the future employer)” and “the satisfactory integration of any CBE/T program with more traditional graduate programs must be through modification of the CBE/T concept” (p. 276).

Although LIS educators have been endeavoring to introduce a competency-based system to the educational community, most of the applications of this concept are in the area of professional training since it is an approach that conveniently and immediately leads to required performance. The literature has revealed numerous efforts in implementing competency-based training in different work settings and for different job functions of the LIS profession, among which most pertinent to the dissertation topic is

the training for chat reference services. Almost all the chat reference training programs started with a checklist of competencies that librarians were expected to achieve (Kawakami & Swartz, 2003; Tucker, 2003; Hirko & Ross, 2004; Martin, 2003; Elias & Morrill, 2003; Tunender & Horn, 2002; Salem, Balraj & Lilly, 2004). A detailed examination of how these programs were designed to impart the competencies was provided in the literature review on digital reference training. Thus, it is not necessary to repeat it here.

2.2.6. Summary

This literature review introduced the competency-based approach by providing the historical and conceptual background of this educational alternative and examining the characteristics and features of CBE/T programs. The application of CBE/T approach in LIS is also reviewed to contextualize the dissertation study.

2.3. Digital Reference Training

Digital reference training refers to a variety of training that librarians have obtained in order to be able to provide digital reference service. The literature on digital reference training primarily focuses on chat reference training because it involves more new knowledge that librarians need to master than email reference.

The development of a training program usually starts with the identification of digital reference competencies or best practices. No training will be effective without clear objectives. In the studies that reported training program implemented for individual or collaborative chat reference services, some achieved the identification of competencies by surveying chat reference librarians in other institutions for their experiences (Tucker,

2003; Hirko & Ross, 2004); some others created the competency checklist by engaging their own librarians in discussion or brainstorming (Kawakami & Swartz, 2003). Once the goals are set, the real training begins. Review of the literature resulted in four primary categories of chat reference training: initial software training, training on chat reference skills, mentoring, and ongoing practice. Each category will be discussed in the following sections along with other aspects of training, such as organization of training materials, and assessment and evaluation of training.

2.3.1. Software Training

Software training is the first step of the entire training program. Ronan (2003) characterized it as the “jump-start training”. Librarians need to understand the features and functions of the software employed to support chat reference service in their own library before they take on the job. Since different chat software has different mechanism and interface, software training is usually provided by external trainer from the vendors (Elias & Morrill, 2003; Ronan, 2003; Tucker, 2003). If the chat software is developed by the library itself, more attention should be paid to instruct librarians of the “particular quirks” of the software (Meola & Stormont, 2002).

Software training is always intensive and delivered in a short period of time, such as a day or two (Coffman, 2003; Ronan, 2003; Meola & Stormont, 2002; Tucker, 2003; Elias & Morrill, 2003). In the training session, the trainer would demonstrate how to use the software, explain different features and functions of the software, and then have librarians pair up with one acting as a patron and the other as a chat reference librarian to practice using the software (Coffman, 2003; Ronan, 2003). Software training can be held as an in-house interactive training with trainers and trainees in the same room or

conducted remotely through the chat software itself. However, Coffman (2003) pointed out that it is difficult to train more than four or six people remotely at one time and both the trainees and the trainer tend to get tired if the online training session lasts more than an hour and a half. Therefore, it is recommended to have in-person software training if the budget allows.

In order to ease up the tension of learning the complex software, Coffman (2003) and Ronan (2003) both suggested that a concrete list of skills would help librarians understand what they are expected to achieve. Ronan's (2003) statement below indicated two benefits of such a list:

“Providing staff members with a hierarchy, or list of tasks to master, accomplishes two vital educational objectives. First, the chat reference staff has a concrete list to take away from the training and to master. Second, and of equal importance, a list demystifies the process of learning chatting and complex software for those who tend to be anxious by breaking down the learning into discrete manageable steps” (p.99).

2.3.2. Training on Chat Reference Transactions

Chat reference is conducted in the online environment and it requires skills and knowledge including online communication skills, reference interview skills, web-based searching skills, and knowledge on electronic resources and chat reference policies and procedures. Training on chat reference transactions is designed to help librarians experience chat reference encounters and understand how to answer users' questions in an online chat session. Most chat reference training programs have sessions on chat reference transactions. Salem et al. (2004) reported training on both transferable reference communication skills in chat environment, such as approachability, question negotiation and follow-up, and non-transferable reference communication skills in chat environment, such as non-visual cues, nonverbal cues, written communication skills and

chat-etiquette skills, and service policies and guidelines. Tucker (2003) reported training on chat reference interviews, chat reference policies and procedures, patron management and research knowledge in database and internet resources.

Ronan (2003) stated that the training session could be the first experience some of the trainees have with chat and it is important for the first encounter to be as pleasant as possible to create a positive tone that can be expanded on in later training. In order to make the training session enjoyable and librarians comfortable, Ronan (2003) then proposed a few training exercises to ease librarians into learning of chat reference skills, which include “Show and Tell”, a demonstration of a chat session from both the users’ and the librarians’ perspective to show how a chat reference encounter goes; “Explore Some Commercial Web Centers”, an exercise to gain chatting experience from initiating a chat with customer service representatives of commercial web sites and; and “Role-Playing”, an activity to explore the characteristics and limitations of online communication in real time by taking the roles of “user” and “librarians”.

In the training program introduced by Hirko (2004), trainees were even assigned readings on internet reference skills and chat skills. They were also asked to experience commercial chat-based customer services and use instant messengers to hone their chat skills, visit chat reference services in other libraries and explore them from perspectives of branding, accessibility, scope of service, authority, privacy and data gathered, and pose questions to existing chat reference services as a user and evaluate the quality of the chat session based on RUSA model reference behavior. Policies and procedures from a variety of chat reference services were reviewed for trainees to gain insights in developing policies and procedures for their own services. Reviewing commercial web-based

question-answering services was also part of the training in order to examine the distinctive contrast to library chat reference services and broaden trainees' vision.

Since chat reference software enables transcripts of each chat sessions to be captured, some training programs took advantage of this feature and used the transcripts in chat reference interview training. Trainees were asked to examine selected transcripts to learn more about chat transaction, or use RUSA behavioral guidelines to analyze and evaluate the transcripts, in order to increase their awareness of reference standards and how reference interviews should be conducted in online environments (Tucker, 2003; Hirko & Ross, 2004; Ward, 2003; Ronan, 2003).

2.3.3. Mentoring

Mentoring in chat reference training makes it possible for trainees to receive personal assistance from librarians more experienced in working with chat reference. Coffman (2003) suggested that librarians who are catching up quickly should be encouraged to become mentors so as to relieve the project leader's workload. He also pointed out that the criteria for selecting mentors should not only include technical skills and chat reference skills, but also the ability of helping others and removing their fear in learning new technologies. Ronan's (2003) concept of mentoring is different from Coffman's. It consists of two activities that happen in actual chat reference sessions rather than training sessions. One is "Safety net", where in a trainee's first shift, the mentor either simulates a user to give the trainee some practices and feed back, or assists him/her in answering an actual question; another is "Coaching", where the mentor monitors the trainee's session with a user and provides private feedback as needed.

However, before mentoring trainees in real chat reference sessions, mentors should practice the activities with trainees in the training setting.

2.3.4. Ongoing Training

The training for chat reference librarians is an ongoing process. Refresher sessions on technical skills need to be held on a regular basis to practice software commands and skills that might not be used everyday. Librarians can pair up as “buddies” to practice chat reference skills with each other as they start to staff actual chat reference services. If there are new resources and changes in policies, librarians should be trained to keep abreast with the updates. Above all, ongoing training provides an opportunity for chat reference librarians to share experiences and discuss problems that they are reluctant to report individually (Coffman, 2003; Ronan, 2003).

Ongoing training is not only for existing chat reference librarians. New staff training is also part of the ongoing training task. Strategies should be developed for training new librarians as they join the service (Ronan, 2003). In the training program reported by Martin (2003), new librarians were paired with experienced staff members until they feel comfortable with chat reference environment.

2.3.5. Training Materials

Training materials are an important component of any training program. Kawakami and Swartz (2003) stated that providing easy access to documents of the competencies, best practices, and other training and policy materials is necessary if librarians are expected to perform accordingly. It is suggested that training materials are provided in multiple formats with similar key concepts to facilitate easy access and

accommodate different needs and learning styles (Coffman, 2003; Kawakami & Swartz, 2003).

Creating a website is a good way to organize and contain the training materials, such as software tips, contact information, transcript examples, etc. Librarians can easily access these materials by reading them on the web or printing them out (Martin, 2003). In the training program discussed by Hirko and Ross (2004), a binder that contained training handouts from in-class training sessions was provided to trainees and file dividers were also provided for them to place materials printed from the training website or other sources.

2.3.6. Assessment and Evaluation

The effectiveness of a training program cannot be determined without an evaluation. Trainees are usually asked to fill out a questionnaire to assess their initial skills before training, then complete another to evaluate what they have learned after the training. The pre-training assessment takes form of self-assessment. Hirko and Ross (2004) reported that the “Initial Skills Assessment” was conducted in the in-person orientation of the training program and trainees were asked to assess their personal skill level both in general and in digital reference, using a scale ranging from one (not confident) to seven (completely confident). As for the post-training evaluation, it either relies on trainees’ own feedback on helpfulness and effectiveness of the training, or can be conducted by formal evaluators. In the former situation, a questionnaire was first distributed right after the training program to elicit feedback on different aspects of the training such as design, content, and activities; then another one was sent out several months after the training program asking trainees to rate their digital reference skills

again, and report how these skills have been improved and their actual use of these skills (Hirko & Ross, 2004; Salem et al., 2004). In the latter situation, evaluation was conducted by evaluators observing trainee's performance in covering actual chat reference shifts with respect to their mastery of technical skills (Kawakami & Swartz, 2003).

2.3.7. Summary

Literature on digital reference training is reviewed in this section. A variety of training approaches discussed in the current literature is examined and presented in this review, which serves as the introductory background for one goal of the dissertation study – to determine the most effective training approaches for chat reference.

2.4. Digital Reference Education

Hauptman (2003) defined education of reference services by disintegrating it into five components: formal sequence of courses as part of the master's degree; on-the-job training; continuing education; evaluation and acquisition of substantive, multidisciplinary knowledge. This definition is a broad umbrella that covers almost every aspect of learning activities of reference librarians. Since on-the-job training has been discussed in the previous section, the literature on digital reference education presented in this section will only focus on the narrowly-defined education, which refers to formal reference courses provided by educational institutions in the field of library and information science in the preparation for the professional degree (Master of Library and Information Science, MLIS) or as continuing education for current practitioners.

While there has been a bulk of literature on digital reference training, not much effort has been devoted to the study of education in digital reference. Only a few publications have been retrieved that center on digital reference education, among which Harris (2004), Smith (2003), and Abels and Ruffner (2005) conducted reflective studies of digital reference courses offered in library and information schools, and Plumb (2004) provided a summary of a student's experience with incorporating digital reference practice in a regular reference course.

2.4.1. Current State of Digital Reference Education

Different approaches have been employed to examine the current status of digital reference education nationwide. Harris (2004) reported two reviews of LIS programs conducted by Lorri Mon and herself to find out how many of the programs included some form of digital reference as part of their curriculum. Mon's review was completed in 2003. In the reviewed twenty-four LIS programs, a total of thirty-three digital reference courses were offered, among which eight required "hands-on" digital reference practice. Mon's findings also indicated a mixed use of terms that have implications of digital reference. For example, courses that stated they included "online services" or "digital reference" were referring to online searching rather than the digital reference interview process; courses with sections on "computer-mediated communication", "Internet communication technology", or "Internet" were not covering digital reference.

The review conducted by Harris (2004) herself examined syllabi for sixteen reference courses offered by LIS programs in the United States and Canada. All had sections on digital reference and assigned readings, while only three incorporated "hands-on" practice as assignment.

Smith (2003) took a different approach to gauge the current digital reference education in master's degree programs. She conducted a survey among reference instructors instead of reviewing syllabi. All respondents indicated digital reference is covered in almost all the basic reference course offerings, primarily through lectures and readings and occasionally through guest speakers involved in digital reference. Part of the respondents reported that digital reference practice through Internet Public Library (IPL) or VRD is incorporated as assignments. A variety of aspects of digital reference, such as comparative evaluation of digital reference services, analysis of queries submitted to digital reference services, and digital reference service design, are also mentioned in reference courses taught by some of the survey participants. While eleven respondents currently offer web-based courses, no one gave specific evidence that learning in this way augments digital reference expertise. As for continuing education, only a small number of schools provide continuing education for practitioners in the form of workshops or videoconferences. Respondents also identified two challenges specific to teaching master's students about digital reference. One is "the sense that basic reference courses are already 'swamped' and it is difficult to integrate additional topics" (p.154); and another is "the need to give students practice in being digital reference librarians, but not having support materials and access to appropriate software" (p.154).

2.4.2. Digital Reference Courses

Several reference courses have been reported in the literature on digital reference education. Harris (2004) and Abels and Ruffner (2005) offered courses solely focused on digital reference, whereas Smith (2003) discussed a web-based reference course which

contributes to the enhancement of students' knowledge, skills, and attitudes as future digital reference librarians (Smith, 2003).

The digital reference course developed by Harris (2004) was a two-credit summer course titled "An Introduction to Digital Reference". The course objectives were (p. 117):

- To review the reference interaction with attention to search models and conducting reference in a digital medium;
- To read scholarly articles on digital reference;
- To familiarize students with online sources and conducting online searches;
- To practice reference in an asynchronous environment; and
- To practice reference in a synchronous environment.

During this course, students learned models of searching, reference interview techniques and considerations, and a brief review of online sources as well.

QuestionPoint was used to let students practice both synchronous and asynchronous reference. The class evaluation indicated that the course was rated as excellent or very good by 95% of the students. Seventy-nine percent of them rated the practice opportunity as excellent or very good, and more than half reported the level of intellectual challenge of this course as above-average comparing to other courses taken. A median of 12.5 hours was spent on this course and all the students considered it valuable. Comments from the students centered on the need for more time to practice and absorb what they learned.

In the redesign of this course, Harris decided to add more theoretical context and split it into two sections. The first section will cover the theory of digital reference, including "information behavior in the online environment with discussion of social

presence theory (Short, Williams, and Christie, 1976)” (p. 118), and “media richness theory (Daft and Lengel, 1984) from the CMC literature” (p. 118). In the second section, the focus will be shifted to the practice of digital reference, including “active learning in asynchronous and synchronous reference via the use of e-mail and chat software” (p. 118). Since the redesigned course was still in the planning stage as of Harris’s (2004) writing, it was not known then how it proceeded and how students evaluated it.

In collaboration with LSSI (now Tutor.com), Abels and Ruffner (2005) developed an online workshop for chat reference training at University of Maryland. This workshop was delivered three times in 2003-2004 and results of the first two offerings were reported in their article. The goal of this four-week online work shop was to explore the feasibility of teaching librarians to use sophisticated chat software without face-to-face instruction, and identify effective online training techniques for chat reference services. Participants were engaged in a step-by-step learning process through four modules:

- The virtual reference environment: familiarity with WebCT, virtual reference principles, practice and professional resources;
- Technology & software: understanding of software options and features; introductory use of simple and VRT software;
- Quality control: identification of “best practice” and beneficial use of transcripts; and
- Role playing: application of skills in simulation, self-assessment.

Evaluative methods for this workshop included participants’ overall satisfaction with the course, their perceived effectiveness of and preferences for specific training techniques, their completion of hands-on exercises, and their confidence level in

conducting chat reference services. The findings indicated that 87% of the participants completed the exercises; 90% rated the course content as good or excellent; over 90% indicated satisfaction with various aspects of the workshop and the same number of participants agreed that the teaching techniques were effective or very effective.

Based on the findings, Abels and Ruffner concluded that “successful participants need some computer experience, a flexible approach to technology issues and a positive attitude toward online training” (p. 24), and suggested asynchronous training methods to be incorporated for online courses for chat reference.

While Harris (2004) and Abels and Ruffner (2005) discussed their breakthrough efforts in developing courses solely dedicated to digital reference, Smith (2003) provided a series of insights on how web-based reference courses facilitated learning of digital reference. The course she taught was an online reference course which intended to “give students a framework for navigating the digital information landscape” (p.155). Aspects of the course related to digital reference included “experience with text chat, experience in email reference, exposure to librarians with real-world experience, experience in using digital resources, experience in creating digital resource, electronic journal club as a form of continuing education, and confronting issues in provision of digital reference service” (p.156).

Besides the extensive covering of digital reference in this course, Smith identified the similarities between being an instructor of an online course and being a digital reference librarian. Seven points were made in this regard.

- Collaboration: both online instructors and digital reference librarians need to collaborate with technology support staff to proceed with their work.

- Public (permanent) performance: online class sessions are archived and accessible; so are digital reference transcripts.
- Creating a learning environment: the content and organization of online classes are designed to support the learning objectives; digital reference collections are created to help users understand the “information landscape”.
- Media management: different media are adopted in both online teaching and digital reference service.
- Time management: online classes are organized in a more flexible way and the communication is not restricted in a specific time; digital reference service is provided at times that are convenient for users.
- Computer-mediated communication: both online instructors and digital reference librarians need to learn to compensate for limitations of the current digital communication media.
- Partnership: the archive of online class sessions can be shared with other faculty member and teaching assistants; transcripts of digital reference can be used in staff training.

No class evaluation was reported in this study. Only the narrative of a student about the value of her experience with the course was provided.

2.4.3. Perceptions from Students

Students enrolled in master programs of library and information science play an important role in digital reference education since they are the ones to judge the value of what they have learned. Their perceptions reflect how digital reference education prepares them for the professional career in the library. Plumb (2004), as an alumna of

School of Information at University of Michigan, discussed her experience of practicing with IPL's email reference service, and how this experience helped her master skills necessary for reference in any medium. She stated that the asynchronous interaction of email reference allows students to develop skills like examining and evaluating a patron's question with care, figuring out where to start searching, organizing the information gleaned and responding to the patron in a comprehensive way, without the stress of patrons being present. Another point she made was about the QRC program which was used to manage questions and answers. Plumb valued the program highly because it created a community where students could communicate with and learn from professional librarians who also worked for IPL and its clearly-defined guidelines urge students to produce appropriate and comprehensible answers to submitted questions.

The above positive comments about IPL experiences in a reference class were echoed by the survey results reported by Harris (2004). A class of students assigned to volunteer for IPL email reference service filled out a survey regarding this assignment. In addition to the benefits from the IPL assignment, they reported challenges in the email reference environment, including difficulty in obtaining clarification from information seekers, and lack of feedback from users making them wonder if the answers they provided were sufficient.

2.4.4. Summary

This literature review examines the status quo of digital reference education, the current offering of courses dedicated to digital reference, and how students react to digital reference education. The purpose of this literature review is to shed light on how to

incorporate results from the dissertation study in educational design in order to better prepare students in their future LIS profession.

2.5. Methodology

As a practical profession where behavioral objectives are important, librarianship enhances itself by achieving a variety of competencies in the increasingly diverse working environment. Competency studies in the field of library and information science have been extensively reported in the literature.

There are two primary approaches involved in competency studies: identification and validation (Griffiths & King, 1986). Since the dissertation study is a competency validation study as it is seeking subjective perceptions from librarians to determine the degree of essentialness of chat reference competencies identified from the literature, and the degree of effectiveness of training approaches to acquire them. Therefore, this literature review only focuses on the methodologies of competency validation studies presented in the LIS literature. In this literature review, a general introduction of two commonly used instruments in competency validation studies, Delphi study and survey, is presented; and then a review of competency validation studies using either of these two methods is provided, with special attention paid to their methodological design.

2.5.1. Delphi Study

As a research method, Delphi studies have been mostly employed in forecasting future events based on the opinions of experts. It is a technique of gleaning and refining the subjective input from a group of people, usually experts, in an attempt to achieve consensus about some aspect of the present or the future (Fischer, 1978).

The opinions of participants are collected through questionnaires where anonymity is ensured. Usually, a Delphi study is an iterative process and has to go through three or four rounds since the goal is to obtain consensus from the group. Researchers summarize the results from each round by means of statistical analysis, such as means, inter-quartile range, and standard deviation, etc., and return the summary of the group responses to each individual participant.

Through the controlled feedback, participants have access to the overall picture of the group input and the distribution of different kinds of responses. In this way, individual participant can compare his/her own opinions with those of the rest of the group and then decide whether to change it or not. Dalkey (1963) discovered that opinions tend to have a large range at the beginning but in the following rounds the range is significantly narrowed and consensus starts forming.

In a Delphi study, participants are asked to provide justification or explanation when their opinions fall out of the range of group consensus. Researchers can have a better understanding and analysis of the results by having participants state their underlying reasons for insisting on their own opinions and remaining outside the consensus range.

One prominent difficulty in conducting Delphi studies is expert selection. Deciding the criteria in expert selection has always been a problem. Expertise, experiences, and knowledge in a particular field are currently the primary criteria for judging an expert's ability to forecast future events. However, different experts may have different pursuit and interest in different sub-fields, and their opinions can be biased by their background and interest so as to make the consensus less reliable than expected.

One possible way of alleviating this problem -- self-rating, was proposed by one of the Delphi reports published by RAND (Fischer, 1978). Participants were asked to rate their knowledge they thought they had on each item on a Delphi questionnaire when they responded to it.

Whether or not the Delphi method is appropriate for a study depends on the nature of the research. Generally, if the problem “does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis” (Linstone, Turoff, 1975, p4), the Delphi method can be considered as a feasible approach to tackle the problem. As for the length and scale of the study, such as how many rounds need to be conducted, how many participants need to be recruited, researchers should take into consideration the specific requirement of the research design to make the decision.

2.5.2. Survey

Survey is one of the frequently used research tools by social researchers, and “can be used profitably in the examination of many social topics” (Babbie, 1990, p. 45). The implementation of survey methodology involves constructing and administering a questionnaire to elicit information (for example, attitudes) relevant to the researcher’s subject of inquiry from a sample of studied population.

The primary sampling method in survey research is probability sampling, where a set of elements from a population is randomly selected in a way that descriptions of those elements can most accurately describe the total population from which they are selected (Babbie, 1990). Different types of sampling designs include simple random sampling, systematic sampling, stratified sampling, and multistage cluster sampling, and probability

proportionate to size (PPS) sampling. Details of these sampling designs can be referred to Babbie (1990).

As for sample size, “the sample size in survey research is generally large, although it is not possible to provide an exact range. A survey research project may include as few as 100 participants or as many as 250 million.” (Dane 1990, p. 120). Since it is almost as easy to distribute a survey to a large sample as to a small one, survey research tends to favor large samples to achieve better population representativeness (Jordan, 2004).

When a survey questionnaire is constructed, both open-ended and close-ended questions can be used to elicit data for different purposes, as long as they are clear, relevant and not double-barreled. Once the instrument is established, there are several different ways to distribute it. Self-administered survey is an easy and convenient way to collecting responses. If the questionnaire is created on the print medium, it can be mailed to, handed out to, or picked up by people at a certain place; if it is created on the electronic medium, it can be emailed to selected samples, or made available on a Web page for a wide audience to access. An obvious disadvantage of the survey method is low response rate, which might be mitigated by sending out follow-ups or providing small rewards as incentives. In the case of Web-based survey, it is also difficult to ensure a representative selection of the population since the respondents are self-selected (Jordan, 2004).

Survey can be conducted by researcher-administered interviews as well, either face-to-face or by telephone. In both cases it is easier to clarify items on the questionnaire to the subject, but more costly in terms of implementation. Given the variety of options to

conduct survey research, researchers should take into considerations specific context of the study, and design the most appropriate questionnaire and administer the survey in a way that suits the study best.

2.5.3. Review of Selected Literature

In this section, competency studies employing the above two methodologies are examined with a focus on their methodological design and data analysis.

2.5.3.1. Studies Using Delphi method

Fiedrich (1985) conducted a two-round Delphi study across the country to identify competencies needed by both library and information science professionals in the next ten years. The study aimed at eliciting input from leading practitioners to reach consensus on the importance of selected competencies for future practitioners. Thus, the thirty-four competencies, identified from previous literature, were generic and not related to a particular sub-field of the LIS profession. The panel of experts was randomly selected from members of four primary associations in LIS field and consisted of 300 people to allow for the high drop-out rate of typical Delphi studies. The response rate for this study was 51%. In the first round, panelists were asked to rate the importance of the competencies on a four-point Likert scale, and the responses were examined for statistical analysis, such as frequencies, mean and standard deviation; in the second round, questionnaires with the indication of distribution of the mean scores from the first round were returned to the panelists, and their responses were analyzed and the final rank order of the competencies was identified.

In the attempt to identify and assess the professional preparation competences which should be included in a curriculum of graduate education in library and

information studies from two different perspectives, Chandler (1995) conducted a two-round Delphi study to elicit input from experts in law librarianship, and compared the results to those from the survey study conducted among a random sample of private law librarians. The survey method will be examined in the next section that focuses on studies employing this particular methodology.

In selecting experts for the Delphi panel, Chandler used research productivity and professional activity as the criteria to ensure the panelist's expertise in the investigated field. Fifty-two experts were identified according to the criteria and the response rate for this study was 87%. In the first round, they were asked to list the ten most important professional preparation competences for law librarianship education, and 389 competences were reported. In the second round, the 389 competences were reduced and compiled to a list of forty-two, and the experts were asked to rate the importance of these competences on a five-point Likert scale. Results from the study were cross-tabulated with demographic variables such as type of libraries, job title, and year of experience, etc., in order to determine if there was any significant difference between perceived competences and various factors that might have affected the perception.

Prestamo (2000) conducted a two-round Delphi study to develop a consensus on inventory model of technology and computer skills for academic reference librarians. A number of fourteen panelists were selected based on their publication records and stature as presenters at national library conferences, and from the officers and members of the board of directors of a state chapter of the Association of College and Research Libraries. In the first round, panelists were provided a list of technology and computer skills and asked to comment on each skill in a separate statement in terms of how much it was

required of academic reference librarians. Results from the first round were analyzed and sorted, then a condensed list of statements was used to create the questionnaire for the second round, where panelists were asked to rate the importance of each item using a five-point Likert scale. Results from the second round came back with a reasonable degree of apparent consensus so that a third round was not necessary. In data analysis, ratings of the skills were collapsed two categories: negative and positive, and Chi square analysis was conducted to determine if there was any significant difference between these two types of response for each skill, and indicate the level of consensus.

2.5.3.2. Studies Using Survey Method

Survey method has been a popular instrument for competency validation studies, all of which had to go through three steps in implementing this method – selecting subjects, creating the questionnaire and analyzing collected data. A review of the literature will be presented in the sequence of the three steps to examine how different studies concur or differ in these aspects.

Identification of Study Subjects

Study population is usually determined by the investigated topic and consists of people whose knowledge and opinions are most relevant to the studied competencies, such as professionals, their peers, their area supervisors, their administrators, educators and related tangential professionals. The size of population varies from study to study. If a study is conducted nation-wide or the population is too large to be manageable, the normal approach is to select a random sample as the subjects to represent the population. In Chandler's (1995) study of law librarians' competencies, a total of 346 law librarians were randomly selected using the systematic sampling technique from the population that

worked in law libraries that met the type and size requirements of the study. In the attitudinal study conducted by Todaro (1984) to assess opinion or attitude toward competencies of children's librarians, seven groups of professionals due to their proximity to or knowledge of, interest in and experience with children's librarians were identified and a random sample of 3312 people was selected. Pfister (1982) selected a random sample of 523 educators from 1872 schools in Florida to determine the perceptions of teachers, principles and media specialists regarding a list of competencies for school media specialists proposed by professional leaders.

However, if a study is restricted to certain region or the population is delimited by a set of well-specified parameters, the manageable size of the population allows the study to consider the entire population as the subjects. In the study of identifying competencies for librarians performing public service functions in public libraries, Mahmoodi (1978) only focused on Minnesota libraries and the study subjects were a group of 242 Minnesota librarians identified by forty-five public library directors as responsible for public service functions. Crowe (1973) surveyed all the students (n=312) who graduated from the Library Science Department at Edinboro State College from 1964 to 1972 to determine their perceptions as to the required on-the-job competencies developed through the current curriculum, and not received through the current curriculum, in the attempt to shed light on curriculum revision for this program. Krentz (1986) conducted a survey study among three groups of educators in public school districts in Wisconsin to determine and analyze the difference between their perceptions about ideal competencies of full-time district library media director and 690 subjects that met the study requirements were identified and contacted.

Instrument Design

Questionnaires in survey studies for competencies mostly consist of a list of selected competencies for survey subjects to assess the importance of them on a five-point scale. There are three ways reported in the literature to identify the competencies based on which a questionnaire is created.

Input from an Expert Panel

An expert panel is a good resort to brainstorm for competencies if very few competency studies have been conducted in the investigated field. Chandler (1995) used the results from a previous Delphi panel of law librarianship experts as the basis to create the questionnaire for the survey study among law librarians. Mahmoodi (1978) formed a panel of seven Minnesota public librarians recommended by thirty Minnesota Library Association officers and section and round-table members for their ability to articulate the competencies requisite to public services librarianship and each panelist submitted a list of words and phrases describing knowledge, skills and attitudes expected of public services librarians. Then, a panel meeting was organized to reach consensus on a final composite, categorized list of competencies, based on which the questionnaire was created and sent to the survey subjects.

Results from a Literature Review

Reviewing the existing literature is a reasonable approach to identify competencies if the literature presents a well-developed pool of competencies to select from in the investigated field. Krentz (1986) created the questionnaire based on a general review of the library literature with a focus on competencies of library media director for his study of competencies of full-time school district media directors. Todaro (1984)

located competencies of children's librarians in journals, monographs, standards and guidelines, competency lists, task analysis reports, etc. Chaudhry and Yeen (2001) identified the competencies from an extensive literature review for their study of professional staff of public libraries in Singapore. Buttlar and Mont's (1996) study of LIS competencies to facilitate curriculum planning was a replicate of their work in 1987 (Buttlar & Mont, 1989), and both identified the competencies from the literature. The old one relied mostly on the competencies identified from the study conducted by Griffiths and King (1984), whereas in the more recent one, a review of the professional literature was conducted to expand and/or modify the list adopted in the previous study.

Official Documents Issued by an Institution

Crowe (1973) used twenty-nine role competencies listed under the general statement of role competencies developed by the LIS program at Edinboro State College as the basis for the survey instrument. In this case, the study goal was to assess the opinions of students who graduated from this particular program regarding competencies they achieved from the curriculum, thus, it made sense to simply use the competency statements developed by the program itself.

In Pfister's (1982) study, the competencies used in the questionnaire were drawn from a competency list proposed by a Media Specialist Task Force and submitted to Council on Teacher Education of the Florida Department of Education. The objective of this study is to find out which of the proposed competencies were considered essential by actual practitioners so that this competency document became the only source of the questionnaire.

Data Analysis

Different study designs result in different data analyses. One thing in common among most of the studies is the statistical analysis conducted to determine different variables' relationship with survey responses in addition to the descriptive report of competency ratings.

Demographic variables such as library type, years of work experiences, position, education, etc., were frequently collected in these studies and statistical methods were used to analyze the responses and determine if there was significant difference between ratings on a particular competency from different demographic groups (Krentz, 1986; Chandler, 1995), or ratings on different competencies from the same demographic group (Todaro, 1984). In other cases, researchers were interested in the relationship between different ratings (different points on the Likert scale) on each competency (Crowe, 1973; Chaudhry & Yeen, 2001), or the relationship between responses on non-competency-related demographic questions to supplement competency findings (Buttler & Mont, 1996).

2.5.4. Summary

The most distinctive feature of Delphi studies, as mentioned earlier, is to reach consensus among panel experts to forecast future events. The justification for using Delphi method in Fiedrich's (1985) study was quite obvious: the study objective was to forecast most needed competencies for information professionals in the coming decade. However, the Delphi method was slightly modified in implementation in that the first-round questionnaire did not contain open-ended questions as standard Delphi studies

would but directly asked close-ended questions for competency ratings. The panel selection process was rather random given that no well-defined criteria were applied.

In comparison, in another Delphi study reviewed above (Chandler 1995), the Delphi panel was carefully selected and open-ended questions were asked in the first round. However, the purpose of the study was not to reach any consensus and the study stopped at the second round where panelists were asked to rate the competencies identified from the first round. The same questionnaire from the second round was used in a following survey among law librarians so that responses from both the panelists and librarians can be compared to each other, which was the main objective of the study. Thus, the Delphi study in this context was not fully functioning because very few efforts on providing controlled group feedback to panelists were exerted to reach consensus. In some sense, the first round of this Delphi study was simply to identify competencies that can be used in the questionnaire for the second round and the survey. It was similar to what Mahmoodi (1978) did for public service librarians. The only difference was the way the panel was organized to identify competencies.

In order to benefit from the Delphi method, the purpose of the study has to be reaching consensus among a representative expert panel in terms of future forecasting or item prioritizing, whereas the survey instrument is more generic and suitable for any study on eliciting subjective information relevant to the investigated topic. The topic of this dissertation is to determine essential competencies and effective training techniques for chat reference librarians. Participants of the study are expected to rate the importance of chat reference competencies and training approaches identified from the literature. The study does not aim to reach consensus among a small group of experienced chat reference

experts, but to seek input regarding chat reference competencies and training from as many librarians as possible. Thus, the survey instrument is considered to be a more appropriate methodological instrument for this study.

2.6. Chapter Summary

In this chapter, literature in five areas related to the dissertation topic is reviewed – reference evolution under the influence of new technologies, competency-based education and training, digital reference training, digital reference education, and methodology. The five areas are closely connected to the investigated topic in this dissertation – the determination of essential chat reference competencies and effective training techniques in delivering these competencies. Thus, the literature review presented in this chapter provides a comprehensive contextual background for the dissertation study.

Chapter III. Research Design

The dissertation seeks to determine the essential competencies and effective training techniques for chat reference services. In this chapter, the methodological design of the dissertation study is discussed, including the overall design, selection of data collection instrument, data analysis methods and validity and reliability of the research design.

3.1. Two Approaches of Competency Studies

There are two primary approaches involved in competency studies: identification and validation (Griffiths & King, 1986). As indicated in the literature of library and information science, competency identification can be achieved through a variety of methods:

- Analysis of job announcements (Fisher, 2001);
- Collecting input from general-purpose meetings like a department retreat (Benefiel, Miller & Ramirez, 1997);
- Organizing an expert committee or a task force to brainstorm and develop a list of competencies (Stacy-Bates, Fryer, Kushkowski, & Shonrock, 2003; Mouer, 1997); and
- Task or role analysis conducted through interviews or performance observation (Griffiths & King, 1986; Canelas, 1970).

Competency validation takes a step further to examine the value of identified competencies in the related profession. According to Griffiths and King (1986), there are two types of validations to consider in the process of achieving information professional competencies. The first type involves validating the definition, identification and description of competencies; the second type involves the confirmation that training or education relating to specific competencies will result in associated acquisition of them.

The dissertation study is a competency validation study as it is seeking subjective perceptions from librarians to determine the degree of essentialness of chat reference competencies identified from the literature, and the degree of effectiveness of training techniques to acquire them. Two primary research questions of this study are:

1. What are the essential competencies that librarians need to master in order to provide chat reference service?
2. What are the effective training techniques that could deliver the essential chat reference competencies?

Answers to the first research question validate the definition, identification and description of chat reference competencies in terms of how they are perceived by librarians. Answers to the second research question present one of several validation venues for the results of training/education in delivering chat reference competencies; other venues might include evaluative exams, direct observation of work performance, etc. The following figure, Figure 3-1, delineates how the research questions of the study correspond to the two kinds of competency validation.

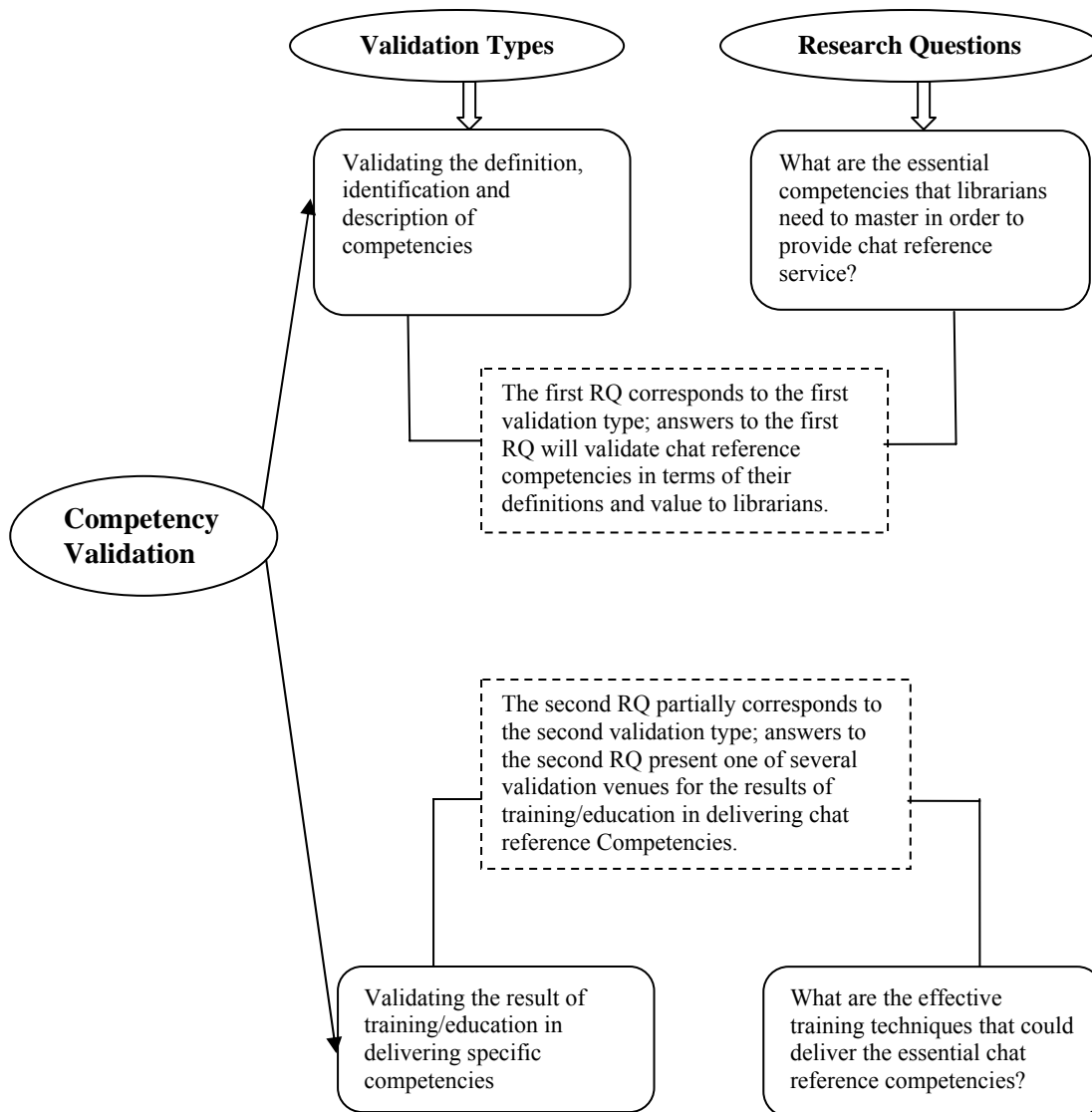


Figure 3-1. Research questions and competency validation study

3.2. Methodology

This study employed the survey instrument for data collection. Two surveys were conducted to glean data on essential competencies and effective training techniques for chat reference respectively. The survey on competencies was conducted first, and the survey on training techniques was then built on the results of the previous survey.

The close examination of the survey methodology can be found in Chapter 2, section 2.5.2. Methodological specifics of how the survey research was implemented in the dissertation study are provided in the next section.

3.3. Methodological Specifics

3.3.1. Population Identification

All previous survey studies of digital reference competencies targeted librarians staffing digital reference services, including both asynchronous (email-based) and synchronous (chat-based) services. Since this study is focusing on competencies and training techniques for chat reference only, the population for this survey are chat reference practitioners – anyone who has experience working with chat reference service. Librarians that only provide email reference service were excluded from the study.

Among all library professionals, chat reference practitioners have the most knowledge of and experience with chat reference. The dissertation study aims at eliciting input from librarians or library staff regarding the most essential competencies and most effective training techniques for chat reference. Thus, conducting the survey among chat reference practitioners was expected to result in the most relevant and valid responses for the investigated topic.

3.3.2. Sampling

The sampling technique for both surveys was self-selection. Respondents to both surveys were self-selected. The reason that self-selection was considered to be the most appropriate sampling technique in this study is because it is nearly impossible to identify individual members of the population of chat reference practitioners.

Chat reference is a fairly new phenomenon and still growing. The number of libraries joining the scenario is constantly increasing. However, there are no up-to-date directories or indexes that keep track of libraries offering chat reference service. Efforts were made in establishing such lists when chat reference just came out¹, but they soon became antique because they were not updated frequently enough to catch up with the changes. In the 2005 ALA conference, the RUSA MARS² Virtual Reference Committee decided to initiate a project to create an online index to keep track of all of the chat reference services across the country (personal communication with Hirko, June 30, 2005). Unfortunately, this index was not available at the time of the implementation of the dissertation study.

If the extant lists were to be utilized as the basis to identify individual members of the chat reference population, a critical amount of information would be missing from the lists. Chat reference service has been growing rapidly, especially in the past few years. But in the mean time, while more and more libraries are jumping on the bandwagon of providing chat reference service, some early adopters of the service have decided to terminate it because of low usage and other problems (Horowitz, Flanagan, & Helman, 2005; Dee, 2003). Apparently these changes are not reflected on the outdated lists, and a selected sample based on these lists would not be representative of the population at all.

Given the fact that little information about the chat reference population is known, an alternative sampling method, self-selection, was employed in the study to select a

¹Such lists include Stephen Francoeur's *Index of Chat Reference Services* (not updated since August 2002), Bernie Sloan's list of *Collaborative Live Reference Services* (not updated since August 2004), Gerry McKeirnan's *A Registry of Real-time Digital Reference Service* (not updated since March 2003), and LIS Wiki Chat Reference Directory (the list is claimed to be incomplete on the website).

²Reference and User Services Association Machine-Assisted Reference Section.

sample among chat reference practitioners. Needless to say, the self-selection method has its own problems, for example, it is likely to result in an atypical and unrepresentative sample of the wider population. However, in the situation where the size of the population is unknown, the self-selection approach is the only appropriate sampling method for the study.

The unrepresentativeness and bias inherent of the self-selection method can be reduced by making the surveys accessible to the widest possible chat reference population. Measures were taken to promote the surveys so that they can reach as many chat reference practitioners as possible. Details of these promoting measures are discussed in the “Implementation” section.

3.3.3. Questionnaire

3.3.3.1. Survey I.

The questionnaire of the competency survey was established based on two sources: a thorough literature review on digital reference competencies and results from preliminary interviews with local librarians in Chapel Hill and Charlotte, North Carolina regarding competencies they considered important for chat reference.

There has been an existing body of literature discussing chat reference competencies, and an exhaustive literature review was conducted to identify all the proposed competencies from the literature. This literature review constituted the primary basis for the questionnaire. In the mean time, a set of preliminary interviews was conducted with a convenience sample of experienced chat reference librarians from diverse backgrounds, such as public library, academic library, medical library, stand-alone service and collaborative service in North Carolina. In these interviews, librarians

were asked to propose the competencies they considered important for chat reference. Some of the interview results overlapped with the literature review; some were never reported in the literature. The final questionnaire was built on the combination of these two sources. Details of the preliminary interviews can be found in Appendix II.

Chat reference competency items on the questionnaire were rated by respondents in terms of their essentialness on a seven-point Likert scale, with the first point being “not important at all”, the seventh one being “very important”, and no labels for the intermediate points. Equal intervals could be assumed for the scale as only the two ends were anchored.

A total number of thirty competencies under eight areas were listed in the questionnaire (see Appendix III for details). Participants of the survey were asked to rate both the individual competencies and the competency areas, so that the competencies can be examined at both the micro- and macro-level and more informative results could be achieved. At end of each competency area, participants were asked to provide up to two additional competencies they considered important but not included in the survey. Their suggestions would serve as a supplemental source where important chat reference competencies could be discovered. In order to ensure the least variation among participants’ understanding of the competencies, definitions for each competency area, and explanatory elaboration for each individual competency are provided (see Appendix IV for details).

Demographic information of participants was collected as well. The demographic variables include:

- Chat reference experience – the number of years working with chat reference;

- Level of comfort in working with chat reference service;
- Professional degree – whether or not participants hold a professional degree in LIS;
- Length of time since receiving professional LIS degree;
- Provision venue: via IM /commercial chat software/home-grown software;
- Work setting: academic/public/medical libraries, etc.;
- Service mode: stand-alone service/collaborative consortium.

Once the questionnaire was established, a pilot test was conducted among a convenience sample of four chat reference librarians. They were asked to think aloud when they completed the survey, and their questions and thoughts of the questionnaire were recorded in notes. Then the questionnaire was revised based on the feedback from the pilot test before it was released to the public.

3.3.3.2. Survey II.

The second survey intends to evaluate training techniques for their effectiveness in delivering chat reference competencies, and this survey was developed based on the results from the first one. From the first survey, twenty-one competencies with a mean rating over 5.5 (out of seven) were determined to be essential competencies, which were then utilized as the basis for the second survey.

A thorough literature review on chat reference training was conducted and a total number of twenty-three training techniques dedicated to the twenty-one essential competencies were identified from the literature, organized into five dimensions, and listed on the survey to be rated by respondents in terms of their effectiveness in delivering those competencies. Definitions for each training technique were provided as

well so that respondents can have a consistent understanding of the questionnaire.

Details of this survey can be found in Appendix V and VI.

The rating scale used in the second survey was the same as the one in the competency survey. Participants were asked to rate the effectiveness of the listed chat reference training techniques on a seven-point Likert scale with the first point labeled “not effective at all” and the seventh one labeled “very effective”. For each training technique, participants were also asked whether or not they had experience with it in their own training programs. Only did they answer “yes” to this question could they proceed to rate the training technique’s effectiveness. Thus, ratings of the surveyed training techniques only came from respondents who had experienced them. Meanwhile, the question asking for participants’ input on additional training techniques was listed in the second survey as well in the hope of expanding the parameter of effective chat reference training.

The same demographic information was collected in the second survey as well. In addition, respondents were also asked to provide the perspective from which they evaluated the training techniques, and their options included “as a trainer”, “as a trainee” and “both”. Participants of the second survey did not necessarily have to participate in the first one since results of the two surveys are not related to each other in terms of the identities of participants.

3.3.4. Implementation

Both of the surveys were administered in a Web-based fashion. They were published in one of the commercial online survey services – surveymonkey.com, and made accessible to the community of chat reference practitioners by different means.

As mentioned earlier, one concern with web-based surveys is that the sample might not be representative due to the coverage bias caused by people who do not have access to the Internet or choose not to access the Internet (Kaye & Johnson, 1999; Crawford, Couper & Lamias, 2001). However, if the survey is targeted to specific populations where Internet access is extremely convenient and the Internet is heavily used, the coverage bias is likely to be less of a concern (Solomon, 2001). In this study, the survey population is chat reference librarians, who provide reference services through real-time Web-based chat sessions. Thus, it is safe to assume that Internet access is not an issue for them, and then the coverage concern should not be a problem that might potentially skew survey results.

For both surveys, an invitation email (see Appendix VII) was sent to popular listservs which reference librarians are most likely to subscribe to, calling for participation and possible forward of this email to relevant people who are not on the lists. About two weeks after the initial invitation message was sent, a follow-up message was sent out to the listservs reminding potential participants of the survey in an attempt to elicit more participation. These lists included:

- Listservs for digital reference librarians, such as *DIG_REF* and *livereference*;
- Listservs for electronic resources librarians, such as *ERIL-L*;
- Listservs for discussions of library technology issues, such as *LIS-Scitec* and *STS-L*; and
- Listservs for reference librarians in general, such as *publib*, *libref-l*, *LIS-LINK*, *Buslib-L*, *ili-l* and *Govdoc-L*.

The first survey, the survey on chat reference competencies, was launched in mid-May of 2006 and lasted for five weeks. A total number of 597 responses were collected for this survey. The second survey, the survey on chat reference training techniques, was launched in mid-July of 2006 and lasted for five weeks as well. But only 286 respondents participated in this second survey. One possible explanation for this decline in survey participation is that the second survey was conducted far into the summer and the potential participants are likely to be away on vacation and not able to participate. In each survey, participants were provided an incentive – one of the respondents was randomly selected and awarded \$100 as a donation in the respondent's name to his/her library.

3.3.5. Data analysis

Two kinds of data analysis methods – descriptive statistical analysis and analysis of relationship between variables, were employed to scrutinize the responses for both surveys in order to answer the research questions raised in this dissertation study. The three research questions are:

1. What are the essential competencies that librarians need to master in order to provide chat reference service?
2. What are the effective training techniques that could deliver the essential chat reference competencies?
3. How do context variables such as service mode, work setting and provision venue, etc., correlate with chat reference competencies/training techniques?

The first two questions were answered by the descriptive statistical analysis of the survey results, whereas the last one was answered by the analysis of relationship between variables. Details of the data analysis methods are presented below.

3.3.5.1. Statistical summary

Descriptive statistical analysis of the survey findings was conducted to generate a straightforward overview of the responses on chat reference competencies and training techniques. Measurements employed included:

- Total number of respondents participated in each survey and number of responses for each chat reference competency and training technique listed in the surveys – this approach was to provide an umbrella view of how the surveys were responded;
- For every chat reference training technique, number of respondents who experienced it or did not experience it – this approach was to present a picture of how the surveyed techniques are currently being employed in chat reference training;
- Number of responses for each demographic question in both surveys – this approach was to examine the number of participants that answered each demographic question;
- Distribution of respondents across different demographic groups in both surveys – this approach was to determine the composition of respondents for each demographic variable so that the demographic delineation of the survey respondents could be achieved;
- Overall ratings in both surveys (ratings on chat reference competencies and training techniques), including the mean and standard deviation – this approach was to generate a prioritized list of chat reference competencies and training techniques so that essential competencies and effective training techniques could be determined; and

- Summary of respondent's suggestions on additional chat reference competencies and training techniques – this approach was to examine respondents' input that could potentially bring new perspectives on chat reference competencies and training.

3.3.5.2 Relationship between demographic variables and ratings

Examination of the relationship between respondents' ratings (both competency ratings and training technique ratings) and their demographic characterization can provide a more detailed view on the contextualization of chat reference training and education. In order to answer the third research question, ANOVA analysis was conducted to determine if there is any significant difference in the ratings between different demographic groups.

- Chat reference experience – do respondents with different length of chat reference experience have significantly different ratings on chat reference competencies and training techniques?
- Comfort level with chat reference service– do respondents with different comfort level with chat reference service have significantly different ratings on chat reference competencies and training techniques?
- Professional LIS degree – do respondents with different status on profession LIS degree have significantly different ratings on chat reference competencies and training techniques?
- Length of time since receiving the degree – do respondents who have had their professional LIS degree for different periods of time have significantly different ratings on chat reference competencies and training techniques?

- Provision venue – do respondents who provide reference service using different software platforms have significantly different ratings on chat reference competencies and training techniques?
- Work setting – do respondents working in different type of libraries have significantly different ratings on chat reference competencies and training techniques?
- Service mode – do respondents working in different service modes have significantly different ratings on chat reference competencies and training techniques?
- Evaluating perspective – do respondents working as a trainer have significantly different ratings on training techniques than those working as a trainee, or both a trainer and a trainee?

3.4. Validity and Reliability

Issues of validity and reliability of the methodological design are addressed in this section.

3.4.1. Internal Validity

Whether a study possesses internal validity depends on whether it properly demonstrates a causal relation between the independent and dependent variables (Brewer, 2000). The key question that should be asked when considering internal validity is “are we measuring what we think we are measuring” (Kerlinger, 1984, p. 417).

One primary factor affecting the study’s internal validity is the selection bias possibly caused by the sampling method – self-selection. Admittedly, self-selection

completely relies on the potential survey subjects to volunteer to participate in the study and may skew the findings by not being able to generate a representative sample of the population. However, as stated in the section of “methodological specifics”, the current population of chat reference practitioners is unidentifiable, and hence, none of the random sampling methods would be effective enough to create a representative sample for the study either. Thus, given the unknown size and demographics of the population, it is unlikely to ensure the certainty of a representative sample. Under such circumstances, the self-selection method was the most appropriate resort in sampling the chat reference population. Still, in order to reduce the selection bias to the least extent, a number of approaches were taken so that the surveys could be made accessible to as many chat reference practitioners as possible:

- The invitation email was sent to a total number of eleven listservs where chat reference librarians are most likely to be subscribers;
- In the invitation email, recipients were encouraged to forward the message to chat reference practitioners they knew if they themselves did not work with chat;
- About two weeks after each survey was launched, a follow-up message was sent to all the listservs again in the attempt of generating more responses; and
- For each survey, a \$100 reward was promised for a randomly selected winner.

Another concern with regard to internal validity is how the surveys were administered. Both surveys were published via a Web based survey service – surveymonkey.com, and the primary issue with Web-based surveys is the coverage bias possibly produced by lack of input from people without the Internet access. Again, as

stated in the “methodological specifics” section, the study was targeting chat reference practitioners whose job involves substantial use of computers and the Web, and access to Web-based surveys should not be a problem to them. Subsequently, the concern of coverage bias can be alleviated.

Thirdly, the questionnaires for both surveys were pilot tested by four experienced chat reference librarians to ensure the clarity of the wording and for each competency and training technique listed on the survey, a definition was provided so that the participants can retain a consistent understanding of the survey. These definitions were piloted tested as well. All these efforts were made to guarantee that the questionnaires would convey the same message to every respondent with the least possible confusion and misunderstanding.

As far as data analysis is concerned, only valid responses were taken into consideration in the examination of competency and training technique ratings. In the competency survey, in addition to the seven point Likert scale, respondents were offered the option of “N/A” if they did not think a rating of the competency was applicable. Then, in the data analysis, the “N/A” responses were all excluded because they were not valid in terms of rating the importance of surveyed chat reference competencies. In the survey on training techniques, respondents were asked whether or not they had experienced a particular training technique before they could vote on its effectiveness. Sometimes, respondents who answered “no” to this question still provided a rating for the training technique, and such a response would be deemed invalid and excluded from the analysis of training technique ratings. Only ratings from those who answered “yes” were considered to be valid.

To sum it up, in order to achieve the internal validity of the study, a number of different measures were taken to make sure that data collection and data analysis were carefully and accurately implemented in this study so that the relationship between different variables could be correctly delineated.

3.4.2. External Validity

External validity refers to the generalizability of a study, that is, the results from the study could hold across different experimental settings, procedures and participants (Brewer, 2000). The goal of this study is to create a framework of chat reference competencies and training techniques that can be applicable in multiple contexts. A total number of 883 responses were received for the two surveys and this large size of the sample, although lacking certainty in representing the chat reference population, indicates generalizability to some extent. In the meantime, the researcher made every effort to provide a detailed description of the setting, procedures and content of the study, so that others might determine how generalizable the findings would be in other situations. It is possible that some or all of the findings can be tested in other settings in the future.

3.4.3. Reliability

Reliability, or repeatability, refers to the consistency of the measuring instruments in an experimental setting. Since this study employed mostly quantitative methods in seeking the perceptions on chat reference competencies and training techniques, it is expected that replication of the study may result in similar results unless there is a change in the landscape of chat reference service and hence, in chat reference practitioners' perceptions on what competencies are important and what kind of training is effective.

As a matter of fact, the two surveys conducted in the study shared the same sampling and administering method, and the demographic information of the respondents in both surveys displayed similar patterns. Thus, the reliability of the measuring instrument has been supported by the consistent demographic characterization of the survey respondents. It is safe to assume that if the methods employed in this study are to be repeated under similar circumstances, consistency in the findings can be anticipated.

Chapter IV. Chat Reference Competencies

The dissertation study seeks to answer three research questions and two survey studies were conducted in the quest for answers. The first survey was to elicit chat reference practitioners' perceptions on the essentialness of a list of competencies identified from the literature so as to answer the first research question "What are the essential competencies that librarians need to master in order to provide chat reference service." The second survey was to collect responses regarding the effectiveness of a list of training techniques in delivering the essential competencies determined from the first survey in order to answer the second research question "What are the effective training techniques that could deliver the essential chat reference competencies." As for the third research question, "How do context variables such as service mode, work setting and provision venue, etc., correlate with chat reference competencies/training approaches", analysis of relationship between variables in both surveys could provide the answer.

In this section, results from the first survey, the survey on chat reference competencies are analyzed and reported, including both descriptive statistical analysis and analysis of relationship between variables. The same analytical methods have been applied to the second survey and findings from the second survey are reviewed and presented in Chapter V.

During a span of five weeks, a total number of 597 chat reference practitioners responded to the survey on chat reference competencies. These responses are examined in the following order:

- Demographic information;
- Ratings of chat reference competencies;
- Suggested chat reference competencies; and
- Analysis of relationship between variables.

4.1. Demographic Information

At the beginning of the survey, demographic information was collected.

Respondents were asked eight questions regarding their demographic background. Listed in Table 4-1 is the number of respondents for each of the demographic questions.

Demographic Question	Number of Respondents
How did you become a chat reference librarian?	595
How long have you been working as a chat reference librarian?	597
What is your comfort level with chat reference service?	597
Do you have a professional degree in LIS?	596
How long has it been since you got your LIS professional degree? (Only those who answered “yes” to the previous question needed to answer this one.)	550
What is the provision venue of the chat reference service you are staffing?	597
What is your work setting?	597
What is the service mode of the chat reference service you are staffing?	597

Table 4-1. Demographic questions asked in Survey I.

The first demographic question concerned how respondents became involved in the chat reference practice. Among all the respondents, 29.9% agreed to do chat reference when asked by their supervisor or someone else in their library; 50.1% volunteered to do chat reference because it is part of the future of reference librarianship; 0.5% both volunteered and were asked by their supervisor to do the job; 14.6% took the job because

they were either assigned or hired to do it – among them, 3% were not comfortable with the role, whereas 2% mentioned they were quite comfortable with it; 2.7% were initiators of chat reference in their library; 0.3% were coordinators; 0.7% were contracted to staff chat service in certain hours; 0.3% simply indicated that they were early adopters of the service; 2% was still investigating the service for his/her library; one respondent was a graduate student and he/she did chat service because it would look good on the resume, and one respondent simply stated he/she liked doing chat service. Responses to this question indicated that more than half of the respondents chose to staff the service out of their own will and believed that chat reference has a promising future.

The next demographic question asked for the length of time for which one has worked with chat reference. As indicated in Figure 4-1, more than half of the respondents had one to three years of experience with chat; the number of respondents who had less than one year of experience, and those who had more than three years of experience, were more or less the same.

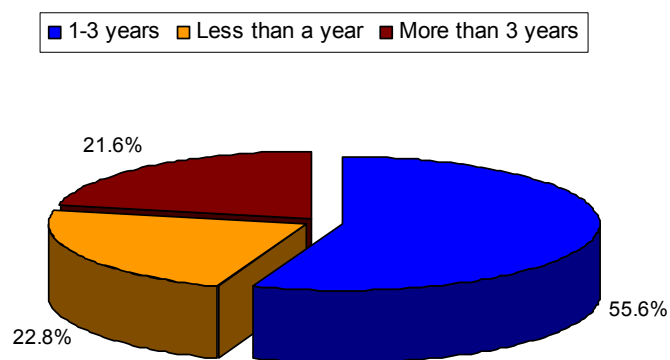


Figure 4-1. Survey I. respondents' length of time working with chat

Information about respondents' comfort level with chat reference was also collected. They were asked to rate their level of comfort with chat reference service on a seven-point scale, with one being "not comfortable at all" and seven being "very comfortable". As shown in Figure 4-2, respondents' comfort level displays a perfect linear trend. The majority of the respondents (87.6%, n=597) reported a comfort level equal to or greater than five, which indicated that most of the respondents were fairly comfortable when working with chat reference.

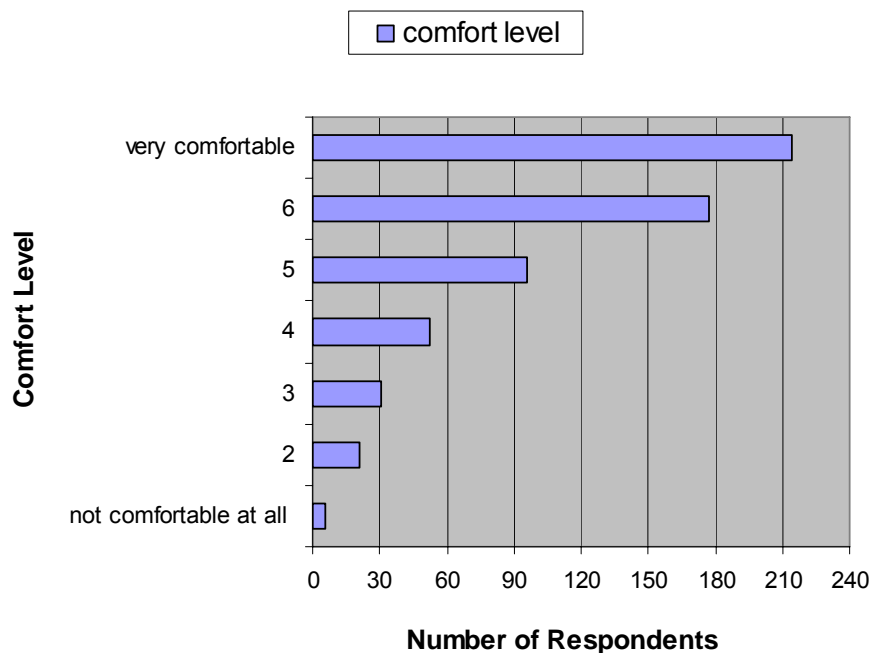


Figure 4-2. Survey I. respondent's comfort level when working with chat

Whether or not the respondents held a professional degree in LIS was of interest to the researcher as well. Responses to the demographic question on LIS degree indicated that 87.4% of the respondents had an Master of Library Science (M. L. S) degree in the U.S; 1.8% had the equivalent of an M.L.S from other countries, such as B.L.S in Australia and M.A. in Library Science in England, etc.; 1.3% had a certificate in LIS;

1.2% were LIS students, and 7.6% did not have any degree in LIS. Figure 4-3 delineated the distribution of the degree status graphically.

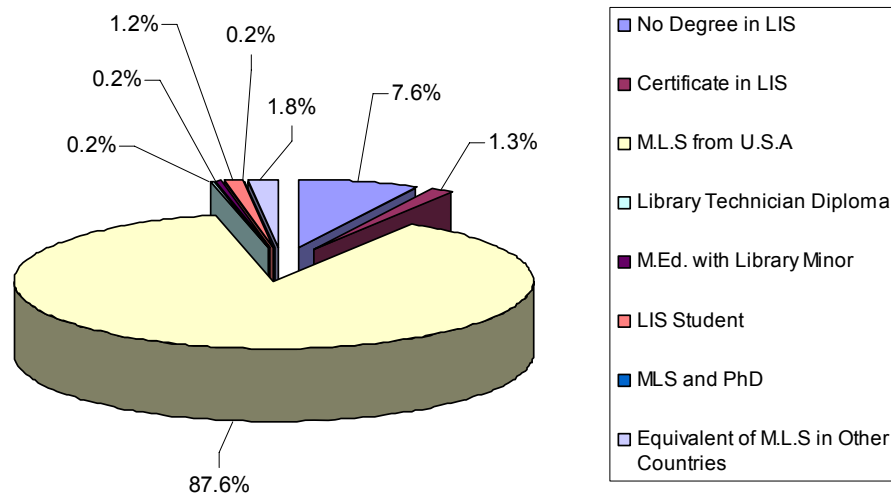


Figure 4-3. Survey I. respondents' professional LIS degrees

A follow-up question to the above question on LIS degree was asked to elicit information on the length of time since the respondents received their degree. Out of the 552 respondents who reported having a LIS degree of some sort, 550 answered the follow-up question. As shown in Figure 4-4, more than half of the respondents had had the degree for more than seven years; one fifth of them had had it for four to seven years; another one fifth had had the degree for one to three years; and only 5% had had the degree for less than one year, suggesting the most of the survey participants were fairly experienced librarians.

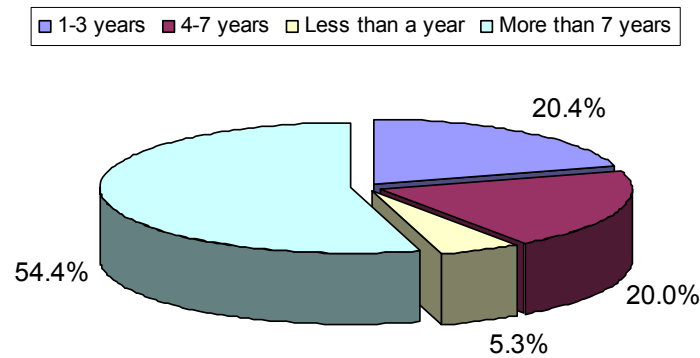


Figure 4-4. Survey I. respondents' length of time since the receipt of a LIS degree

Chat reference can be provided through a number of different ways – via instant messengers, via commercial software, or via home-grown applications. The majority of respondents (66.8%, n=597) of this survey were staffing chat reference services based on commercial software only; 17.1% of them served chat reference via instant messengers only; 0.8% employed home-grown applications in their chat reference services; and the rest of the respondents provided chat reference via more than one venues, as shown in Figure 4-5.

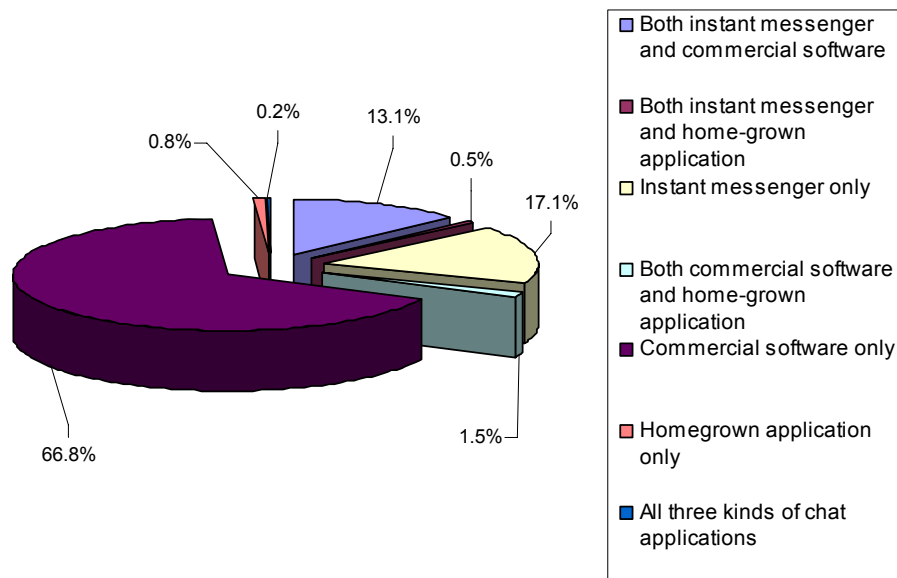


Figure 4-5. Survey I. respondents' service provision venues

Chat reference is provided across a variety of libraries. Information about respondent's work setting was elicited and a summary of the types of libraries they were working with is presented in Table 4-2. The responses indicated that academic libraries (73.9%, n=597) are the predominant type of libraries that offer chat reference service.

Library type	# of respondents	Percentage (%)
Academic library	441	73.9
Public library	97	16.2
Contractor	17	2.8
Medical library	11	1.8
State library	9	1.5
Law library	5	0.8
Independent research library	4	0.7
Library vendor	3	0.5
National library	2	0.3
School library	2	0.3
Private company	2	0.3
Joint public and academic library	1	0.2
Government library	1	0.2
Joint community college and public library	1	0.2
Consultant/Web teacher	1	0.2
Total	597	100

Table 4-2. Survey I. respondents' work settings

Unlike desk reference, the advent of chat reference has made it possible for libraries to collaborate and form consortia to share manpower and resources in providing chat reference service. Thus, whether the respondents were staffing a collaborative service, or an independent service, or both, was of interest to the research and asked as a demographic question in this survey. As shown in Figure 4-6, the number of collaborative services (42.5%, n=597) and that of stand-alone services (40.5%, n=597) were about the same; 15.2% of the respondents staffed both modes of services, and another 1.7% indicated that they were not sure about the mode of chat reference service provided at their library.

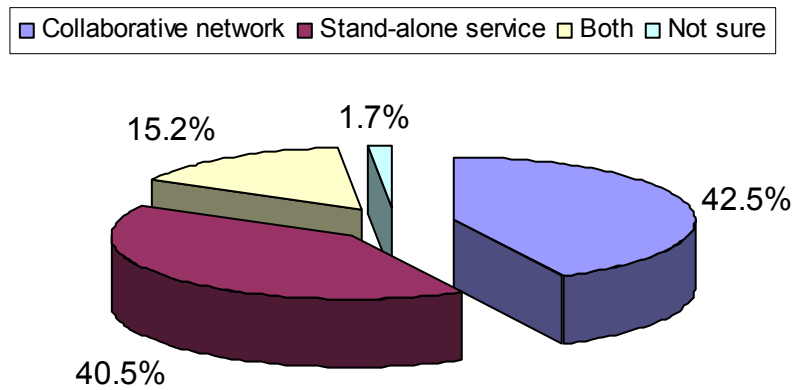


Figure 4-6. Survey I. respondents' service modes

4.2. Ratings of Competencies and Competency Areas

4.2.1. Ratings of Chat Reference Competencies

In this survey, thirty competencies grouped under eight areas were listed and respondents were asked to rate the importance of them on a seven-point scale, with one being “not important at all” and seven being “very important”. Presented in Table 4-3 is the summary of the results – the number of respondents who rated each competency, the number of respondents whose answer was “N/A” for each competency, the mean and standard deviation of the ratings for all the competencies and the ranking of competencies.

ID #	Competency name	# Response	# N/A	Mean	Standard Deviation	Rank #
Mastery of basic computer techniques						
1	Typing proficiency	580		5.42	1.17	22
2	Mastery of keyboard shortcuts	577	3	3.99	1.51	30
3	Effective use of Windows operating system	577	3	5.15	1.57	26
4	Technical troubleshooting skills	579	1	4.78	1.46	27
5	Effective use of supporting tools (including both hardware and software) for chat reference system	563	17	5.17	1.47	24
Familiarity with chat reference applications						
6	Skillful maneuver of features of chat software or instant messenger to effectively conduct a chat session	565	1	6.03	1.09	14
7	Ability to critically evaluate chat software/instant messenger in terms of supporting chat reference service	560	6	4.58	1.59	29
Reference Interview skills						
8	Offering a personal greeting at the beginning of a chat session to provide clear interest and willingness to help	560		6.3	1.04	8
9	Using open probes to clarify questions	560		6.39	0.98	5
10	Keeping users informed by constantly notifying them of what the librarian is doing	560		6.1	1.13	13
11	Providing jargon-free responses	558	2	6.15	1.13	12
12	Providing opinion-free responses	556	4	5.92	1.27	17
13	Recognizing when follow-ups are necessary	559	1	6.38	0.91	6
14	Referring users to appropriate resources/services when necessary	560		6.7	0.64	1
15	Confirming the satisfaction of users _ information needs	559	1	6.27	0.98	10
Online communication skills						
16	Understanding and appreciation of the online culture and chat etiquette	555	1	5.61	1.28	19
17	Mastery of online real-time written communication skills	556		5.92	1.15	18
Familiarity with electronic resources						
18	Familiarity with subscribed library databases	553		6.55	0.81	3
19	A wide-ranging knowledge of the internet resources	553		6.26	0.93	11
20	Skills in selecting and searching databases and internet resources	553		6.63	0.66	2
21	Knowledge of other participating libraries' resources in a collaborative chat reference project	447	106	5.6	1.37	20
22	Mastery of knowledge in as many fields as possible	550	3	4.73	1.53	28
23	Rapid evaluation of the quality of information resources and services	551	2	6.02	1.12	15
(Table continues on the next page)						

ID #	Competency name (cont.)	# Response	# N/A	Mean	Standard Deviation	Rank #
Instructional role						
24	Ability to take the instructional role to educate users to augment their level information literacy	548	1	5.41	1.37	23
25	Ability to provide peer instructions to colleagues in obtaining chat reference skills	541	8	5.17	1.39	25
Ability to work under pressure						
26	Skills in time management	547	2	5.52	1.27	21
27	Ability to manage multiple tasks	549		6.29	0.98	9
28	Ability to think quickly and deal flexibly with unexpected situations in chat reference sessions	549		6.46	0.84	4
Customer service mentality						
29	Understanding of customer service ethic in order to provide good service to users	547		6.33	0.92	7
30	Ability to apply chat reference service policies when necessary	540	7	5.94	1.01	16

Table 4-3. Mean rating and standard deviation for all competencies in Survey I.

The graphic delineation in Figure 4-7 shows that the higher the mean is, the lower the standard deviation is. Thus, respondents were more likely to converge on the competencies they considered important and less so on those they deemed not as important.

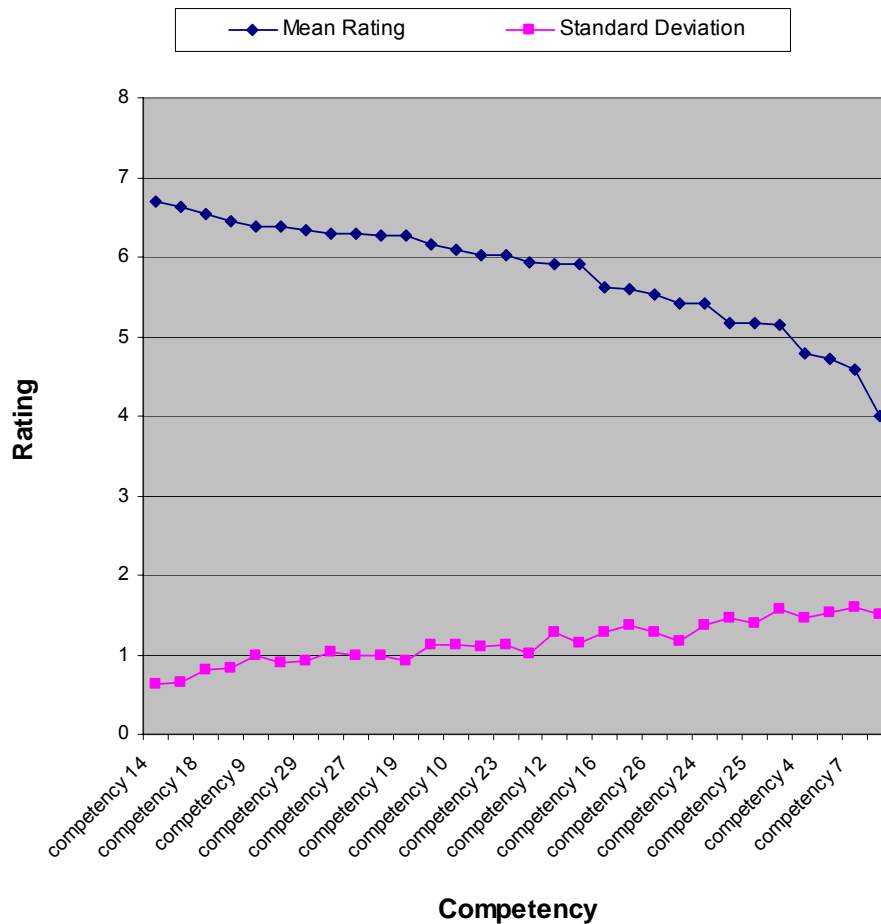


Figure 4-7. Mean ratings and standard deviations of all competencies

4.2.2. Ratings of Chat Reference Competency Areas

In this survey, not only were the thirty individual competencies rated in terms of their importance to chat reference practice, but the eight broader competency areas under which the 30 competencies were grouped were rated as well, in an attempt to examine chat reference competencies on a macro level. Table 4-4 presents the number of

respondents who rated each competency area, the number of respondents whose answer was “N/A” for each competency area, the mean and standard deviation of the ratings for the eight competency areas, and the ranking of the competency areas.

ID #	Competency area	# Responses	# N/A	Mean	Standard Deviation	Rank #
1	Mastery of basic computer techniques	543		5.91	1.1	6
2	Familiarity with chat reference applications	540	3	5.67	1.17	7
3	Reference Interview skills	543		6.68	0.68	1
4	Online communication skills	543		6.34	0.84	4
5	Familiarity with electronic resources	543		6.53	0.72	2
6	Instructional role	542	1	5.35	1.22	8
7	Ability to work under pressure	543		6.15	0.99	5
8	Customer service mentality	543		6.47	0.84	3

Table 4-4. Number of responses for each competency area in Survey I.

As shown in Figure 4-8, the distribution of the mean and standard deviation revealed the same pattern as that for the individual competencies – respondents were more likely to converge on the competency areas they considered important and less so on those they considered not as important.

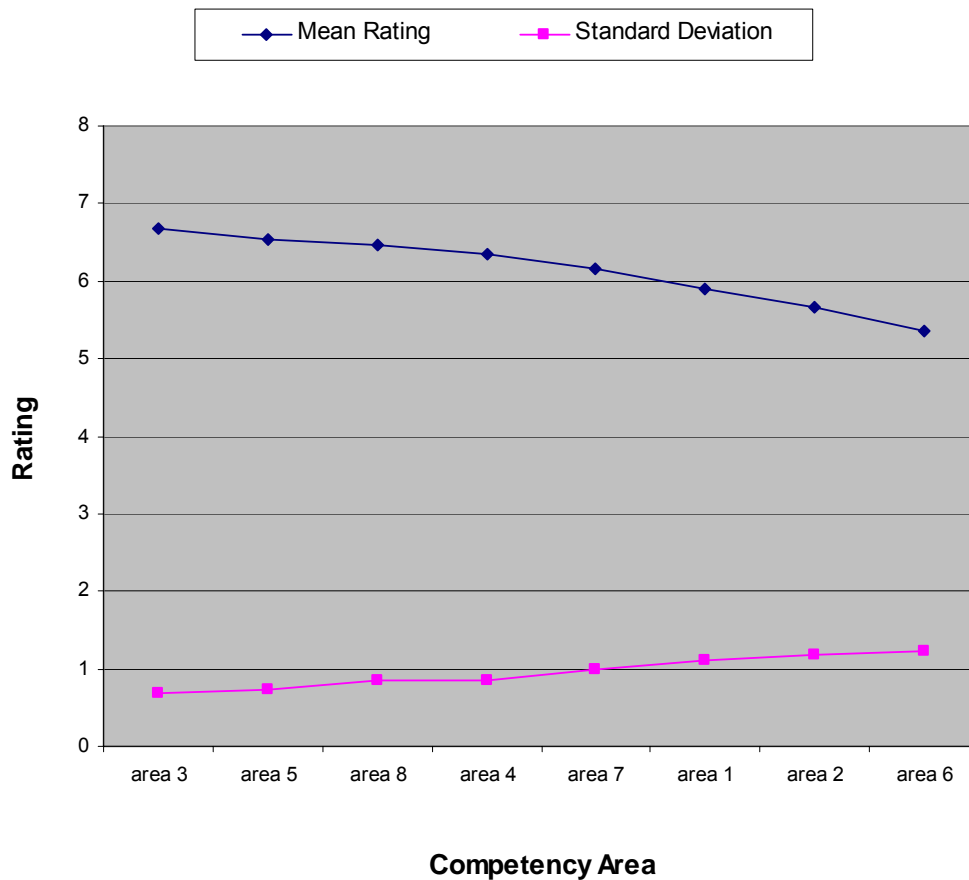


Figure 4-8. Mean ratings and standard deviations of all competency areas

Fig

4.2.3. Summary of Competency and Competency Area Ratings

The most highly rated competency area is “Reference interview skills”. Reference interview techniques are the fundamental competencies across all reference venues, and the respondents’ ratings have proved that there is no exception in chat reference.

Respondents’ ratings of this competency area are consistent with their ratings of the individual competencies under this area. Out of eight competencies under “Reference interview skills”, five were among the top ten highly rated competencies of all, where “Referring users to appropriate resources/services when necessary” received the highest mean rating of 6.7 (out of seven), suggesting that respondents considered the ability to

make appropriate referrals to be the most important competency for chat reference. Though almost all competencies in this area were rated highly, some were more preferable than others according to the respondents. For example, “Using open probes to clarify questions” was in the fifth place with a mean rating of 6.39; following it was “Recognizing when follow-ups are necessary”; whereas “Providing jargon-free responses”, “Keeping users informed by constantly notifying them of what the librarian is doing” and “Providing opinion-free responses” were in the twelfth, fourteenth and seventeenth place respectively. This difference reveals that reference interview techniques are not equally weighted in the venue of chat reference, and respondents believed that it is more important to be able to complement chat sessions with referrals and follow-ups, than to keep an objective point of view when providing answers to users.

The second highest rating of the competency areas went to “Familiarity with electronic resources”, indicating the vast inventory of knowledge in database and Internet searching is a key element in successfully conducting chat services. Among the 6 competencies under this area, “Skills in selecting and searching databases and internet resources” and “Familiarity with subscribed library databases” received the second and third highest rating of all thirty competencies. However, “Knowledge of other participating libraries’ resources in a collaborative chat reference project” was only in the twentieth place, and “Mastery of knowledge in as many fields as possible” received the third lowest rating, suggesting that respondents did not regard have subject specialization in multiple areas as a crucial competency for chat, which could serve as a counter argument to the point raised by Horowitz et al. (2005) that generalists were more appropriate to staff chat service than subject specialists.

“Customer service mentality” was in the third place of the eight competency areas, indicating respondents’ high regard of the patience, friendliness and enthusiasm that should be exhibited in chat sessions. The two competencies under this area, “Understanding of customer service ethic in order to provide good service to users” and “Ability to apply chat reference service policies when necessary” received the seventh and the sixteenth highest ratings of all thirty individual competencies respectively.

The mean rating for “Online communication skills” ranked fourth in all eight areas. Chat reference is implemented via online written communications and chat reference encounters would be greatly facilitated by an exceptional understanding of the online culture and communication techniques. Though respondents acknowledged the importance of online communication skills in general, the two specific competencies associated with this area – “Mastery of online real-time written communication skills” and “Understanding and appreciation of the online culture and chat etiquette” were not rated as high. They were in the eighteenth and nineteenth place of the ratings of individual competencies.

In the fifth place of the competency area ratings is “Ability to work under pressure”. There are three competencies under this area and their ratings differ greatly. The highest rating of the three is that of “Ability to think quickly and deal flexibly with unexpected situations in chat reference sessions”, which ranked fourth among all thirty competencies; next to it was “Ability to manage multiple tasks” in the ninth place; the last one was “Skills in time management”, which received a fairly low rating and ranked twenty-first. The vast divergence on the ratings suggests that respondents were more

concerned about how to handle the dynamic chat environment with flexibility and multi-tasking capability than mastering time management skills.

The two areas of technical skills – “Mastery of basic computer techniques” and “Familiarity with chat reference applications” ranked in the sixth and seventh place respectively. Individual competencies under these two areas received low ratings as well. Out of the five least important competencies, three were basic computer techniques – “Mastery of keyboard shortcuts”, “Technical troubleshooting skills” and “Effective use of Windows operating system”. Such low ratings for these skills indicated that computer techniques, though indispensable in conducting chat reference service, are not as pivotal as other chat reference competencies. As for the two competencies under “Familiarity with chat reference applications”, although one of them, “Skillful maneuver of features of chat software or instant messenger to effectively conduct a chat session” received a mid-level rating and ranked fourteenth, the other one, “Ability to critically evaluate chat software/instant messenger in terms of supporting chat reference service” was next to the last place.

The least important competency area was “Instructional role”. The two competencies under this area, “Ability to take the instructional role to educate users to augment their level information literacy” and “Ability to provide peer instructions to colleagues in obtaining chat reference skills” also received low ratings and ranked twenty-third respectively among all 30 competencies. This result indicates that, although the ability to take on the instructional role is an integral part of general reference competencies, it was considered to be least useful in the venue of chat.

4.2.4. Essential Chat Reference Competencies

In order to determine the essential chat reference competencies, a cut-off mean rating point of 5.5³ (out of seven) was selected and twenty-one competencies above this point were considered to be the essential chat reference competencies. Table 4-5 presents a summary of the twenty-one essential competencies, including the competency areas they belong to and their mean rating and ranking respectively. This list of essential competencies can be used as the basis in establishing requirements for chat reference training and education.

³The cut-off point is the point where the shape of the competency rating distribution curve starts to slope precipitately in Figure 4-7, and obviously this point is 5.5.

Competency Areas	Competencies	Mean rating	Rank #
Reference interview skills	Referring users to appropriate resources/services when necessary	6.7	1
	Using open probes to clarify questions	6.39	5
	Recognizing when follow-ups are necessary	6.38	6
	Offering a personal greeting at the beginning of a chat session to provide clear interest and willingness to help	6.3	8
	Confirming the satisfaction of users' information needs	6.27	10
	Providing jargon-free responses	6.15	12
	Keeping users informed by constantly notifying them of what the librarian is doing	6.1	13
	Providing opinion-free responses	5.92	17
Familiarity with electronic resources	Skills in selecting and searching databases and internet resources	6.63	2
	Familiarity with subscribed library databases	6.55	3
	A wide-ranging knowledge of the internet resources	6.26	11
	Rapid evaluation of the quality of information resources and services	6.02	15
	Knowledge of other participating libraries' resources in a collaborative chat reference project	5.6	20
Customer service mentality	Understanding of customer service ethic in order to provide good service to users	6.33	7
	Ability to apply chat reference service policies when necessary	5.94	16
Ability to work under pressure	Ability to think quickly and deal flexibly with unexpected situations in chat reference sessions	6.46	4
	Ability to manage multiple tasks	6.29	9
	Skills in time management	5.52	21
Online communication skills	Mastery of online real-time written communication skills	5.92	18
	Understanding and appreciation of the online culture and chat etiquette	5.61	19
Familiarity with chat reference applications	Skillful maneuver of features of chat software or instant messenger to effectively conduct a chat session	6.03	14

Table 4-5. Twenty-one essential chat reference competencies

4.3. Competencies Suggested by Respondents

Under each competency area, respondents were asked to suggest up to two competencies that were not included in the survey, and rate the importance of them. This was an optional question and respondents did not have to complete it to proceed in the survey.

A total number of 510 competencies were suggested by respondents. Only 29.4% (n=150) of them were indeed new competencies supplementary to the survey, whereas the other 70.6% (n=360) were repeating competencies already being covered by the survey. The overlap of suggested competencies and surveyed competencies can be explained by the fact that although respondents were only asked to supply additional competencies for a particular competency area at the end of that area, sometimes they put in competencies missing in that area but covered in following areas which they had no information about at the moment of making suggestions.

A detailed summary of the suggested competencies that overlap with the survey can be found in Appendix VIII. The focus of this section is the 29.4% of the suggestions that have added new information to the survey on chat reference competencies, as shown in Table 4-6.

Suggested Competencies	# of times suggested	Mean Rating	Standard Deviation
Ability to recognize different groups of users, understand the difference between them and answer their questions using different techniques	23	6.26	0.81
<i>"Knowledge/understanding of the differences between major chat/IM clients"</i>			
Ability to handle the irregularities of user behavior, such as abusive, excessively demanding, rude users	14	6.36	1.15
<i>"customer service is important, but librarians shouldn't let anything go--abusive users should be dealt with like other problem patrons."</i>			
General reference skills	10	6.9	0.32
<i>"Standard reference librarianship"</i>			
Mastery of multiple communication tools and ability to quickly adapt to software changes	10	6.5	0.71
<i>"Ability to work in a variety of different chat software clients and operating systems"</i>			
Additional computer techniques	8	6.13	1.13
<i>"Awareness of virtually transmitted diseases (VTDs) in an online environment."</i>			
Ability to determine when instructions are not necessary	8	6.13	0.83
<i>"Can interpret a patrons needs and understands when it is appropriate to instruct or to provide direct answer"</i>			
Ability to use casual but professional conversation style	7	6.29	0.95
<i>"Must strike a balance between being professional and being informal."</i>			
Formal training or informal experience with chat prior to covering the service	6	6.8	0.45
<i>"training in virtual chat techniques & standards"</i>			
Ability to spell well and use correct grammar	5	6.4	0.89
<i>"Grammar and spelling are important as well. Using emoticons and abbreviations are also important, but communicating clearly also depends greatly, I think, on accurate spelling."</i>			
Provide a positive closure at each session	5	6	0.71
<i>"skill at politely ending conversation"</i>			
Interpersonal skills	4	7	0
<i>"people skills--interpersonal skills"</i>			
Ability to prioritize	4	6.75	0.5
<i>"Ability to prioritize service amongst, in-person, chat, and phone reference questions"</i>			
Knowledge of what chat software features not to use	4	6.5	0.58
<i>"Sense of the limitations of the software platform/user interface; practical sense of what's realistic & what's not worth trying"</i>			
Understanding of users' urgency/cost level for the question	4	6	1.15
<i>"Determine the users acceptable 'quest cost' of the material presented"</i>			
Language skills, including writing and reading proficiency	3	7	0
<i>"Reading proficiency and comprehension"</i>			
Providing answers of good quality	3	6.33	0.58
<i>"Providing complete answers with context and options, if available."</i>			
Ability to provide instruction to faculties and student supervisors	3	5.67	1.15
<i>"ability to provide peer instruction to faculty in the school/college to augment their teaching of info lit"</i>			
(Table continues on the next page.)			

Suggested Competencies (cont.)	# of times suggested	Mean Rating	Standard Deviation
Critical thinking and analytical skills	2	7	0
<i>“analytical skills ” “critical thinking”</i>			
Knowledge of the relationship between different resources	2	6.5	0.71
<i>“It is important to have an understanding of the relationship of all of the above resources that is important. This is more that mastery.”</i>			
Ability to adjust users’ expectations	2	6.5	0.71
<i>“Ability to adjust user expectations .e.g. that their ideal outcome may not be met, but giving the user choices/power”</i>			
Respect users’ privacy	2	6	1.41
<i>“maintaining user confidentiality when appropriate”</i>			
Desire for self-enhancement in service performance	2	6	1.41
<i>“Active in pursuing opportunities to continue to develop own skills and learn from others (not sure where else to fit this, e.g. reading the research on chat reference, following lists/blog discussion)”</i>			
Comfort and confidence	2	6	1.41
<i>“comfort with web-based reference”</i>			
Ability to communicate and work with software vendors	2	6	1.41
<i>“Ability to translate software/hardware evaluations into useful terms for programmer or service provider”</i>			
Ability to use scripted messages	2	4.5	2.12
<i>“Used standard scripts or canned answers when appropriate for consistency in service”</i>			
Understanding of when and how to ask for assistance from colleagues	1	7	0
<i>“Knowing how and when to call for assistance--to have another colleague take some of the calls.”</i>			
Ability to become “connected”	1	7	0
<i>“Imagination and connectedness - the ability to visualize the real person a the other end of the chat connection”</i>			
Professional dignity	1	7	0
Keeping in constant contact with users	1	7	0
<i>“number 26-but you can just ask them to wait w/o explaining just as long as you are in constant contact”</i>			
Giving users sufficient time to respond to questions	1	7	0
Do not assume users only want online resources	1	7	0
Clear sense of the difference between languages that promote solidarity and those that pander	1	7	0
Ability to treat online users and physical users equally	1	7	0
Ability to advertise chat reference service	1	7	0
Understanding of library mission	1	6	0
Explaining the likely length of time for a chat session	1	6	0
Cultural literacy	1	6	0
Information literacy	1	3	0

Table 4-6. Supplemental competencies suggested by survey I. respondents

4.3.1. User Management Skills

The two most frequently suggested competencies are concerning user management skills. The first one is “ability to recognize different groups of users, understand the difference between them and answer their questions using different techniques”. Twenty-three respondents believed that different user populations, such as high school students, college students, and adult public library users, have different level of knowledge, experience, written communication skills and receptiveness to instructions; thus different reference techniques need to be employed when handling questions from different user groups.

The second one is “ability to handle the irregularities of user behavior, such as abusive, excessively demanding, rude users”, suggested by fourteen respondents. The anonymous nature of the online chat media has made it more likely to encounter improper user behavior in chat reference than in face-to-face reference service, and librarians should be able to professionally, politely, and effectively deal with any kind of inappropriate use of chat reference service.

4.3.2. Other Competency Suggestions

While the importance of reference interview skills was highly acknowledged in the survey, ten respondents took a step further and considered the broader skill set – general reference skills to be a chat reference competency as well. They believed that chat reference librarians should master excellent reference skills, follow the RUSA behavioral guidelines and use the best practices of ACRL Information Literature standards within chat service.

Another ten respondents brought forward the competency – “mastery of multiple communication tools and ability to quickly adapt to software changes”. The landscape of chat applications is constantly changing and sometimes libraries offer chat reference service via multiple tools; thus librarians are expected to be familiar with a variety of chat reference systems, including both commercial software and instant messengers, and their upgrades. In the mean time, four respondents suggested that librarians also need to have a clear sense of chat software limitations and understand what is realistic and what is not worth trying, given the fact that not all the features of chat software could function well in a chat session.

Although the competency area “instructional role” received the lowest mean rating in the survey, a suggestion made by eight respondents somehow slightly altered the view – it is more of a concern to determine when instruction is necessary and appropriate than to negate the importance of instruction. Not all users want instruction in a chat session and librarians need to have a solid sense of the practicality of offering instructions and feel unoffended when denied. On one hand, librarians should have the capability to determine users’ needs for instructions; on the other hand, it is likely that the survey respondents had experienced enough sessions where instructions were unwanted to conclude that “instructional role” was the least important chat reference competency area.

The basic computer techniques listed on the questionnaire did not seem to cover all the technical skills that chat reference librarians need to master. Respondents suggested eight more, among which including “ability to incorporate links, cut/paste text, and other digital tools into chat transaction”, “computer Safety awareness/skills, (e.g.

knowing not to click on suspicious IM attachments)”, and “off-campus authentication technologies”, etc.

A number of additional reference interview techniques were suggested by respondents as well. Seven pointed out that librarians should be able to use casual but professional conversation style in a chat session; five mentioned that a positive closure should be provided at each session; four made it clear that an understanding of users' urgency or cost level for the question is indispensable; two considered it a must to be able to adjust users' expectations and let them know what can realistically happen in a chat session; one proposed that librarians should notify users of the likely length of a chat session; one believed that users need to be given sufficient time to respond to librarians' questions; another one made a correction to a competency listed on the survey – “Keeping users informed by constantly notifying them of what the librarian is doing” by suggesting that librarians could simply ask users to wait without any explanation as long as they are in constant contact with users.

Regarding the treatment for online users and physical users, four respondents suggested that librarians should be able to prioritize users based on the mode of communication or the first-come first-served mechanism, and one respondent stated that users from different communication venues deserve to be equally treated, though in a prioritized sequence.

One final interesting finding from these suggestions is respondents' contradictory opinions concerning the accuracy of spelling and grammar in chat communications. Five of them suggested that accurate spelling and grammar are important to the success of chat reference service, whereas two others considered the typing accuracy is not as important

as typing speed and the use of chat lingo. This conflicting finding motivated the researcher to explore if there is any correlation between the responses and the demographic information of these respondents, especially the comfort level with chat and the length of time working with chat, but no significant difference was found.

4.4. Analysis of Relationship between Variables

Eight demographic questions were asked in the competency survey to collect demographic information about the respondents, such as how they became a chat reference librarian, the provision venue of their chat service and their work setting. One of the research questions is seeking to find out whether these contextual or demographic variables correlate with the competency ratings. Thus, ANOVA was employed to determine whether respondents from different demographic groups had significantly different ratings of the competencies and competency areas.

A total number of 304 ANOVA tests were conducted, and for each ANOVA test, Scheffe's test⁴ was chosen as the post-hoc analysis for pair-wise comparisons due to the unequal sample size and heterogeneity of variance of different groups for each demographic variable.

In this section, results of the ANOVA are organized by competency areas – for each area and the competencies under that area, the significant differences between different demographic groups' ratings determined by the ANOVA analysis are presented in a table, where the results from both the overall analysis and Scheffe's test are incorporated. More detailed results of the ANOVA can be found at http://ils.unc.edu/~luolili/anova_results.doc.

Area I – Mastery of basic computer techniques

Ratings of the competency area “Mastery of basic computer techniques” were found significantly different between the following demographic groups:

⁴Scheffe's test is one of the commonly used posteriori tests for pair-wise comparisons in ANOVA analysis. It is more conservative than Tukey's HSD procedure, but robust with respect to non-normality and heterogeneity of variance.

- Respondents who serve in both collaborative chat reference network and stand-alone service rated this competency area significantly higher than those who serve in a stand-alone chat reference service only;
- Respondents who serve in a collaborative chat reference network rated this competency area significantly higher than those who serve in a stand-alone service;
- Respondents who use IM applications to provide chat reference rated this competency area significantly lower than those who use commercial chat software;
- Respondents who work in academic libraries rated this competency area significantly lower than those who work in public libraries.

Ratings of the competency “Typing proficiency” from respondents who use IM applications to provide chat reference were found significantly lower than those from respondents who use commercial chat software.

Ratings of the competency “Mastery of keyboard shortcuts” were found significantly different between the following demographic groups:

- Respondents who serve in both collaborative chat reference network and stand-alone service rated this competency significantly higher than those who serve in a stand-alone chat reference service only;
- Respondents who received their professional LIS degree more than seven years rated this competency significantly higher than those who received their degree only four to seven years ago.

Ratings of the competency “Technical troubleshooting skills” were found significantly different between the following demographic groups:

- Respondents who serve in both collaborative chat reference network and stand-alone service rated this competency significantly higher than those who serve in a stand-alone chat reference service only;
- Respondents who use IM applications to provide chat reference rated this competency significantly lower than those who use commercial chat software;
- Respondents who only use IM applications to provide chat reference rated this competency significantly lower than those who use both IM applications and commercial chat software.

Ratings of the competency “Effective use of supporting tools for chat reference” were found significantly different between the following demographic groups:

- Respondents who serve in both collaborative chat reference network and stand-alone service rated this competency significantly higher than those who serve in a stand-alone chat reference service only;
- Respondents who serve in a collaborative chat reference network rated this competency significantly higher than those who serve in a stand-alone service.

Competency or Competency Area	Demographic Variable	f value	p value	Scheffe's test		
Mastery of basic computer techniques (competency area)	Chat reference service mode	5.136	0.002	p=0.047		
				both collaborative network and stand-alone service	$\mu=6.10$	$\sigma=1.01$
				stand-alone service	$\mu=5.66$	$\sigma=1.34$
				p=0.006		
				collaborative network	$\mu=6.06$	$\sigma=1.08$
				stand-alone service"	$\mu=5.66$	$\sigma=1.34$
	Chat reference provision venue	3.63	0.003	p=0.006		
				IM only	$\mu=5.44$	$\sigma=1.60$
				commercial chat software only	$\mu=6.01$	$\sigma=1.09$
	Work setting	2.867	0.009	0.009		
				academic library	$\mu=5.82$	$\sigma=1.23$
				public library	$\mu=6.35$	$\sigma=0.87$
Typing proficiency	Chat reference provision venue	2.708	0.02	p=0.049		
				IM only	$\mu=5.04$	$\sigma=1.46$
				commercial chat software only	$\mu=5.48$	$\sigma=1.09$
Mastery of keyboard shortcuts	Chat reference service mode	3.429	0.017	p=0.042		
				collaborative network	$\mu=4.16$	$\sigma=1.67$
				stand-alone service	$\mu=3.73$	$\sigma=1.64$
	Length of time since receiving the professional LIS degree	3.872	0.009	p=0.021		
				more than 7 years	$\mu=4.24$	$\sigma=1.65$
				4-7 years	$\mu=3.65$	$\sigma=1.57$
Technical troubleshooting skills	Chat reference service mode	5.122	0.002	p=0.002		
				both collaborative network and stand-alone service	$\mu=5.26$	$\sigma=1.30$
				stand-alone service	$\mu=4.82$	$\sigma=1.40$
	Chat reference provision venue	4.206	0.001	p=0.046		
				IM only	$\mu=4.28$	$\sigma=1.55$
				commercial chat software only	$\mu=4.83$	$\sigma=1.44$
				p=0.028		
				IM only	$\mu=4.28$	$\sigma=1.55$
				both IM and commercial chat software	$\mu=5.07$	$\sigma=1.44$
Effective use of supporting tools (including both hardware and software) for chat reference	Chat reference service mode	5.79	0.001	p=0.031		
				both collaborative network and stand-alone service"	$\mu=5.47$	$\sigma=1.35$
				stand-alone service	$\mu=4.92$	$\sigma=1.65$
				p=0.0031		
				collaborative network	$\mu=5.32$	$\sigma=1.28$
				stand-alone service	$\mu=4.92$	$\sigma=1.65$

Table 4-7. ANOVA results for competency area I.

Area II – Familiarity with chat reference applications

Ratings of the competency area “Familiarity with chat reference applications” were found significantly different between the following demographic groups:

- Respondents who serve in both collaborative chat reference network and stand-alone service rated this competency area significantly higher than those who serve in a stand-alone chat reference service only;
- Respondents who serve in a collaborative chat reference network rated this competency area significantly higher than those who serve in a stand-alone service.

Ratings of the competency “Skillful maneuver of features of chat software or instant messenger to effectively conduct a chat session” were found significantly different between the following demographic groups:

- Respondents who serve in both collaborative chat reference network and stand-alone service rated this competency significantly higher than those who serve in a stand-alone chat reference service only;
- Respondents who use IM applications to provide chat reference rated this competency significantly lower than those who use commercial chat software;

Ratings of the competency “Ability to critically evaluate chat software/instant messenger in terms of supporting chat reference service” from respondents who serve in both collaborative chat reference network and stand-alone service were found significantly higher than those from respondents who serve in a stand-alone chat reference service only.

Competency or Competency Area	Demographic Variable	f value	p value	Scheffe's test		
Familiarity with chat reference applications (competency area)	Chat reference service mode	9.988	0.00002	p=0.025		
				both collaborative network and stand- alone service	$\mu=5.80$	$\sigma=1.13$
				stand-alone service	$\mu=5.33$	$\sigma=1.33$
				p=0.000004		
				collaborative network	$\mu=5.93$	$\sigma=1.05$
				stand-alone service	$\mu=5.33$	$\sigma=1.33$
Skillful maneuver of features of chat software or instant messenger to effectively conduct a chat session	Chat reference service mode	7.956	0.00003	p=0.0003		
				both collaborative network and stand-alone service	$\mu=6.40$	$\sigma=0.83$
				stand-alone service	$\mu=5.80$	$\sigma=1.23$
	Chat reference provision venue	4.726	0.0003	p=0.011		
				IM only	$\mu=5.65$	$\sigma=1.35$
				commercial chat software only	$\mu=6.13$	$\sigma=1.01$
Ability to critically evaluate chat software/instant messenger in terms of supporting chat reference service	Chat reference service mode	4.536	0.004	p=0.01		
				both collaborative network and stand-alone service	$\mu=5.01$	$\sigma=1.63$
				stand-alone service	$\mu=4.33$	$\sigma=1.63$

Table 4-8. ANOVA results for competency area II.

In summary of the ANOVA test results for the above two competency areas, respondents who serve in a collaborative chat reference network tended to give a significantly higher rating to the technical competencies, including both computer techniques and chat software skills, than those who serve in a stand-alone chat reference service. It is likely that collaborative chat reference services are distributed among all the participating libraries and the technical training and support might not be as easily accessible and well-organized as concentrated stand-alone services which are provided at a much smaller scale; hence, librarians from collaborative efforts would consider it more important to obtain these skills than librarians from stand-alone services.

Another finding is that respondents who use IM applications to provide chat reference tended to rate these technical competencies lower than those who use commercial chat software. Generally, commercial chat software are more complex ; it is more difficult and time-consuming to master the features of commercial chat software than IM applications; and more computer techniques may be required to handle chat sessions offered via commercial chat software than via IM applications.

Area III – Reference Interview skills

Ratings of the competency area “Reference Interview skills” were found significantly different between the following demographic groups:

- Respondents who serve in both collaborative chat reference network and stand-alone service rated this competency area significantly higher than those who are grouped under the category of “other”⁵;
- Respondents who serve in a collaborative chat reference network rated this competency area significantly higher than those who are grouped under the category of “other” (this finding and the above one are likely to be a false positive given the small size of the “other” demographic group – there were only 8 respondents categorized as “other” whereas more than 80 fell under the other two demographic groups);
- Respondents who received their professional LIS degree more than seven years ago rated this competency area significantly higher than those who received their degree only four to seven years ago.

⁵The category “other” contains responses that did not specify to which type of chat reference mode their services belong.

Ratings of the competency “Providing opinion-free responses” from respondents who received their professional LIS degree more than seven years ago were found significantly higher than those from respondents who received their degree only four to seven years ago.

Ratings of the competency “Referring users to appropriate resources/services when necessary” from respondents who have worked with chat reference for more than three years were found significantly lower than those from respondents who have worked with chat reference for one to three years.

The competency area “Reference interview skills” received the highest rating among the eight areas. Though there is a significant difference between the mean rating from respondents who received their professional LIS degree more than seven years ago and that from respondents who received their degree four to seven years ago, both groups rated this competency area very high in the first place. The difference might indicate that respondents with more library working experience (assuming the length of time since the receipt of LIS degree reflecting the length of time working in a library) are more familiar with reference work, thus more aware of the importance of reference interview skills no matter what the service medium is, than those with less library working experience.

The competency “Referring users to appropriate resources/services when necessary” received the highest rating among all thirty competencies listed in the survey. Not surprisingly, the ratings of this competency from respondents who have worked with chat for more than three years and who have only worked with chat for one to three years were very high as well. But there is a significant difference between them. It is likely that, though both groups have acknowledged the importance of this competency, those with

less experience with chat might find it more difficult to handle certain types of questions and more necessary to refer it to other sources than those with more experience with chat.

Competency or Competency Area	Demographic Variable	f value	p value	Scheffe's test		
Reference Interview skills (competency area)	Chat reference service mode	2.938	0.033	p=0.046		
				both collaborative network and stand-alone service	$\mu=6.71$	$\sigma=0.68$
				other	$\mu=6.00$	$\sigma=0.76$
				p=0.037		
				collaborative network	$\mu=6.71$	$\sigma=0.62$
				other	$\mu=6.00$	$\sigma=0.76$
	Length of time since receiving the professional LIS degree	3.859	0.009	p=0.01		
				more than 7 years	$\mu=6.77$	$\sigma=0.55$
				4-7 years	$\mu=6.53$	$\sigma=0.77$
Providing opinion-free responses	Length of time since receiving the professional LIS degree	3.116	0.026	p=0.035		
				more than 7 years	$\mu=6.04$	$\sigma=1.16$
				4-7 years	$\mu=5.61$	$\sigma=1.42$
Referring users to appropriate resources/services when necessary	Length of time working with chat reference service	3.255	0.039	p=0.049		
				more than 3 years	$\mu=6.59$	$\sigma=0.80$
				1-3 years	$\mu=6.76$	$\sigma=0.53$

Table 4-9. ANOVA results from competency area III.

Area IV – Online communication skills

Ratings of the competency “Understanding and appreciation of the online culture and chat etiquette” from respondents who serve in both collaborative chat reference network and stand-alone service were found significantly higher than those from respondents who serve in a stand-alone chat reference service only. It is likely that respondents who serve in both chat reference modes might encounter a larger variety of users and have to deal with a larger variety of user behaviors than those who only serve in stand-alone services, thus, attach more importance to the understanding and appreciation of online chat culture.

Competency or Competency Area	Demographic Variable	f value	p value	Scheffe's test		
Understanding and appreciation of the online culture and chat etiquette	Chat reference service mode	4.099	0.007	p=0.011		
				both collaborative network and stand-alone service	$\mu=5.95$	$\sigma=1.03$
				stand-alone service	$\mu=5.41$	$\sigma=1.39$

Table 4-10. ANOVA results from competency area IV.

Area V – Familiarity with electronic resources

Ratings of the competency area “Familiarity with electronic resources” were found significantly different between the following demographic groups:

- Respondents who are not comfortable with chat reference service at all rated this competency area significantly lower than those whose comfort level is five;
- Respondents who are not comfortable with chat reference service at all rated this competency area significantly lower than those whose comfort level is six;
- Respondents who have worked with chat reference for more than three years rated this competency area significantly lower than those who have worked with chat for one to three years.

Ratings of the competency “Skills in selecting and searching databases and internet resources” were found significantly different between the following demographic groups:

- Respondents who are not comfortable with chat reference service at all rated this competency significantly lower than those whose comfort level is five;
- Respondents who have worked with chat reference for one to three years rated this competency significantly higher than those who have worked with chat for less than a year;

- Respondents who serve in a collaborative chat reference network rated this competency significantly higher than those who serve in a stand-alone service.

Ratings of the competency “Rapid evaluation of the quality of information resources and services” were found significantly different between the following demographic groups:

- Respondents who are not comfortable with chat reference service at all rated this competency area significantly lower than those whose comfort level is six;
- Respondents who serve in a collaborative chat reference network rated this competency significantly higher than those who serve in a stand-alone service;
- Respondents who received their professional LIS degree more than seven years ago rated this competency significantly higher than those who received their degree only four to seven years ago;
- Respondents who received their professional LIS degree one to three years ago rated this competency significantly higher than those who received their degree four to seven years ago;
- Respondents who use instant messaging (IM) applications to provide chat reference rated this competency significantly lower than those who use commercial chat software.

Ratings of the competency “Mastery of knowledge in as many fields as possible” from respondents who received their professional LIS degree more than seven years ago were found significantly higher than those from respondents who received their degree only four to seven years ago, though both groups’ ratings of this competency were fairly low to begin with.

Ratings of the competency “A wide-ranging knowledge of the Internet resources” were found significantly different between the following demographic groups:

- Respondents who serve in a collaborative chat reference network rated this competency significantly higher than those who serve in a stand-alone service;
- Respondents who received their professional LIS degree more than seven years ago rated this competency significantly higher than those who received their degree only four to seven years ago;
- Respondents who use IM applications to provide chat reference rated this competency significantly lower than those who use commercial chat software.

Competency or Competency Area	Demographic Variable	f value	p value	Scheffe's test		
Familiarity with electronic resources (competency area)	Comfort level with chat reference service	2.381	0.028	p=0.046		
				comfort level 1 (not comfortable at all)	μ=5.40	σ=2.60
				comfort level 5	μ=6.57	σ=0.60
				p=0.049		
				comfort level 1 (not comfortable at all)	μ=5.40	σ=2.60
				comfort level 6	μ=6.55	σ=0.63
	Length of time working with chat reference service	4.137	0.016	p=0.017		
				more than 3 years	μ=6.37	σ=1.03
				1-3 years	μ=6.59	σ=0.57
Skills in selecting and searching databases and internet resources	Comfort level with chat reference service	2.844	0.01	p=0.043		
				comfort level 1 (not comfortable at all)	μ=5.60	σ=2.61
				comfort level 5	μ=6.69	σ=0.55
	Length of time working with chat reference service	4.013	0.019	p=0.02		
				1-3 years	μ=6.68	σ=0.55
				less than a year	μ=6.48	σ=0.81
	Chat reference service mode	4.115	0.007	p=0.022		
				collaborative network	μ=6.71	σ=0.52
				stand-alone service	μ=6.52	σ=0.79
Rapid evaluation of the quality of information resources and services	Comfort level with chat reference service	4.218	0.0003	p=0.046		
				comfort level 1 (not comfortable at all)	μ=4.40	σ=3.13
				comfort level 6	μ=6.20	σ=0.89
(Table continues on the next page)						

Competency or Competency Area	Demographic Variable	f value	p value	Scheffe's test		
	Chat reference service mode	4.155	0.006	p=0.019		
				collaborative network	$\mu=6.14$	$\sigma=1.07$
				stand-alone service"	$\mu=5.81$	$\sigma=1.16$
	Length of time since receiving the professional LIS degree	4.767	0.003	p=0.004		
				more than 7 years	$\mu=6.15$	$\sigma=1.02$
				4-7 years	$\mu=5.70$	$\sigma=1.25$
				p=0.036		
				4-7 years	$\mu=5.70$	$\sigma=1.25$
				1-3 years	$\mu=6.13$	$\sigma=0.99$
	Chat reference provision venue	2.395	0.037	p=0.048		
				IM only	5.68	1.24
				commercial chat software only	6.11	1.08
Mastery of knowledge in as many fields as possible	Length of time since receiving the professional LIS degree	4.491	0.004	p=0.005		
				more than 7 years	$\mu=4.93$	$\sigma=1.49$
				4-7 years	$\mu=4.30$	$\sigma=1.55$
A wide-ranging knowledge of the Internet resources	Chat reference service mode	3.188	0.023	p=0.047		
				collaborative network	$\mu=6.36$	$\sigma=0.84$
				stand-alone service	$\mu=6.11$	$\sigma=0.97$
	Length of time since receiving the professional LIS degree	5.035	0.002	p=0.01		
				more than 7 years	$\mu=6.40$	$\sigma=0.81$
				4-7 years	$\mu=6.05$	$\sigma=1.15$
	Chat reference provision venue	2.632	0.023	p=0.039		
				IM only	$\mu=5.96$	$\sigma=1.13$
				commercial chat software only	$\mu=6.32$	$\sigma=0.89$

Table 4-11. ANOVA results from competency area V.

In summary, respondents from collaborative chat reference networks rated competencies associated with reference resources higher than those from stand-alone services. It is likely that the larger variety of users handled by collaborative networks require librarians to master more diverse resources than librarians from stand-alone services where the user base is not as varied; thus, the resource competencies were considered more important in the collaborative reference mode.

Respondents with longer library working experience (more than seven years) rated the resource competencies higher than those with lesser experience. It is likely that more experienced librarians are more aware of the importance of reference resources than less experienced librarians, thus, give them higher ratings.

Area VI – Instructional role

Ratings of the competency “Ability to take the instructional role to educate users to augment their level information literacy” received a low rating in general; but respondents who have worked with chat reference for more than three years rated it significantly lower than those who have worked with chat for only one to three years. It is likely that the more experience with chat, the more librarians realize that instructions in chat sessions are not as needed as they are in other reference venues, thus, the lower rating for this competency.

Competency or Competency Area	Demographic Variable	f value	p value	Scheffe’s test		
Ability to take the instructional role to educate users to augment their level information literacy	Length of time working with chat reference service	3.177	0.042	p=0.048		
				more than 3 years	$\mu=5.13$	$\sigma=1.48$
				1-3 years	$\mu=5.49$	$\sigma=1.28$

Table 4-12. ANOVA results from competency area VI.

Area VII - Ability to work under pressure

Ratings of the competency area “Ability to work under pressure” were found significantly different between the following demographic groups:

- Respondents who serve in a collaborative chat reference network rated this competency area significantly higher than those who serve in a stand-alone service;

- Respondents who use IM applications to provide chat reference rated this competency area significantly lower than those who use commercial chat software.

Ratings of the competency “Ability to think quickly and flexibly deal with unexpected situations in chat reference sessions” from respondents who volunteer to become chat reference librarians were found higher than those from respondents who are assigned to work with chat.

Ratings of the competency “Ability to manage multiple tasks” from respondents who serve in both collaborative chat reference network and stand-alone service were found higher than those from respondents who serve in a stand-alone chat reference service only.

Ratings of the competency “Skills in time management” from respondents who serve in a collaborative chat reference network were found higher than those from respondents who serve in a stand-alone service.

Competency or Competency Area	Demographic Variable	f value	p value	Scheffe's test		
Ability to work under pressure (competency area)	Chat reference service mode	3.519	0.015	p=0.028		
				collaborative network	$\mu=6.28$	$\sigma=0.97$
				stand-alone service"	$\mu=6.00$	$\sigma=1.05$
	Chat reference provision venue	4.803	0.0003	p=0.001		
				IM only	$\mu=5.73$	$\sigma=1.19$
				commercial chat software only	$\mu=6.26$	$\sigma=0.94$
Ability to think quickly and flexibly deal with unexpected situations in chat reference sessions	The way to become a chat reference staff	3.337	0.01	p=0.012		
				volunteer	$\mu=6.55$	$\sigma=0.73$
				assigned	$\mu=6.16$	$\sigma=1.12$
Ability to manage multiple tasks	Chat reference service mode	3.457	0.016	p=0.041		
				both collaborative network and stand-alone service	$\mu=6.53$	$\sigma=0.77$
				stand-alone service	$\mu=6.17$	$\sigma=1.02$
Skills in time management	Chat reference service mode	4.014	0.008	p=0.011		
				collaborative network	$\mu=5.71$	$\sigma=1.14$
				stand-alone service	$\mu=5.32$	$\sigma=1.33$

Table 4-13. ANOVA results from competency area VII.

In summary, respondents from collaborative networks rated the pressure management competencies higher than those from stand-alone services. In a collaborative network, users come from all participating libraries and it is more likely for librarians to encounter unexpected user behavior and other situations, thus, librarians tend to attach more importance to competencies that deal with the pressure inherent in chat reference service than those who work in stand-alone services.

4.5. Chapter Summary

In this chapter, findings from the survey on chat reference competencies are reported. Both the descriptive statistical analysis and analysis of relationship between variables are presented to provide a thorough view of librarians' evaluation of the importance of surveyed competencies. The first research question, "What are the

essential competencies that librarians need to master in order to provide chat reference service”, and half of the third research question “How do context variables such as service mode, work setting and provision venue, etc., correlate with chat reference competencies”, can be fully answered by findings reported in this chapter.

Chapter V. Chat Reference Training Techniques

After the twenty-one essential chat reference competencies were determined in the first survey study, another survey was launched to investigate the effectiveness of training techniques that could deliver these competencies. Findings from the second survey are reported in this chapter.

A total number of 286 chat reference practitioners responded to the second survey, i.e. the survey on chat reference training techniques. Again, these responses are examined in the following order:

- Demographic information;
- Ratings of chat reference training techniques;
- Suggested training techniques; and
- Analysis of relationship between variables.

5.1. Demographic Information

The same set of demographic questions as in the competency survey was asked at the beginning of the survey on training techniques. In addition, respondents were asked to specify their perspective from which they would like to provide input on chat reference training techniques. Table 5-1 presents a summary of the number of respondents that answered each of the nine demographic questions.

Demographic Question	Number of Respondents
How did you become a chat reference librarian?	286
How long have you been working as a chat reference librarian?	286
What is your comfort level with chat reference service?	286
Do you have a professional degree in LIS?	286
How long has it been since you got your LIS professional degree? (Only those who answered “yes” to the previous question needed to answer this one.)	271
What is the provision venue of the chat reference service you are staffing?	286
What is your work setting?	286
What is the service mode of the chat reference service you are staffing?	286
From what perspective would you like to evaluate the training techniques listed in this survey?	285

Table 5-1. Demographic questions asked in Survey II.

The first demographic question concerned how respondents became involved in chat reference practice. As indicated in Table 5-2, responses to this question had a similar pattern to those on the competency survey – close to half of the respondents claimed that they chose to work with chat because they believed it has a promising future. About another half became chat reference librarians simply because it is part of their job.

Response	# of respondents	Percentage
I volunteered to do chat reference because it is part of the future of reference librarianship.	126	44.1%
It is part of my job.	138	48.3%
I agreed to do it when asked by my supervisor.	2	0.7%
All of the above.	1	0.3%
I initiated the chat service at my library.	11	3.8%
I’m a library contractor.	2	0.7%
I’m investigating library chat reference service.	2	0.7%
I’m retired.	1	0.3%
I’m the service supervisor/manager.	1	0.3%
Unspecified.	2	0.7%

Table 5-2. How Survey II. respondents became chat reference librarians

The next demographic question asked for the length of time for which one had worked with chat reference. As indicated in Figure 5-1, about half of the respondents had one to three years of experience with chat, 30.1% had more than three years of experience, and 20.6% had only less than one year of experience.

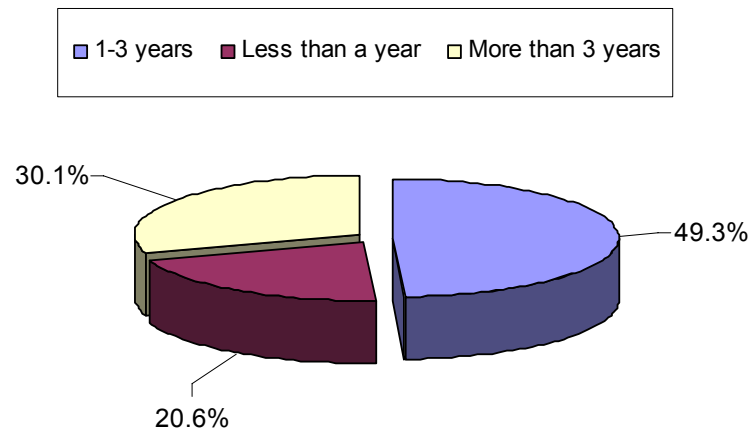


Figure 5-1. Survey II. respondent's length of time working with chat

Responses to the question about respondents' comfort level with chat reference exhibited the same pattern to those on the competency survey as well – most of the respondents were comfortable working with chat reference service. As shown in Figure 5-2, about 81% of them reported a comfort level equal to or greater than point five on the seven-point scale where one indicates “not comfortable at all” and seven “very comfortable”.

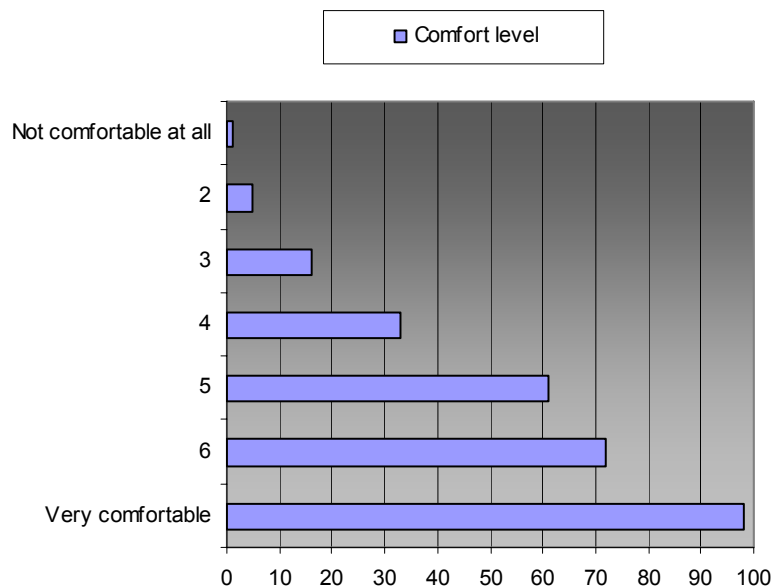


Figure 5-2. Survey II. respondents' comfort level when working with chat

For the question of whether or not the respondent held a LIS degree, as indicated in Figure 5-3, 92% reported having an M.L.S from the United States; 1.4% had the equivalent of M.L.S from other countries; another 1.4% had an LIS certificate; 4.5% did not have any professional degree in LIS; 0.3% was LIS students; and another 0.3% did not answer this question clearly. Once again, responses to this question revealed the same pattern as in the competency survey.

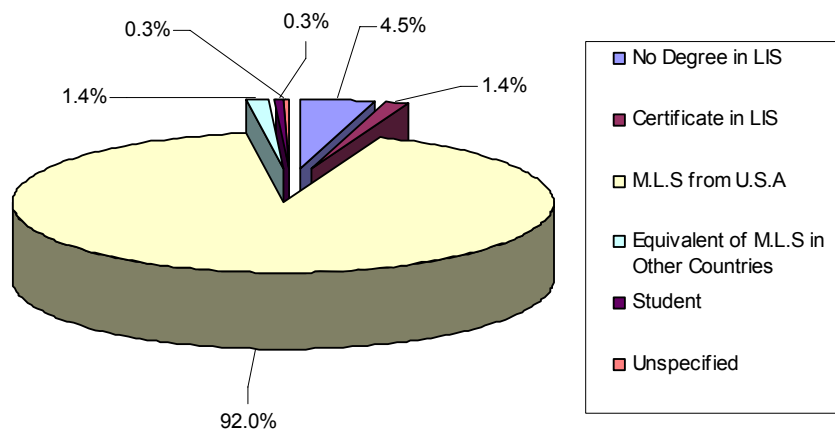


Figure 5-3. Survey II. respondents' professional LIS degrees

A follow-up question to the LIS degree question was about the length of time since the respondents received their degree. Not surprisingly, the distribution of responses to this question was quite similar to that on the competency survey. As shown in Figure 5-4, about half of the respondents had had the degree for more than seven years; the number of respondents who had had the degree for four to seven years and the number of those who had had it for one to three years were more or less the same; and only 3.3% had had the degree for less than one year.

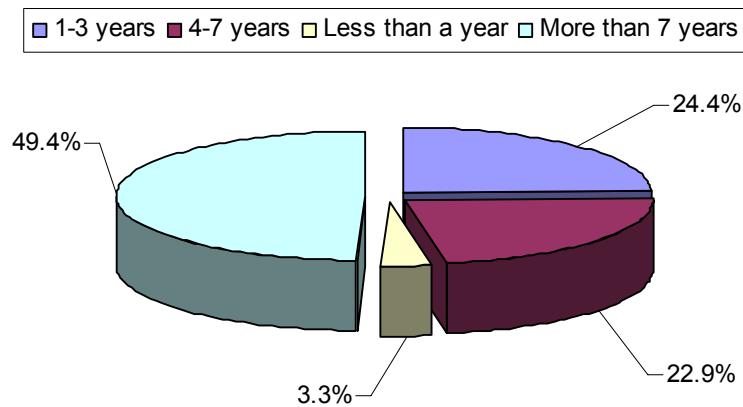


Figure 5-4. Survey II. respondents' length of time since the receipt of a LIS degree

Regarding the provision venue of chat reference service, more than half of the respondents (64.3%, n=286) reported using commercial software only. The next largest category is instant messenger, but the number is only 19.2%. About 13% employed both to offer chat reference service. As indicated in Figure 5-5, the distribution of responses to this question, once again, was quite similar to that on the competency survey.

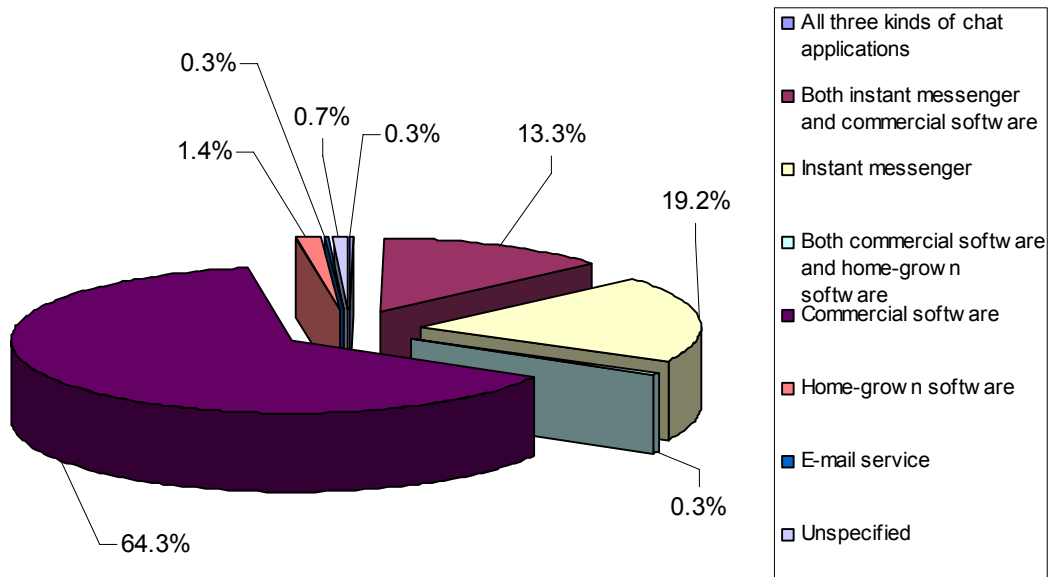


Figure 5-5. Survey II. respondents' service provision venues

Information about respondent's work setting was collected and a summary of the types of libraries they were working with is presented in Table 5-3. Again, the majority of the respondents came from academic libraries (71.7%, n=286), the same as those who participated in the competency survey.

Work Setting	# of respondents	Percentage
Academic library	205	71.7%
Public library	57	19.9%
Medical library	5	1.7%
Contractor	4	1.4%
Joint public and academic library	3	1.0%
Government library	2	0.7%
Library system	2	0.7%
State library	2	0.7%
Consortium	1	0.3%
Corporate	1	0.3%
Joint academic and business library	1	0.3%
Library vendor	1	0.3%
Web teacher	1	0.3%
Unspecified	1	0.3%

Table 5-3. Survey II. respondents' work settings

Chat reference could be offered in two different service modes - either by an individual institution or through a collaborative network. Respondents were asked of the service mode in which their chat reference service was provided, and their answers fell under the same pattern as in the competency survey. As shown in Figure 5-6, the number of collaborative services (43.7%, n=286) and that of stand-alone services (40.6%, n=286) were fairly close to each other, and about 15% services were provided in both modes.

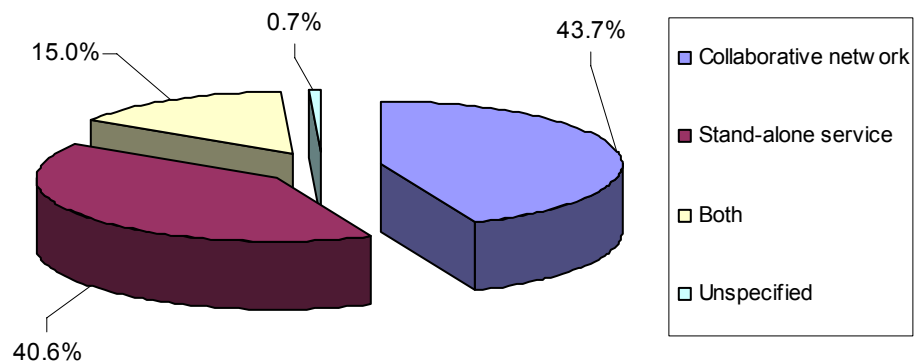


Figure 5-6. Survey II. respondents' service modes

One last demographic question asked respondents to specify the perspective from which they would like to evaluate the training techniques listed on the survey. Over fifty percent of the respondents provided their input as a trainee; about 27% completed the survey from the trainer's perspective; and 14% covered both angles.

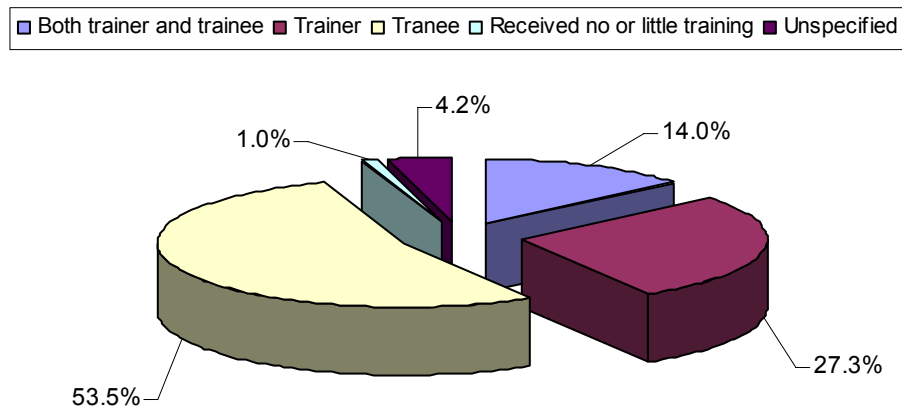


Figure 5-7. Survey II. respondents' evaluation perspectives

Overall, responses to the demographic questions on the survey of training techniques appeared to have a similar pattern to those on the survey of competencies, which indicated the consistency of the demographic distribution of respondents, although it is not necessary that participants of the second survey have to have completed the first

survey. However, the total number of respondents decreased by half. One possible explanation for the declination is that the second survey was launched in the end of July and the potential participants were likely to be away for vacation.

5.2. Popularity of Training Techniques

For each training technique listed on the survey, respondents were asked whether they experienced it or not; if they did, they could proceed and evaluate the effectiveness of that training technique; if they did not, they could skip it and move to the next one. Figure 5-9 presents a summary of the number of respondents who answered “yes” or “no” when asked about their experience with each training technique. As shown in this figure, the software training technique “Trainer demonstrates the features and functions of the chat software” was experienced by most respondents (n=213); another software training technique “Trainees pair up as patron and librarian to gain hands-on experiences on using the software” was experienced by 196 respondents and ranked in the second place; in the third place was the face-to-face training mode - “Training is provided in-house where trainer is physically present with trainees”, whereas another training mode “Training is provided online, through software like WebCT or BlackBoard” was experienced by the least respondents (n=17).

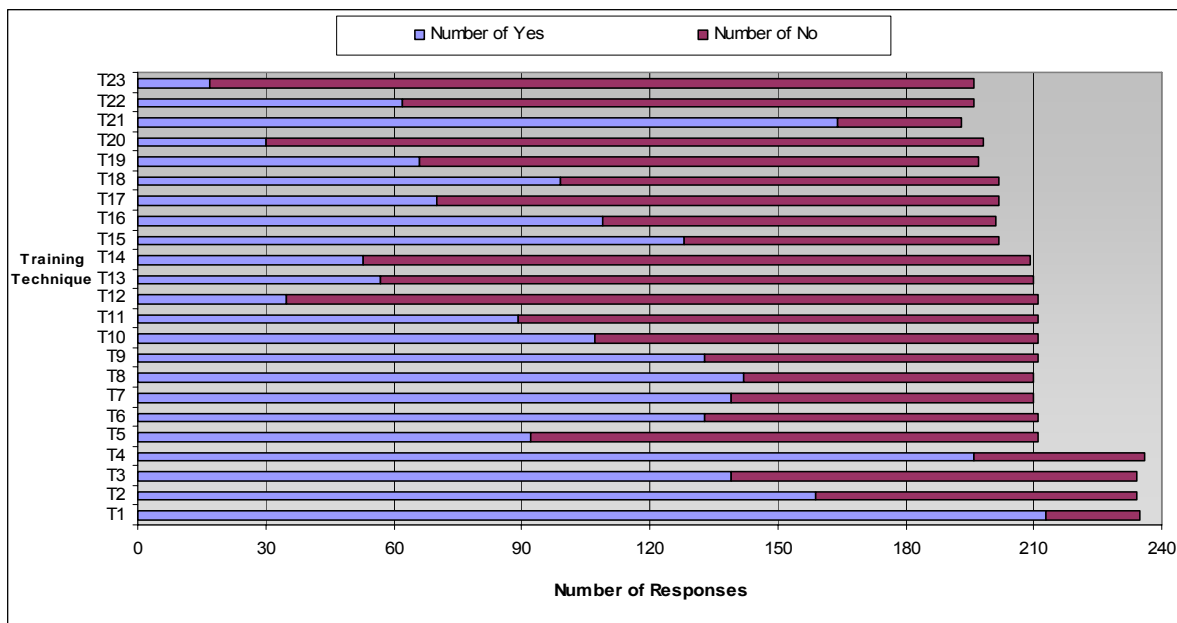


Figure 5-8. Number of respondents who experienced (or not) the training techniques

5.3. Ratings of Training Techniques

A total number of twenty-three training techniques were listed on the survey and respondents were asked to rate them in terms of their effectiveness in delivering chat reference competencies. The twenty-three training techniques cover five dimensions of chat reference training, and results of the ratings under each dimension are organized and reported in this section. Table 5-4 presents a summary of the mean rating and standard deviation for each training technique and the number of people who experienced the training in their own training program.

5.3.1. Training on Chat Software

As shown in Table 5-4, among four chat software training techniques, “Trainees pair up as patron and librarian to gain hands-on experiences on using the software” received the highest mean rating of 6.16 on a seven-point scale. Not only did respondents deem hands-on experiences to be the most effective way to gain chat software skills, this

technique was rated the highest among all training techniques in the five dimensions as well. The second highest rating in this dimension went to “Trainer breaks down the learning into a list of concrete tasks and subtasks to make it more manageable”, where respondents acknowledged the value of the “divide and conquer” strategy to master complex chat applications. The least effective chat software training technique was “Trainer provides complete and objective information about the software, including advantages and disadvantages”, indicating that respondents were more concerned about mastering the features and functions of chat software than having a thorough understanding of its advantages and disadvantages.

Training Technique	ID #	# Yes⁶	Mean	Standard Deviation
Training on Chat Software				
Trainees pair up as patron and librarian to gain hands-on experiences on using the software.	T4	196	6.16	1.20
Trainer breaks down the learning into a list of concrete tasks and subtasks to make it more manageable.	T3	139	5.70	1.12
Trainer demonstrates the features and functions of the chat software.	T1	213	5.29	1.42
Trainer provides complete and objective information about the software, including advantages and disadvantages	T2	159	5.28	1.34
Training on Chat Reference Transaction				
Trainees review selected chat transcripts to learn more about the transaction.	T10	107	6.01	1.15
Trainees ask questions to real chat reference services as users and evaluate their experiences - the secret shopper approach.	T12	35	5.89	1.35
Trainees have more experienced librarians as mentors to monitor their real chat sessions for a given period of time and provide feedback to them.	T13	57	5.54	1.23
Trainees pair up and engage in pre-designed reference scenarios to practice the reference interview and online communication skills.	T11	89	5.47	1.43
Trainer discusses/demonstrates how to apply reference interview techniques in chat sessions where no visual and verbal cues exist.	T6	133	5.35	1.33
Trainer discusses the service policy and procedural issues, including the scope of the service, when to provide instructions and when to give direct answers, etc.	T9	133	5.35	1.15
Trainer discusses/demonstrates online written communication skills and chat etiquette skills to help trainees better understand the chat communication method.	T7	139	5.29	1.37
Trainer explains the concept of chat reference and how it has impacted library reference work, preparing trainees at the conceptual level.	T5	92	5.25	1.34
Trainer discusses/demonstrates user management techniques, such as making referral or follow-up decisions and dealing with rude users, etc.	T8	142	5.18	1.26
Trainer discusses/demonstrates database and the Internet searching skills.	T14	53	5.09	1.38
(Table continues on the next page)				

Training Technique (cont.)	ID#	# Yes	Mean	Standard Deviation
Supporting Training Materials				
Cheat sheet containing vital information librarians might need to access quickly and often while covering the service.	T16	109	5.81	1.17
Training manual (either print or electronic) containing all the training related information to facilitate the training process and for future reference.	T15	128	5.15	1.53
Communication venues like email-listserv, online discussion board, or regular feed-back meetings for trainers and trainees to exchange their thoughts on the training program.	T18	99	4.88	1.55
Online tutorials created by software vendors on learning how to use the chat software.	T17	70	4.36	1.63
Ongoing Training				
Librarians pair up to practice chat reference skills on a regular basis for a certain period of time.	T20	30	5.83	1.23
Software training refreshers are provided on a regular basis.	T19	66	5.55	1.23
Training Modes				
Training is provided in-house where trainer is physically present with trainees.	T21	164	5.79	1.32
Training is provided through tele-conferencing or web-conferencing.	T22	62	4.31	1.53
Training is provided online, through software like WebCT or BlackBoard.	T23	17	4.29	1.90

Table 5-4. Summary of the ratings for chat reference training techniques

5.3.2. Training on Chat Reference Transaction

Ten techniques were listed under the dimension of chat reference transaction training, and among them, “Trainees review selected chat transcripts to learn more about the transaction” received the highest mean rating of 6.01, which in the meantime was the second highest among all training techniques. Unlike face-to-face reference encounters, no obtrusive or non-obtrusive approaches need to be taken when recording chat reference transactions since chat software can capture every one of them for future reference. Thus, the transcripts can be used in chat reference training for trainees to learn more about the service. The high rating of this technique indicates respondents’ confirmation of its effectiveness in helping trainees obtain a better understanding of chat reference transactions. The second most effective technique in this dimension was “Trainees ask questions to real chat reference services as users and evaluate their experiences - the secret shopper approach”, which once again suggests that respondents attached importance to hands-on experiences, no matter in software training or in chat reference transaction training.

Surprisingly, the lowest rating in this dimension went to “Trainer discusses/demonstrates database and the Internet searching skills”, and the second lowest one went to “Trainer discusses/demonstrates user management techniques, such as making referral or follow-up decisions and dealing with rude users, etc.”, given the fact that as a competency, the ability to make referral and search electronic resources were ranked in the top two places in the competency survey. It is likely that although the two competencies were essential, the corresponding techniques were not effective enough to

deliver them. More general approaches like the “secret shopper” or transcript review might be better venues for trainees to acquire these competencies.

5.3.3. Supporting Training Materials

Chat reference training is facilitated by a variety of supporting materials, among which, “Cheat sheet containing vital information librarians might need to access quickly and often while covering the service” was considered to be the most effective one. Respondents’ high rating of this material indicates that easy access to frequently-needed information is important in establishing a chat reference service. The second most helpful supporting material was “Training manual (either print or electronic) containing all the training related information to facilitate the training process and for future reference”, which serves as a guide book to help trainees navigate in their training program.

Ranked in the third place was “Communication venues like email-listserv, online discussion board, or regular feed-back meetings for trainers and trainees to exchange their thoughts on the training program”, which only received a fairly low rating of 4.88 out of seven, indicating the respondents did not consider communication between trainees and trainers to be an important supporting tool during the training process. The least helpful material was “Online tutorials created by software vendors on learning how to use the chat software”, suggesting that online tutorials were not as effective a way for trainees to master chat software skills as other chat software training techniques.

5.3.4. Ongoing Training

Chat reference training is an ongoing process. When the initial training is finished, trainees usually engage in regular training follow-ups to practice what they have learned from the initial program. Two ongoing training options were listed on the survey, and

respondents gave a higher rating to “Librarians pair up to practice chat reference skills on a regular basis for a certain period of time” than to “Software training refreshers are provided on a regular basis”, indicating that chat reference transaction skills need more frequent practice than chat software skills.

5.3.5. Training Modes

Chat reference training can be provided in various venues, and respondents considered the face-to-face venue – “Training is provided in-house where trainer is physically present with trainees” – to be the most effective training mode by giving it a mean rating of 5.79 out of seven. The two other venues, “Training is provided through tele-conferencing or web-conferencing” and “Training is provided online, through software like WebCT or BlackBoard” only received a mean rating around 4.30, suggesting that respondents did not believe that chat reference training could be effectively delivered via remote training modes.

In summary, the graphic delineation of the mean and standard deviation of the ratings for each training technique is presented in Figure 5-8, which suggests that the higher the mean is, the lower the standard deviation is. Thus, respondents’ opinions were more likely to converge on the training techniques they considered effective and less so on those they deemed not as effective.

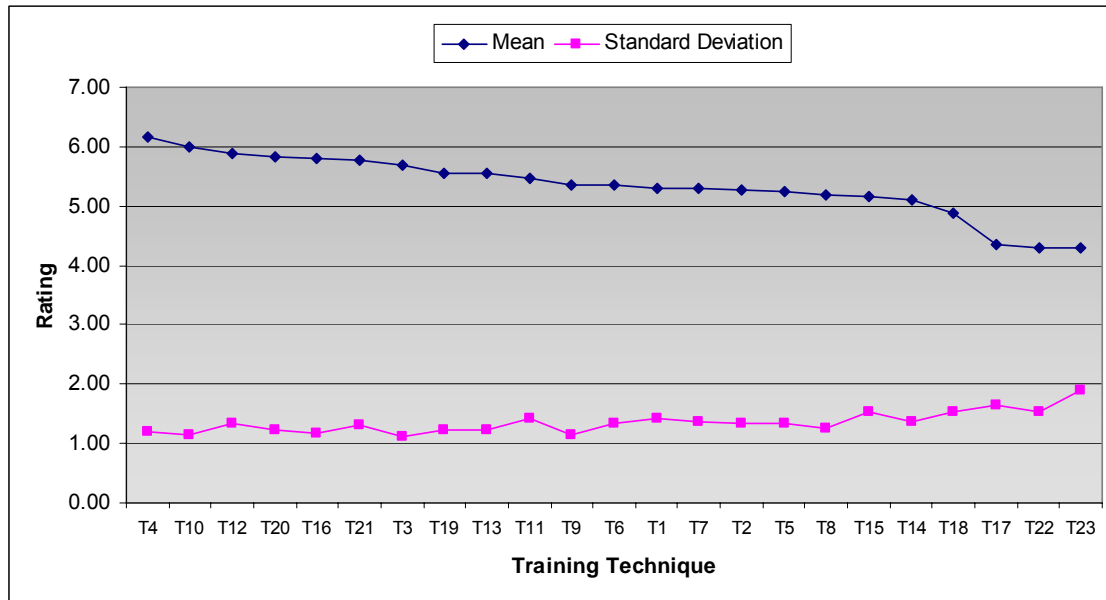


Figure 5-9. Mean ratings and standard deviations of all training techniques

5.3.6. Effective Training Techniques

In order to determine the effective chat reference training techniques, a cut-off mean rating point of 5.15⁷ (out of seven) was selected and eighteen techniques above this point were considered to be the effective training techniques. Table 5-5 presents a summary of the 18 effective techniques, including the training dimensions they belong to and their mean rating and ranking respectively.

Training dimensions	Training Techniques	Mean rating	Rank #
Training on Chat Software	Trainees pair up as patron and librarian to gain hands-on experiences on using the software.	6.16	1
	Trainer breaks down the learning into a list of concrete tasks and subtasks to make it more manageable.	5.70	7
	Trainer demonstrates the features and functions of the chat software.	5.29	13
	Trainer provides complete and objective information about the software, including advantages and disadvantages	5.28	15
Training on Chat Reference Transaction	Trainees review selected chat transcripts to learn more about the transaction.	6.01	2
	Trainees ask questions to real chat reference services as users and evaluate their experiences - the secret shopper approach.	5.89	3
	Trainees have more experienced librarians as mentors to monitor their real chat sessions for a given period of time and provide feedback to them.	5.54	9
	Trainees pair up and engage in pre-designed reference scenarios to practice the reference interview and online communication skills.	5.47	10
	Trainer discusses/demonstrates how to apply reference interview techniques in chat sessions where no visual and verbal cues exist.	5.35	11
	Trainer discusses the service policy and procedural issues, including the scope of the service, when to provide instructions and when to give direct answers, etc.	5.35	12
	Trainer discusses/demonstrates online written communication skills and chat etiquette skills to help trainees better understand the chat communication method.	5.29	14
	Trainer explains the concept of chat reference and how it has impacted library reference work, preparing trainees at the conceptual level.	5.25	16
	Trainer discusses/demonstrates user management techniques, such as making referral or follow-up decisions and dealing with rude users, etc.	5.18	17
Supporting Training Materials	Cheat sheet containing vital information librarians might need to access quickly and often while covering the service.	5.81	5
	Training manual (either print or electronic) containing all the training related information to facilitate the training process and for future reference.	5.15	18
Ongoing Training	Librarians pair up to practice chat reference skills on a regular basis for a certain period of time.	5.83	4
	Software training refreshers are provided on a regular basis.	5.55	8
Training Mode	Training is provided in-house where trainer is physically present with trainees.	5.79	6

Table 5-5. Eighteen effective chat reference training techniques

5.3.7. Self-training and Readings

Respondents of the survey were asked whether or not they used any self-training material, such as Lipow's (2003) "The Virtual Reference Librarians' Handbook". A total

of twenty-eight respondents indicated that they used this book as a self-training manual. A number of other publications were mentioned as well, although they were not explicit self-training materials. Another open-ended question asked on the survey was for respondents to report readings assigned by their training program that they considered helpful. Only 9 responded to this question.

Table 5-6 presents a summary of chat reference literature identified by respondents as either helpful self-training materials or helpful trainer-assigned readings.

Title of material	# of times mentioned
Hirko, B., & Ross, M. B. (2004). <i>Virtual reference training : the complete guide to providing anytime, anywhere answers</i> . Chicago: American Library Association.	3
Janes, J. (2003). <i>Introduction to reference work in the digital age</i> . New York : Neal-Schuman Publishers	3
Ronan, J. (2003). <i>Chat reference : a guide to live virtual reference services</i> . Westport, Conn.: Libraries Unlimited.	3
Sloan, B. 1998. Electronic Reference Services: Some Suggested Guidelines. <i>Reference and User Services Quarterly</i> , 38, 77-81.	2
Kimmel, S. & Heise, J. (Eds.). (2003). <i>Virtual reference services : issues and trends</i> . Binghamton, NY : Haworth Information Press.	1
Anderson, E., Boyer, J. & Ciccone, K. (2000). <i>Remote reference services at the North Carolina State University Libraries</i> . Retrieved December 20, 2006 from http://www.vrd.org/conferences/VRD2000/proceedings/boyer-anderson-ciccone12-14.shtml	1
Boyer, J. (2001). Virtual reference at the NCSU Libraries: The first one hundred days. <i>Information Technology and Libraries</i> , 20(3), 122-128.	1
Ciccone, K., & VanScoy, A. (2003). Managing an established virtual reference service. <i>Internet Reference Services Quarterly</i> , 8(1/2), 95-105.	1
Abels, E. G. (1996). The e-mail reference interview. <i>RQ</i> , 35(3), 345-358.	1
Ward, D. (2003). Using virtual reference transcripts for staff training. <i>Reference Services Review</i> , 31(1), 46-56	1
Meer, P. V., Poole, H., & Valey, T. V. (1996). The connection between library use and use of campus computer applications. <i>Electronic Library</i> , 14(4), 339-346.	1
Grudin, J. (1994). Groupware and social dynamics: Eight challenges for developers. Retrieved December 20, 2006, from http://research.microsoft.com/~jgrudin/past/Papers/CACM94/cacm94.html	1
Bushallow-Wilbur, L., DeVinney, G., & Whitcomb, F. (1996). Electronic mail reference service: A study. <i>RQ</i> , 35(3), 359-363.	1
Chat reference blogs	1
Washing State Library Virtual Reference Tutorial Overview	1

Table 5-6. Summary of additional self-training material and assigned readings

5.4. Training Techniques Suggested by Respondents

Respondents of the survey were asked to suggest additional training techniques and rate their effectiveness at the end of each training dimension. Although they were instructed to only provide training techniques that were not covered on the survey, the majority of the suggestions repeated items already listed on the survey.

Table 5-7 presents a summary of the training techniques suggested by respondents. A total number of sixty suggestions were made and 70% (n=42) of them were training techniques overlapping with what had already been covered by the survey, which are listed in the shaded area in Table 5-7. The clear area contains training techniques that added new information to the survey, which, subsequently, is the focus of this section.

Seven respondents mentioned a specific training program in which they participated, such as “OCLC and PALINET workshops”, “My Web Librarian from tutor.com”, “QuestionPoint viewlets” and “Anytime, Anywhere Answers”. Some of these programs are in-house training workshops; some are online tutorials. Respondents’ mentioning them indicates their acknowledgement of the effectiveness of these programs, and thus, training approaches employed in these programs might be beneficial to the further development of chat reference training and education.

Three respondents suggested that trainees review and critique each other’s chat session transcripts and learn from their peers. For them, having a mentor monitor and evaluate one’s performance is not enough; peers’ feedback on how one handles a chat session may provide a fresh perspective and enable a more thorough learning process.

Suggested Training Techniques	# of times suggested	Mean Rating	Standard Deviation
Trainees have hands-on practice of chat reference skills learned in the training program	10	6.4	0.84
<i>"Trainees practice hands-on with partners or by themselves following the in-person training day."</i>			
Trainer and trainees discuss issues related to chat reference in regular meetings.	7	6.29	0.76
<i>"Chat team meets or emails as necessary to discuss issues related to chat reference."</i>			
Trainees review chat transcripts to learn more about the chat reference service.	6	5.83	0.98
<i>"Reading old transcripts of previous interactions."</i>			
Trainees have trainer to monitor and critique their real chat sessions.	6	7	0
<i>"Trainer pairs with trainee to work together for first several chat sessions."</i>			
Trainees view online tutorials to learn about chat reference.	4	5.5	1.73
<i>"Online audio-video tutorials"</i>			
Training is conducted in-house.	3	65.5	1
<i>"site visit rather than webinar/teleconf."</i>			
The "secret shopper" approach	2	6.5	0.71
<i>"I'd strongly recommend that the trainer ask the participants to take part in a secret shopper activity before the in-person class. This lets them experience the customer's perspective."</i>			
Trainees read professional articles about chat reference	2	7	0
<i>"Professional articles."</i>			
Self-training	1	7	
<i>"exploring on my own and actually reading the manual - gasp! - have worked well for me."</i>			
Subject librarians introduce key resources to trainees.	1	6	
<i>"Subject librarians provided half hour review of their key resources"</i>			
A specific chat reference training program	7		
<i>"OCLC and PALINET workshops", "My Web Librarian from tutor.com", "QuestionPoint viewlets", "Anytime, Anywhere Answers"</i>			
Peer review of chat reference transcripts among trainees	3	6.33	0.58
<i>"transcripts are anonymized and reviewed by fellow chat ref librarians"</i>			
Trainees use IM applications in their regular library work.	1	7	
<i>"regular use of IM as part of work communication"</i>			
Trainees are shown a sample question and talk out loud in answering it.	1	7	
<i>"Instead of having trainees pair up to engage in ref scenarios, I have begun an activity called, 'You're on the spot.' Trainees are shown a sample Q and talk out loud"</i>			
Build a chat reference blog for the training program	1	7	
<i>"Chat Reference blog with FAQ and helpful hints and upcoming assignments with suggested resources"</i>			
Distribute a list of chat etiquettes for trainees to reference	1	4	
<i>"Receiving a list of acronyms commonly used by younger generations"</i>			
Trainees go to conferences on chat reference	1	7	
<i>"attended a Virtual Reference Conference"</i>			
Identify a chat reference leader in the training program.	1	4	
<i>"Chat reference leaders at each library are identified and encouraged to lead trainings"</i>			
Introduce chat reference in the LIS curriculum	1	4	
<i>"showed chat transaction to a LIS Program Class"</i>			
Clear chat reference instructions	1	7	
<i>"Instructions that I was able to print out"</i>			

Table 5-7. Summary of training techniques suggested by survey II. respondents

One respondent suggested the use of IM applications in regular work communication so that trainees could gain more hands-on experience of the tool that supports chat reference transactions. Another one proposed a particular technique to help trainees respond to a chat reference query by having them talk out loud when answering a sample question. Several others made suggestions about making useful training-related information easily accessible to trainees, such as creating a blog containing helpful hints and upcoming assignments and distributing a list of acronyms frequently used in chat, etc.

Going to conferences about chat reference was suggested by one respondent as well. One such conference is “Virtual Reference Conference” hosted annually by the “Virtual Reference Desk” project. However, unfortunately, this conference has been discontinued since 2006 due to lack of funding. Another suggestion was that a chat reference leader should be identified at each library to lead the training. In other words, even when the training is provided by software vendors, the training program still needs a leader from within the library to oversee the training.

Finally, one respondent realized that the professional preparation of chat reference librarians ought to be expanded to the education setting and chat reference should be incorporated in the curriculum so that LIS students can have the opportunity to have some hands-on experience of chat reference service.

5.5. Analysis of Relationship between Variables

Nine demographic questions were asked in the survey on training techniques to collect demographic information about the respondents, such as how they became a chat reference librarian, the provision venue of their chat service, their work setting, etc. One of the research questions is seeking to find out whether these contextual or demographic

variables correlate with the ratings of training techniques. Thus, ANOVA was employed to determine whether respondents from different demographic groups had significantly different ratings of the surveyed chat reference training techniques.

A total number of 207 ANOVA tests were conducted, and for each ANOVA test, Scheffe's test was chosen as the post-hoc analysis for pair-wise comparisons due to the unequal sample size and heterogeneity of variance of different groups for each demographic variable.

In this section, results of these analyses are organized by training dimensions – for the training techniques under each dimension, the significant differences between different demographic groups' ratings determined by the ANOVA analysis are presented in a table, where the results from both the overall analysis and Scheffe's test are incorporated. More detailed results of the ANOVA can be found at http://ils.unc.edu/~luolili/anova_results.doc.

Dimension I. – Software training

Ratings of the training technique “Trainer demonstrates the features and functions of the chat software” from respondents whose level of comfort with chat reference is three were found significantly lower than those from respondents whose comfort level is six or seven (very comfortable).

Ratings of the training technique “Trainees pair up as patron and librarian to gain hands-on experiences on using the software” were found significantly different between the following demographic groups:

- Respondents whose level of comfort with chat reference is three rated this technique significantly lower than those whose comfort level is five and higher.
- Respondents who responded from a trainer's perspective rated this competency significantly higher than those who responded as a trainee, or as both a trainer and a trainee.

In summary, respondents with lower level of comfort with chat reference found the two software training techniques significantly less effective than those with higher comfort level, indicating that regular chat reference software training might be overwhelming for people who are not very comfortable with the service, and for them, trainers might have to consider tailoring the introduction of software features to make them easier to understand, and provide more instructions during the hands-on practice sessions.

Another significant difference was found between the ratings from respondents who are trainers, and respondents who are trainees (no matter they become trainer or not later on), regarding the training technique of hands-on practice. Trainees, as the subject of a training program, found this technique significantly less effective than trainers. This finding suggests that although hands-on practice was acknowledged as an effective technique in general (ranked first among all techniques), trainers might still need to align their view on it with trainees' in order to reach a shared understanding of the effectiveness of this technique.

Training Technique	Demographic Variable	f value	p value	Scheffe's test		
Trainer demonstrates the features and functions of the chat software.	Comfort level with chat reference service	5.99	0.00003	p=0.005		
				comfort level 3	$\mu=3.90$	$\sigma=1.20$
				comfort level 6	$\mu=5.45$	$\sigma=1.23$
				p=0.043		
				comfort level 3	$\mu=3.90$	$\sigma=1.20$
				comfort level 7	$\mu=5.75$	$\sigma=1.42$
Trainees pair up as patron and librarian to gain hands-on experiences on using the software.	Comfort level with chat reference service	6.01	0.00003	p=0.032		
				comfort level 3	$\mu=4.80$	$\sigma=1.48$
				comfort level 5	$\mu=6.20$	$\sigma=1.21$
				p=0.018		
				comfort level 3	$\mu=4.80$	$\sigma=1.48$
				comfort level 6	$\mu=6.26$	$\sigma=1.00$
				p=0.003		
				comfort level 3	$\mu=4.80$	$\sigma=1.48$
				comfort level 7	$\mu=6.45$	$\sigma=1.03$
	The perspective from which respondents provide their input	5.29	0.002	p=0.015		
				as a trainer	$\mu=6.67$	$\sigma=0.75$
				as a trainee	$\mu=6.03$	$\sigma=.23$
				p=0.023		
				as a trainer	$\mu=6.67$	$\sigma=.75$
				both as a trainer and as a trainee	$\mu=5.83$	$\sigma=1.51$

Table 5-8. ANOVA results for training dimension I.

Dimension II. – Chat reference transaction training

Ratings of the training technique “Trainer discusses/demonstrates online written communication skills and chat etiquette skills to help trainees better understand the chat communication method” from respondents who have worked with chat reference for more than three years were found significantly higher than those from respondents who have worked with chat for only one to three years.

Ratings of the training technique “Trainer discusses the service policy and procedural issues, including the scope of the service, when to provide instructions and

when to give direct answers, etc.” were found significantly different between the following demographic groups:

- Respondents who work in both collaborative chat reference network and stand-alone chat service rated this technique significantly lower than those who only work in a collaborative network.
- Respondents who work in both collaborative chat reference network and stand-alone chat service rated this technique significantly lower than those who only work in a stand-alone service.

In summary, respondents who had longer experience with chat found the training on online communication significantly more effective than those with less experience. Meanwhile, respondents who serve in both collaborative chat reference network and stand-alone chat service found the training on service policy and procedural issues significantly less effective than those who serve in either the collaborative network or a stand-alone service, indicating that more attention should be paid to develop training in this regard to make it more effective when trainees face a more complex chat reference working environment that involves both collaborative and stand-alone chat reference services.

Training Technique	Demographic Variable	f value	p value	Scheffe's test		
Trainer discusses/demonstrates online written communication skills and chat etiquette skills to help trainees better understand the chat communication method.	Length of time working with chat reference service	3.61	0.03	p=0.03		
				more than 3 years	$\mu=5.75$	$\sigma=1.33$
				1-3 years	$\mu=5.01$	$\sigma=1.41$
Trainer discusses the service policy and procedural issues, including the scope of the service, when to provide instructions and when to give direct answers, etc.	Chat reference service mode	4.07	0.019	p=0.038		
				both collaborative network and stand-alone service	$\mu=4.71$	$\sigma=1.10$
				collaborative service	$\mu=5.46$	$\sigma=1.07$
				p=0.029		
				both collaborative network and stand-alone service	$\mu=4.71$	$\sigma=1.10$
				stand-alone service	$\mu=5.51$	$\sigma=1.21$

Table 5-9. ANOVA results for training dimension II.

Dimension III. – Supporting training materials

Ratings of the training material “Online tutorials created by software vendors on learning how to use the chat software” from respondents who work in both collaborative chat reference network and stand-alone chat service were found significantly lower than those from respondents who only work in a stand-alone service. This finding suggests that when trainees serve in multiple chat reference modes, online tutorials are not as an effective approach as for those who only work in the stand-alone service mode.

Training Technique	Demographic Variable	f value	p value	Scheffe's test		
Online tutorials created by software vendors on learning how to use the chat software.	Chat reference service mode	3.33	0.042	p=0.045		
				both collaborative network and stand-alone service	$\mu=3.50$	$\sigma=1.65$
				stand-alone service	$\mu=5.00$	$\sigma=1.31$

Table 5-10. ANOVA results for training dimension III.

Dimension IV. – Ongoing training

No significant differences between different demographic groups' ratings of training techniques under this dimension were found.

Dimension V. – Training mode

Ratings of the training mode "Training is provided in-house where trainer is physically present with trainees" were found significantly different between the following demographic groups:

- Respondents who volunteer to become chat reference librarians rated this technique significantly higher than those who are assigned to work with chat.
- Respondents whose level of comfort with chat reference is 2 or 3 rated this technique significantly lower than those whose comfort level is 5 or higher.
- Respondents who responded from the trainer's perspective rated this technique significantly higher than those who responded from the trainee's perspective.

Generally, the in-house training mode was found to be the most effective one among three training modes. Nonetheless, people who are less comfortable with chat reference considered it less effective than people who are more comfortable with chat; people who volunteer to work with chat found it more effective than those who are assigned to work with chat; and trainers deemed it more effective than trainees.

Training Technique	Demographic Variable	f value	p value	Scheffe's test		
Training is provided in-house where trainer is physically present with trainees.	The way to become a chat reference staff	2.86	0.039	p=0.042		
				volunteer	$\mu=6.09$	$\sigma=1.15$
				part of the job	$\mu=5.49$	$\sigma=1.46$
	Comfort level with chat reference service	9.17	0.0000001	p=0.031		
				comfort level 2	$\mu=3.00$	$\sigma=0.00$
				comfort level 6	$\mu=6.05$	$\sigma=0.96$
				p=0.016		
				comfort level 2	$\mu=3.00$	$\sigma=0.00$
				comfort level 7	$\mu=6.24$	$\sigma=1.07$
				p=0.014		
				comfort level 3	$\mu=3.71$	$\sigma=1.50$
				comfort level 5	$\mu=5.57$	$\sigma=1.27$
				p=0.001		
				comfort level 3	$\mu=3.71$	$\sigma=1.50$
				comfort level 6	$\mu=6.05$	$\sigma=0.96$
				p=0.0001		
				comfort level 3	$\mu=3.71$	$\sigma=1.50$
				comfort level 7	$\mu=6.24$	$\sigma=1.07$
	The perspective from which respondents provide their input	4.32	0.006	p=0.013		
				as a trainer	$\mu=6.32$	$\sigma=0.82$
				as a trainee	$\mu=5.51$	$\sigma=1.49$

Table 5-11. ANOVA results for training dimension V.

5.6. Chapter Summary

In this chapter, findings from the survey on chat reference training techniques are reported. Both the descriptive statistical analysis of the effectiveness and analysis of the relationship between the ratings and respondents' demographic characterization are presented to provide a thorough view of librarians' evaluation of the effectiveness of surveyed training techniques. The second research question, "What are the effective training techniques that could deliver the essential chat reference competencies", and half of the third research question "How do context variables such as service mode, work

setting and provision venue, etc., correlate with chat reference training techniques”, can be fully answered by findings reported in this chapter.

Chapter VI. Discussion and Conclusions

Twenty-one essential chat reference competencies and eighteen effective training techniques have been determined in this dissertation study. What implications will they have in the professional development for chat reference librarians? This question is addressed in this chapter, through a summary and synthesis of the findings from the previous two chapters. Limitations of the study are also discussed and possible areas of future research are identified.

This chapter will be organized in the following order:

- Discussion of chat reference competencies;
- Discussion of chat reference training techniques;
- Overview of essential competencies and effective training techniques; and
- Implications for chat reference education.

6.1. Discussion of Chat Reference Competencies

6.1.1. General Reference Competencies

Library reference is a continually evolving field. The constant advancement of technologies and the social and economical transformation thus incurred have impacted the development of library reference services in a great many ways. Over the past half a century, library reference has undergone a series of changes brought about by the advent of technologies, growing from the solely print resource oriented services limited to a

certain physical space, to a diversified service portfolio that could reach more people with more resources and less restriction of time and space. The library world has witnessed the dramatic increase of the availability and accessibility of electronic resources, and the unprecedented expansion of the media through which reference services are provided.

These changes undoubtedly respond well to the evolving needs of user communities. In the mean time, they also pose new challenges to the work environment and require reference staff to have corresponding knowledge and skills to stay current as information professionals. Thus, the need for reference staff to acquire new competencies inevitably arises every time the reference field is reshaped by technological progress.

The reference literature abounds with efforts seeking to identify competencies requisite for providing reference service when changes take place. From the late 1970s to the mid 1980s, libraries embraced the development of hard disc storage systems and started offering online searching services by accessing bibliographic databases from telecommunicating terminals. Entering the era of electronic online searching, reference staffs were expected to be well-equipped with knowledge and skills to process online information retrieval requests. Many researchers took notice of the emerging needs for updated reference competencies and contributed to the literature in this regard. Bourne and Robinson (1981) reviewed the reference training and education efforts that delivered competencies of online searching. Nitecki (1984) discussed competencies of public service librarians in relation to new technologies in reference services. Walters and Barnes (1985) provided twelve online searching objectives which were further subdivided into individual competencies. Griffiths and King (1986), in response to the radically changing information landscape, led a nation-wide study to determine

competencies required of the library workforce in the information age. Among the results, a comprehensive list of 46 reference competencies was identified.

Since the late 1980s, mass storage and networking technologies brought CD-ROM and the Internet to libraries, and more importantly, drove reference service to a critical point of change, where reference librarians no longer assumed the exclusive role of “online searcher” and electronic information searching became available to all end-users. Thus, new responsibilities occurred and reference staffs were expected to master matching competencies to keep abreast with the increasingly service-oriented reference work. Once again, the needs for updated reference competencies were acknowledged in the literature. Bauner (1990) conducted a survey to elicit the competencies that most often had to be taught to entry level reference librarians with the appropriate MLS degree. Stafford and Serban (1990) provided a list of core competencies needed by reference librarians in an automated environment. Massey-Burzio (1991) identified four basic competency areas for reference librarians beyond MLS education. King and Mahmoodi (1991) determined a detailed and hierarchical listing of competencies for reference librarians in a public library. Larson and Dickson (1994) developed a list of behaviors, goals and performance standards for reference librarians, and emphasized behavioral standards. Sherrer (1996) defined competencies that reference librarians need to acquire when facing challenges brought by the sheer power and scope of Internet information services. Kong (1996) identified core competencies for academic reference librarians in response to the great demands from the academic community for access to and instruction in electronic information resources such as the Internet.

The advent of another technological breakthrough in the mid 1990s – the World Wide Web – spawned exponential growth of remotely accessible information and opened the public's eyes to the volume of information in a way that traditional library services have never managed. The impact that the Web has had on reference work motivated a new wave of studies to examine competencies required of reference librarians in the more and more complex information world. Nofsinger (1999) identified a list of core competencies that need to be mastered by the twenty-first century reference professionals to handle the drastic changes in work environments, increased job responsibilities and new role expectations. Prestamo (2000), in her dissertation, did a Delphi study to generate an inventory of technology and computer skills for academic reference librarians. Another dissertation by Burkhardt (1995) was also devoted to the technology's challenge for job responsibilities of reference librarians. Auster and Chan (2003) reviewed the literature to determine the competencies for reference work that have been pinpointed as necessary for today's work environment. The professional organization of reference librarians, Reference and User Services Association (2003), organized a task force to develop a model statement of competencies essential for successful reference and user services librarians.

In the late 1990s, when the popularity of the Web became deeper and wider, a new reference service provision venue – online real-time chat reference service – was nurtured and then was adopted by a large number of libraries. This dissertation, hence, seeks to continue the competency identification efforts in the reference literature by focusing on determining a prioritized list of essential competencies for the most recent reference progress – chat reference – and identifying the most effective training

techniques to deliver them. This study is a step forward along the continuum of reference competency development and the competencies determined in this study are inextricably related to all the reference competencies identified in previous efforts. The goal of this dissertation is to benefit the professional preparation of chat reference librarians; and eventually, results from this study can be incorporated with previously identified reference competencies to create a thorough repository of competencies for the reference field as a whole.

Before the interpretation and discussion of findings from this study are presented, a summary of general reference competencies identified from previous studies is provided as a contrast to specific chat reference competencies determined in this study. Thus, a better understanding of what reference competencies remain critical in chat, what are entirely new and what are not as important, can be achieved.

- *Ability to conduct an effective reference interview* (Nitecki, 1984; Walters & Barnes, 1985; Griffiths & King, 1986; Buttlar & Du Mont, 1989; Bauner, 1990; Massey-Burzio, 1991; Nofsinger, 1999; Auster & Chan, 2003; RUSA, 2003);
- *Knowledge of referral methods and techniques* (Walters & Barnes, 1985; Griffiths & King, 1986; RUSA, 2003);
- *Knowledge of standard print and electronic sources and the primary subject field of users served* (Nitecki, 1984; Smith, Marchant, & Nielson, 1984; Griffiths & King, 1986; Buttlar & Du Mont, 1989; Bauner, 1990; Stafford & Serban, 1990; Kong, 1996; Sherrer, 1996; Nofsinger, 1999; Auster & Chan, 2003; RUSA, 2003);

- *Communication and interpersonal skills* (Nitecki, 1984; Smith, Marchant, & Nielson, 1984; Griffiths & King, 1986; Buttlar & Du Mont, 1989; Bauner, 1990; Stafford & Serban, 1990; Kong, 1996 Sherrer, 1996; Nofsinger, 1999; Auster & Chan, 2003; RUSA, 2003);
- *Technological skills* (Bauner, 1990; Stafford & Serban, 1990; Massey-Burzio, 1991; Kong, 1996; Nofsinger, 1999; Auster & Chan, 2003; RUSA, 2003);
- *Instructional skills* (Nitecki, 1984; Walters & Barnes, 1985; Bauner, 1990; Stafford & Serban, 1990; Virginia, 1991; Auster & Chan, 2003; RUSA, 2003);
- *Ability to apply library policies and procedures* (Walters & Barnes, 1985; Bauner, 1990; Auster & Chan, 2003; RUSA, 2003);
- *Personal traits or attributes* (Griffiths & King, 1986; Sherrer, 1996; Auster & Chan, 2003; RUSA, 2003);
- *Analytic and critical thinking skills* (Kong, 1996; Sherrer, 1996; Nofsinger, 1999; Auster & Chan, 2003; RUSA, 2003);
- *Management and supervisory skills* (Nitecki, 1984; Massey-Burzio, 1991; Sherrer, 1996; Nofsinger, 1999; Auster & Chan, 2003; RUSA, 2003); and
- *Commitment to user services* (Griffiths & King, 1986; Sherrer, 1996; Nofsinger, 1999; RUSA, 2003).

6.1.2. Chat Reference Competencies

The twenty-one essential chat reference competencies⁸ identified in this dissertation can be characterized by three categories, as indicated by the clear area in Figure 6-1. Some of them are core competencies across all reference modes; some of them are specific only to chat; and some are general reference competencies elevated to a

higher stance of importance in the context of chat. Each of the three groups of competencies will be discussed in more details.

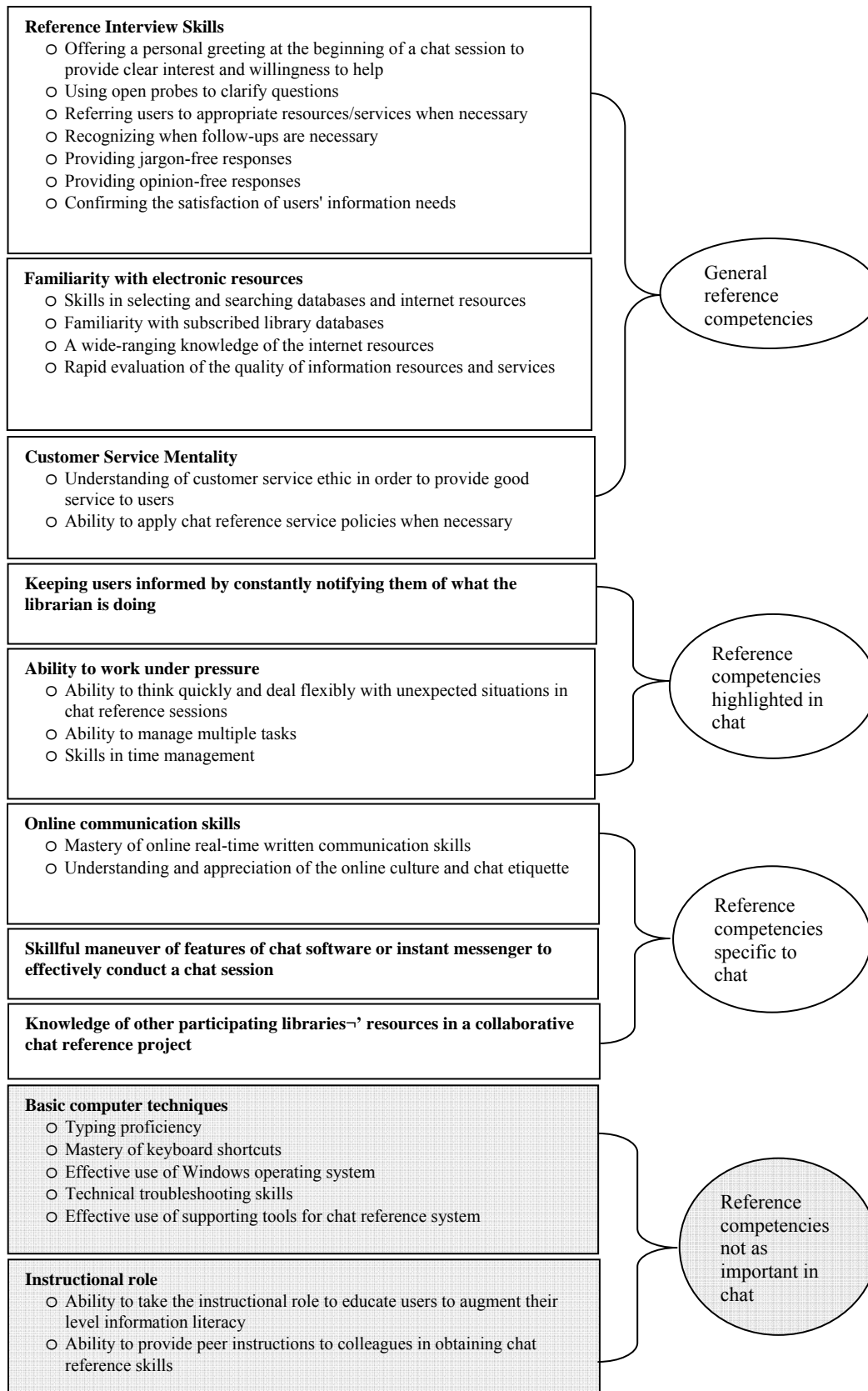


Figure 6-1. An analytical view of chat reference competencies

Competencies across all reference settings

Reference interview skills have been acknowledged to be one of the core skills in reference work. The purpose of reference interview is to ease users into a reference encounter, clarify users' questions and discover their real information needs in order to help them locate the sought information. Chat reference, in nature, is no different than all the other reference venues where human-intermediated assistance is provided to fulfill users' information needs. Thus, the utmost obligation in a chat reference session remains to be identifying what users really want, and reference interview skills are indispensable for chat reference librarians as well.

However, chat reference is a service facilitated by on-line real-time technologies and studies have revealed that it is not the ideal option for complex research questions that demand more time and effort (Horowitz et al., 2005; Ruppel & Fagan, 2002). Chat reference practitioners are well aware of this situation and consider it crucial to be able to resort to other reference alternatives in a chat session. Findings from the dissertation indicate that librarians attach importance to competencies like having the ability to make appropriate referrals and recognize the need to follow up with the user⁹. Although traditional reference values include thoroughness, it is not necessarily so in chat. Chat reference can be viewed as a convenient access point toward a vast amount of reference expertise where complex questions can be handled more efficiently and thoroughly than they can within a chat session. Any chat reference training or education program should, from the onset of the program, inform trainees of this particular characteristic of chat reference and instruct them to learn to "let go" at a certain point of a chat session when it comes to a complex question.

A large part of reference librarians' expertise comes from the knowledge of general and subject-specific resources. In the context of chat reference, such knowledge has a particular emphasis on resources in electronic format. Librarians' familiarity with resources on the Internet and in subscription databases plays a critical role in delivering chat reference service since users expect immediately available answers in a chat reference transaction (Coffman, 2003); it is only likely for answers to be provided electronically in order to be delivered immediately. Thus, chat reference training/education ought to accentuate the significance of electronic resources and make sure librarians have a solid mastery of them before staffing chat sessions.

Reference service is one of the library public services that assist different user populations in their information seeking process. Commitment to user services has always been a competency in reference work and chat reference is no exception. As a matter of fact, it is even more important in chat given that there are no non-verbal cues and users can be completely anonymous. Misunderstandings arise and inappropriate user behaviors occur in chat reference sessions, and still, librarians need to maintain a professional presence and have a customer service mentality when dealing with users from all sorts of backgrounds and with all sorts of needs. This point should be clearly communicated to trainees in a chat reference training/education program – commitment to user services is a constant in all variations of reference service, although more challenges are posed in the context of chat.

Each library service has its own policies and these policies guide librarians in the process of providing services to users. Thus, chat reference librarians, without any exception, should be able to understand where the boundaries are and apply service

policies effectively. Different chat reference services, such as an individual service or a collaborative consortium, may have drastically varying policies. It is important that service policies be stated clearly in a training program and help trainees learn how to apply them in order to ensure the success of chat reference service.

Out of the eleven general reference competencies identified in the literature, five remain the same in chat. Chat reference librarians are expected to master effective reference interview techniques, especially to be able to determine when to make referral or follow-up decisions; their expertise in resources, especially electronic resources, is critical, as well as their understanding of service policies and the ability to apply them. After all, they should stay committed to serving library users even though it is more challenging in the chat reference environment. These universal competencies are required by the nature of library reference work. They might need a little bit of fine-tuning in chat, but they are the core skills, knowledge and attitudes leading to a successful chat reference encounter.

Reference competencies highlighted in chat

Chat reference, though retaining the principles of reference services, is provided in a different context than all the other reference options technologically and procedurally. These changes in provision venues have increased the importance of certain reference competencies that might not be prominent in other reference modes. The ability to work under pressure is one of them.

Every line of work has pressure. In the field of library reference, a considerable proportion of the stress comes from dealing with human beings, such as encountering

rude users and receiving tough questions. With the advent of chat reference, a number of new sources of pressure have come into the picture and aggravated the stress level.

To name a few: 1) the lack of verbal and visual cues could make the librarian-user communication difficult and even cause anxiety and misunderstanding on both ends; 2) the unexpected situations, like technology failure or the disappearance of users in the middle of a chat session, could make librarians panic; 3) sometimes librarians have to staff both chat sessions and the reference desk at the same time and juggle virtual and physical user queries. All the pressure inherent in the chat environment requires librarians to be able to multi-task, think quickly, manage time effectively, and be flexible and calm when dealing with difficult situations.

Another highlighted competency in chat reference is the ability to keep users informed by constantly notifying them of what the librarian is doing. In a face-to-face reference encounter, the physical presence of both the librarian and the user makes it easier to communicate the process of searching for an answer to the user's question. However, in a chat reference session, where no audio or visual cues exist and the entire communication is based on the exchange of written messages, librarians are faced with a more critical need to stay connected to the user. Telling the user what search activities the librarian is engaged in is an effective technique for the librarian to assure users of the "connectedness" and avoid making the user feel ignored.

The provision of chat reference has elevated the above competencies to the spotlight. When a training or education curriculum is designed for chat reference librarians, the increased importance of these competencies needs to be made clear so that trainees can be better prepared for the augmented pressure level in chat reference service.

Reference competencies specific to chat

The way that chat reference service is delivered necessitates certain competencies specific only to this particular reference mode, among which, the first and foremost is the ability to use the chat application effectively, especially when the service is offered through complex chat software. The currently popular commercial chat software on the market, such as QuestionPoint from OCLC or Virtual Reference Toolkit from Tutor.com, supports various functions including co-browsing, file-sharing, backchannel communication and the use of scripted messages. Librarians cannot be assigned the task of chat reference service without familiarizing themselves with all these features of a chat application.

While chat software skills ensure the technical operation of a chat session, it is online communication skills that produce the content of a successful transaction. The effective exchange of written messages, both in the online environment in general and in the chat context in particular, requires a clear understanding and appreciation of the online culture/chat etiquette, and the ability to use online language appropriately. The reference literature indicated that general interpersonal and communication skills are indispensable to the success of a reference encounter; however, in the specific context of chat, these skills need to be reevaluated and fine-tuned to fit in the online culture. In other words, in order to maintain a professional and yet friendly online presence, librarians need to master online communication skills to successfully conduct a chat reference session.

In addition to changes in the technical and communication horizon, the advent of chat reference has generated the possibilities of organizational changes as well. It has

enabled the formation of consortia in which a variety of libraries participate. This unprecedented expansion in reference collaboration has been accompanied by the expansion in user populations, hence, the expansion in librarians' knowledge. In a chat reference consortium where members take turns staffing a collaborative service, librarians are expected to know other participating libraries' resources as well as their own so that users of other participating libraries can be well served. Usually users come to use a collaborative service with the expectation being connected to a librarian from their own library and anticipate a conversation with a professional who knows the local library's resources well. Thus, in order for users to receive the best possible service, librarians of a chat reference consortium should expand their expertise to include knowledge of the member libraries' resources.

The above competencies specific to chat deserve special attention in a training/education program since trainees do not have prior reference experience to relate to. These competencies are new to them and they should be given explicit instruction on why they need these competencies and how they can attain them.

Reference competencies not as important in chat as in other reference venues

The twenty-one essential chat reference competencies covered six out of eight competency areas proposed in this study. Competencies under the other two, "Basic computer techniques" and "Instructional role", received fairly low ratings and were considered to be less important in terms of the role they play in the success of a chat reference transaction. Although the literature suggested that these two competency areas are gaining more and more magnitude in reference practice (Auster & Chan, 2003), findings from this dissertation obviously countered this argument.

Basic computer techniques such as typing proficiency and effective use of the operating system are prerequisites in providing chat reference service. It is likely that librarians did not regard this competency area highly because they do not need to develop these techniques particularly in a chat reference training program; instead, they come to work with chat with these techniques as a default prerequisite skill set. Technical skills are important in general, but in the context of chat, they are outweighed by other competencies that make more significant contributions to the success of a chat reference transaction.

User instruction has always been viewed as a crucial part of reference service. However, when it comes to chat reference, the view becomes different. The average length of a reference session reported in the literature is between ten and fifteen minutes (Ward, 2004; Curtis & Greene, 2004; Kibbee, Ward & Ma, 2002); and users choose to use chat reference service because of its convenience in terms of time and space and only consider it a good option for quick easy questions (Horowitz et al., 2005; Ruppel & Fagan, 2002). Thus, users' appreciation of chat reference's convenience and immediacy suggests their unwillingness to receive lengthy instruction in information seeking. It is likely that librarians had experienced enough sessions where instruction was unwanted to conclude that "instructional role" was the least important chat reference competency area of all¹⁰.

On the other hand, the decline in users' receptiveness to instruction does not necessarily mean that competencies for providing user instruction should be completely ignored in chat reference training/education. There are still users who want to learn about library resources and how to search for information instead of only obtaining a quick easy

answer from the librarian. It should be more of a concern to understand how to determine when instruction is necessary and appropriate than to negate the importance of instructions at all when training/education is provided for chat reference librarians.

Competencies associated with user expectations

Chat reference is still a new and growing service in many libraries. It is likely that library users do not have a clear understanding about it and might come to use the service with an expectation different than what the service can offer. Thus, in order to accurately project the image of chat reference service, libraries should make sure that users are informed of the basic mechanics of the service. Several participants of the dissertation study suggested that librarians should be able to adjust users' expectations in a chat session, such as letting them know what can realistically happen in a chat session, or notifying them of the likely length of a chat session.

It is certainly true that users need to have a realist expectation for how a chat session runs. However, it is not necessary for librarians to educate them about it. Information that could help users gain a better understanding of the service, such as the average length of a chat session and possible pitfalls of the chat application, can be displayed on the front page of the chat reference service. If users read this information before they engage themselves in a chat session, they will have a better idea of what to expect from the service and not feel disappointed if things are different than they originally anticipate.

6.1.2. Different Competency Emphasis in Different Contexts

6.1.2.1. Service Mode: Collaborative Network vs. Stand-alone Service

Technical competencies

The findings from the dissertation study indicated that librarians working with a collaborative network attached significantly more importance to technical competencies, including both basic computer techniques and familiarity with chat reference software, than librarians working with a stand-alone service did. Although, in general, technical competencies were not considered to be the essential chat reference competencies, the significant difference in librarians' perceptions towards them warrants attention to the design of the technical component when training programs are established for the two different service modes.

A collaborative chat reference network involves multiple participating libraries and usually adopts complex commercial software as the service platform, which is not entirely trouble-free. Librarians working with such a network are likely to face challenges posed by insufficient technical coordination among member libraries and have to resort to their own technical skills to solve problems caused by technical difficulties. In other words, the collaborative service mode might be more technically challenged than the stand-alone service mode. The fact that librarians of collaborative networks placed more emphasis on technical competencies should be taken into consideration in the design of chat reference training programs. More efforts should be made to ensure that librarians are well aware of the technical problems that may occur in a collaborative service and that they are equipped with adequate technical skills to not only manipulate the hardware

and software, but also trouble shoot technical problems when there is no technical support available.

Familiarity with electronic resources

Familiarity with electronic resources is a competency area that librarians from collaborative networks held in higher regard than librarians from stand-alone services did. In a collaborative chat reference network, all participants take turns staffing the service and the user community consists of the constituency of all member libraries. As a consequence of the service expansion, librarians face a more diversified pool of questions and users' information needs, which demands exceptional knowledge and navigation skills of the electronic resources.

Since librarians working in the collaborative network mode acknowledged the importance of the competency area "familiarity with electronic resources" to a significantly higher degree than those working in the stand-alone service mode, this competency area deserves more attention in training programs for collaborative services. Librarians should be instructed on the various kinds of scenarios that could occur due to the extended user community and they should receive in-depth training in selecting and searching electronic resources to fulfill users' information needs.

Understanding of online culture and chat etiquette

The competency of understanding online chat culture and etiquette was considered significantly more important by librarians of collaborative chat reference networks than by librarians of stand-alone services. Once again, the expansion of service coverage in a collaborative network may lead to the increased expectation for librarians to be fluent in communicating in "chat style" and motivate them to attach more

importance to online communication skills. Thus, training programs for collaborative services should be aware of the emphasized need for this particular competency and design appropriate activities to facilitate librarians' mastery of online communication skills.

Ability to work under pressure

Librarians working in the collaborative chat reference mode considered the ability to work under pressure, including time-management skills and multi-tasking skills, to be important to chat reference practice significantly more than librarians working in the stand-alone service mode did. Collaboration in chat reference service is usually accompanied by extended service hours and broadened user population, which in turn generates an increase in service traffic. Hence, it is not uncommon for librarians to handle more than one user at the same time. On the other hand, collaborative services mostly use commercial chat software to accommodate all member libraries, and technical difficulties associated with such software sometimes lead to unexpected situations like sudden session disruptions and software malfunctions, among other problems. These unexpected situations could be stressful and need to be dealt with in a composed and flexible way.

Given that librarians of collaborative networks attached more importance to the competency of working under pressure than librarians of stand-alone services did, training programs should respond to this distinction and employ effective techniques to make clear the potential stress involved in the service when preparing librarians for a collaborative network, and help them master necessary skills to cope with it.

6.1.2.2. Provision Venue: Commercial Software vs. IM Application

Technical competencies

More importance was placed on technical competencies, including both basic computer techniques and chat software skills, by librarians using commercial chat software than by librarians using IM applications. Needless to say, commercial chat software is far more complex than IM applications; it obviously takes more time and effort for librarians to learn how to use commercial chat software than IM applications. This significant difference should be acknowledged in training programs; and trainers should employ effective techniques to help librarians master the elaborate features and functions of commercial chat software as well as make sure that they have sufficient computer skills to facilitate a chat session supported by such software.

Resource competencies

Two specific competencies associated with electronic resources, “a wide-ranging knowledge of the Internet resources” and “rapid evaluation of the quality of information resources and services” were considered to be significantly more important by librarians using commercial chat software than by librarians using IM applications. Commercial chat software is more full-fledged than IM applications and supports advanced features such as co-browsing, which allows librarians and users share the same view of a Web page. The convenience of this feature might increase librarians’ awareness of the availability of Web resources and even encourage them to resort to Web resources in response to users’ questions. Thus, when training programs are designed for commercial chat software users, this emphasis on knowledge of Web resources should be taken into consideration. Similarly, critical resource evaluation skills should be emphasized, considering the fact that the Web is inundated with information.

Ability to work under pressure

Librarians using commercial chat software attached significantly more importance to the ability to work under pressure than those using IM applications. As stated in an earlier section of this chapter, technical difficulties associated with commercial chat software sometimes can lead to unexpected situations like sudden session disruptions and software malfunctions, etc., and hence form a source of stress for on-duty librarians. Thus, in a training program, trainers should point out all the pitfalls that commercial software may have and provide corresponding solutions for each one of them, so that librarians can be better prepared to handle unexpected technical problems with calm and flexibility when they occur in a chat session.

6.1.2.3. Length of Time since Receiving a Professional LIS degree: More than seven years vs. Four to seven years

Reference interview skills

Librarians who received their professional LIS degree more than seven years ago held higher regard for the importance of reference interview skills than librarians who received their degree four to seven years ago. Reference interview skills are a core competency area across all reference service venues. The longer librarians hold a professional LIS degree, the longer they might work in a library. Hence, the more reference experience they have, and the more cognizant they are of the value of reference interview skills to the success of a reference transaction. When this accentuated awareness is also displayed in chat reference practice by experienced librarians, corresponding training activities should be devised to accommodate their needs and help them learn how to transfer face-to-face reference interview skills to the online context.

Resource competencies

Three competencies in relation to reference resources, “rapid evaluation of the quality of information resources and services”, “mastery of knowledge in as many fields as possible” and “a wide-ranging knowledge of the Internet resources”, gained significantly more recognition from librarians who received their professional LIS degree more than seven years ago than from those who received their degree only four to seven years ago. Again, the longer one holds a LIS degree, the longer he/she might work in a library. Subsequently, longer library working experience may enhance librarians’ awareness of the importance of core reference competencies such as knowledge of reference resources and ability to critically evaluate them, regardless of the medium via which reference service is provided. Given the emphasis placed on these resources competencies, chat reference training programs should adopt effective techniques to ensure that librarians with longer professional practice can successfully apply their skills in selecting and evaluating resources in chat reference transactions.

Different demographic groups of librarians place different emphasis on chat reference competencies. These differences could guide training programs to factor in contextual variables such as service mode, provision venue and length of library working experience, in order to make sure that different demographic groups’ competency needs are well addressed.

6.2. Discussion of Chat Reference Training Techniques

In the five-stage model proposed by Griffiths and King (1986) that delineates the process of how competent professional performances are obtained in an increasingly dynamic working environment, the stage “determination of competency needs and requirements” is immediately followed by the next stage “establishment of education &

training requirements”. Following the competency development flow reflected in this model, this dissertation continues to explore training techniques that could effectively deliver essential chat reference competencies once these competencies are identified. Discussions of the effective training techniques determined in this study are presented in this section.

6.2.1. Chat Reference Training

Learning from practice and experiences

The training techniques that were considered to be highly effective were the ones that emphasize hands-on practice and experiences. Apparently the wisdom of “practice makes perfect” has been deeply appreciated by librarians involved in chat reference training programs.

The most effective training technique determined in this study, “trainees pair up as patron and librarian to gain hands-on experiences on using the software”, is a technique to familiarize librarians with the chat application to be used in providing the service. The competency on chat software mastery is one of the essential chat reference competencies and librarians expect to obtain this competency through hands-on practice with using various features and functions of the software. Thus, although the “show and tell” strategy in chat software training is indispensable, the focus should be on actual practice. A substantial amount of time should be set aside for librarians to practice with the software. Trainers should devise exercises and ask librarians to complete them by using different software functions such as co-browsing, creating scripted messages, and file sharing, etc. Librarians can only successfully deliver chat reference service after they fully understand how to manipulate the delivery vehicle. If they believe they benefit most

from hands-on practice, the training resources should be allocated accordingly to make sure that they receive the software training in the way they deem most effective.

As for the training on chat reference transactions that intend to deliver competencies with respect to the reference interview, resource knowledge and online communication, librarians once again placed the emphasis on practice and experiences. The two most effective techniques in this training dimension are “trainees review selected chat transcripts to learn more about the transaction” and “trainees ask questions to real chat reference services as users and evaluate their experiences - the secret shopper approach”. The first one enables librarians to learn from other people’s experience by reviewing how they handle real chat reference questions; the second one allows librarians to experience the service themselves by participating in a chat reference transaction as a user, where they could not only observe how a real chat session proceeds, but also critically evaluate service performance from the user’s perspective. Being able to place themselves in the role of users, librarians can gain a better understanding of how users feel in a chat session and become more aware of users’ needs and expectations when they finish training and start covering actual chat reference shifts. Thus, the design of chat reference transaction training ought to take into consideration the importance of practice and experience. It is necessary for trainers to demonstrate reference interview skills, electronic resource searching skills, and online communication skills. But more importantly, they need to guide librarians in identifying how these skills are actually applied in chat reference transactions when they review previous session transcripts or experience chat reference encounters as a user. In this way, the transcript review and service participation are not random but task-oriented and librarians can better

incorporate their own experience in absorbing the skills and knowledge imparted by trainers.

Chat reference training is usually an ongoing process. After the initial concentrated training, librarians sometimes engage in a series of follow-up activities that help them consolidate or refresh their skills. Among all the ongoing training techniques, the most effective vote went to “librarians pair up to practice chat reference skills on a regular basis for a certain period of time”, which is a resounding echo of librarians’ appreciation of hands-on practice. If a chat reference training program has ongoing sessions, librarians can attend these sessions and pair up to practice their skills. If not, librarians can still find a partner from their training cohort and coordinate schedules with each other to practice what they have learned from the initial training. The ongoing practice may continue until both parties feel comfortable and confident in applying the skills in chat reference transactions.

In summary, the most effective way to implement chat reference training is to ensure librarians learn from their hands-on practice and experiences with various aspects of the service. Trainer demonstration and trainee practice are the two primary components of a training program, but the emphasis should be placed on the latter, as indicated in Figure 6-2.

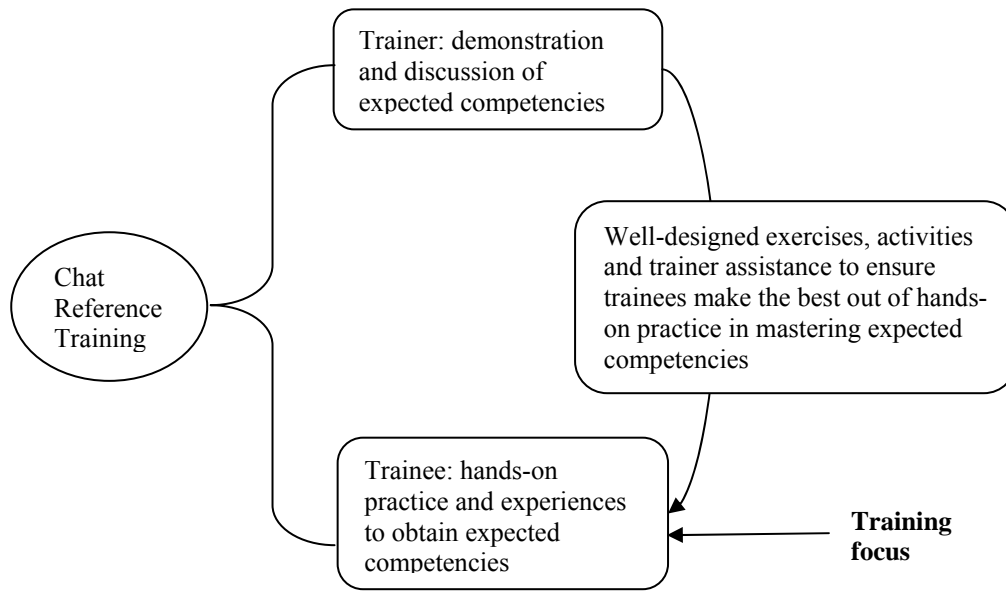


Figure 6-2. Two key components in chat reference training

Easy access to supporting information

Supporting materials play an important facilitating role in chat reference training programs. The most helpful supporting material recognized by librarians was a “cheat sheet containing vital information librarians might need to access quickly and often while covering the service”. During a chat reference shift, librarians might need to find instructions on certain rarely used software features, to seek help from the technical team, or to access answers to frequently asked questions like circulation policy, etc. Such a need can be met when a cheat sheet with all the frequently consulted information is made readily available to them.

When librarians receive training before they start covering chat reference services, they should be instructed on the helpfulness of a cheat sheet. Meanwhile, the design of a cheat sheet should take into consideration various factors including:

- Format: whether it should be print or electronic, or both;
- Organization: how to make the content easily navigable;

- Type of information: what is the most frequently needed information in a chat session;
- Place: where the cheat sheet (or the link of the cheat sheet) should be placed; and
- Librarians' preferences: what do librarians prefer?

A cheat sheet can quickly provide librarians with the information they frequently need and hence help them deliver better services to users. Thus, to ensure its viability and easy access is one of the crucial tasks in implementing a chat reference project.

In-house training

As far as the training mode is concerned, librarians preferred to receive chat reference training through face-to-face communication. In other words, training should be provided in-house rather than via telecommunication in order for librarians to benefit the most from it. In-house training allows both trainer and trainee to be physically present at the same time and in the same place, where the communication is more smooth and direct than in the telecommunication mode. When training is implemented in-house, the trainer can have better access to various resources to support the demonstration and discussion of expected competencies as well as gain a better understand of trainees' learning process so as to better respond to their questions and concerns associated with the training.

Although in-house training is the most effective training delivery mode, libraries might not be able to support it because of budgetary constraints. If a library has to resort to telecommunication to provide training, one suggestion would be to incorporate as many interactive elements as possible. For example, trainer and trainee can communicate over the phone while trainer demonstrates skills on a computer screen. The essence of in-

house training is the ease of communication, therefore, the more the telecommunication venues make the trainer-trainee communication easier, the more effective the training should be.

Innovative training techniques

As mentioned in earlier discussions, librarians considered hands-on practice to be a more helpful training technique than demonstrations from trainers. They believe they could learn more effectively from activities like transcript review and secret participation in an actual chat service than from trainers' demonstrations and discussions when it comes to reference interview skills, electronic resources skills and online communication skills, the three most important competency areas in chat reference. However, the hands-on practice and experiences, if too general and not targeting specific competencies, will be far less valuable than expected. For each particular area of competencies, hands-on practice should be guided by learning objectives aimed at the attainment of the competencies. For example, when librarians are learning chat reference interview skills, they could initiate a chat reference session in the role of a user and pay special attention to how the on-duty chat reference librarian applies reference interview skills in identifying users' real information needs in the online environment where no non-verbal cues exist. After all, the value of practice and experiences can only be maximized when they are objective-oriented. It is up to trainers to be both creative and practical in conceiving effective exercises and activities to assist librarians' achievement of learning objectives through hands-on practice. Sources of helpful training ideas include evaluation of training programs, brainstorming of experienced chat reference librarians and service managers, and consultation with chat software vendors.

The training techniques determined to be effective in this dissertation study do not encompass all the essential chat reference competencies. The ability to work under pressure is the competency area that has been left out. To begin with, the literature has revealed no report of specific chat reference training in this competency area to date. Reviewing chat reference transcripts and engaging in a chat reference transaction as a user may touch upon the necessity of having flexibility, multi-tasking skills and time management skills in a chat session, but they do not specifically target each of these stress management competencies. Since findings from this study indicated librarians' acknowledgement of the importance of the capability to deal with stress, future chat reference training should take into serious consideration the design of exercises for librarians to learn how to handle the pressure associated with chat reference. Stressful scenarios can be created for librarians to practice these skills. For example, one librarian has to answer questions from two (or more) users played by other librarians at the same time, or librarians have to deal with deliberately rude users played by other librarians. Only after librarians experience the actual level of stress in a chat session can they understand why they need to be calm and flexible when covering real chat reference shifts, and how they can be so. Once again, the delivery of pressure management skills calls for innovative training skills, and trainers need to be creative and yet practical in designing this particular component of a chat reference training program.

What the current chat reference training has been missing

Current chat reference training programs apparently have an emphasis on chat software training. The two training techniques experienced by most participants in the dissertation study, "Trainer demonstrates the features and functions of the chat software"

and “Trainees pair up as patron and librarian to gain hands-on experiences on using the software”, were to deliver software skills. However, the competency associated with chat reference software, “Skillful maneuver of features of chat software or instant messenger to effectively conduct a chat session”, only ranked in the fourteenth place on the essential competency list, trailing other more important competencies such as reference interview skills and familiarity with electronic resources.

Unfortunately, effective training techniques that could help librarians enhance their reference interview skills in the chat context and enrich their knowledge of electronic resources do not seem popular among current training programs. Only half of the participants in the study reported the inclusion of transcript review in the training program although it is the second most highly valued training technique and can be easily implemented. Only a bit over sixteen percent of the participants experienced the secret shopper approach – the training technique that received the third highest rating; and only about fifteen percent of the participants had a chance to engage in an ongoing training process to hone their chat reference skills – another technique among the top five most effective training techniques determined in the study. These findings, to some extent, indicate that current chat reference training programs have not been employing effective strategies in delivering the training. It is time to rethink training program design and shift the training paradigm to a new stage where there is less software focus but more attention to effective and efficient mastery of other essential chat reference competencies.

6.2.2. Different Training Emphasis in Different Context

6.2.2.1. Comfort Level: Low vs. High

Librarians with higher levels of comfort when working with chat considered certain software training techniques, such as “trainer demonstrates the features and functions of the chat software” and “trainees pair up as patron and librarian to gain hands-on experiences on using the software”, to be significantly more effective than librarians with lower comfort levels did. The extent to which one feels comfortable when working in the chat reference environment largely determines the extent to which one could effectively absorb the knowledge and skills requisite for performing chat reference tasks. If librarians bear resistance toward the adoption of new technologies in library services and feel uncomfortable using chat reference software, they might be overwhelmed by the software training and then deem it far less effective than their peers who are more receptive to and comfortable with technologies.

Given the concern of comfort levels with chat reference service, trainers should conduct a general technical background survey to understand where librarians stand in using online real-time technologies to offer reference services, and then employ targeted strategies to ease them into the software training process. For example, if librarians are not comfortable engaging in a reference transaction entirely online, a series of small steps can be taken to help them understand the nature of technology-enabled online communication. Instead of pushing them to the role of a chat reference librarian immediately, trainers should encourage librarians to use the chat software as a regular communication tool to chat with friends and colleagues in order to obtain a basic sense of what it feels like to have an online conversation. Once librarians realize the new

communication mode is not as intimidating as it looks, they will be more prepared to receive formal software training leading toward the successful achievement of chat reference competencies.

6.2.2.2. Perspective: Trainer vs. Trainee

The librarians that evaluated training effectiveness from the trainers' perspective considered two training techniques, "trainees pair up as patron and librarian to gain hands-on experiences on using the software" and "training is provided in-house where trainer is physically present with trainees", to be significantly more effective than those who provided input from the trainees' perspective. The different perspectives and different perceptions of training effectiveness indicate that there is a discrepancy between trainers' and trainees' views of certain training approaches, and this discrepancy has to be removed before the value of a training program can be maximized.

One of the two training techniques where the significant difference arises is hands-on practice with chat software, the most effective training technique of all. However, trainers obviously held a higher regard toward it than trainees. In order to bring both trainer and trainee to the same understanding, more attention should be paid to the exercises and activities that trainees do when practicing with chat reference software. Assessment should be conducted to examine how well trainees are learning through the exercises and activities designed by trainers. Although well-intentioned, sometimes these exercises are not as effective as trainers expect in helping trainees master software skills. Thus, unless they are thoroughly evaluated, trainers may continue to over-estimate the effectiveness of this approach.

Another significant difference appeared in the perception of the in-house training mode. Overall, in-house training was considered to be more effective than telecommunicating training. But trainers and trainees diverged regarding how effective the in-house training itself is. Once again, program evaluation can help close the gap between trainer and trainee's perceptions. Trainers should make the effort to find out in what ways trainees think of in-house training as a more effective mode than telecommunicating training and whether there are telecommunication elements that could be incorporated in in-house training. In other words, in order for trainees to fully benefit from the in-house training mode, trainers and trainees need to reach a consensus on how the training program should be effectively implemented.

Trainers and trainees both play an essential role in a training program, but trainees are the ultimate beneficiary of training. Thus, trainers ought to adopt methods that will motivate trainees to learn and successfully achieve the competency objectives.

6.2.2.3. Service Mode: Multiple vs. Single

Librarians working in multiple chat reference service modes (both collaborative network and stand-alone service) found the policy training – “trainer discusses the service policy and procedural issues, including the scope of the service, when to provide instructions and when to give direct answers, etc.” – to be significantly less effective than did librarians working in a single mode (either collaborative network or stand-alone service). Service policies help to define the boundary of and proper conduct in a chat reference service. If librarians engage in multiple service modes, the policies they have to familiarize themselves with are usually more complex than in a single service mode. Thus, simple discussions from a trainer regarding things they should and should not do

when offering chat reference service may not be as effective for them to gain a solid understanding of the policy and procedural issues and the capability to apply them appropriately in a chat session. Other techniques need to be employed to help multiple-mode librarians gain the essence of service policies. For example, a trainer may create a number of chat reference scenarios involving policy issues and then ask librarians to critique each scenario in terms of how service policies are followed or violated. This approach may help them reinforce their knowledge of policies and relate to the policy application in a real chat setting.

6.2.2.4. The Way to Become a Chat Reference Librarian: Volunteer vs. Assigned

For librarians who volunteer to work with chat, the in-house training mode was a significantly more effective training mode than it was for librarians who work with chat because it is part of their job. Different roads leading to the role of a chat reference librarian sometimes affect one's motivation and mentality to perform the job. Those volunteering to cover chat shifts are usually open-minded and eager to explore the service, and more importantly, they tend to have strong faith in the future of chat reference. It is likely for them to be more positive about the in-house training than those who feel rather neutral about chat reference because it is simply part of their job.

Even though some librarians work with chat due to job obligations, they may be as excited and interested in it as the volunteers. It is up to the trainer to figure out librarians' attitudes toward chat reference and design appropriate topics to incorporate in the in-house training. For example, those who show a great deal of zeal for chat reference may be encouraged to discuss with their colleagues who are less convinced in the value of chat regarding the role of chat reference in a library. Then all the issues and concerns

raised in the discussion need to be carefully and thoroughly addressed by the trainer so that librarians can become more motivated and engaged in the training process.

6.3. Overview of Essential Competencies and Effective Training Techniques

Summarizing the essential chat reference competencies and effective training techniques identified from this dissertation, the following seven figures (Figure 3 to 9) present a graphic delineation of what the competencies are and what training techniques can deliver these competencies. Visually mapping out the competencies, the training techniques, and how they are connected provides a straightforward view of the requirements for establishing a chat reference training program and how the competency-based approaches can be employed to ensure the attainment of these competencies.

In these figures, competencies are presented in rounded rectangle boxes. The training techniques are broken down to two categories: trainer demonstration and hands-on practice. All the techniques that fall under the category of hands-on practice are presented in shaded rectangle boxes, whereas trainer demonstration techniques are contained in regular rectangle boxes. The arrowed lines represent the corresponding relationship between competencies and training techniques.

Competency Area I. Familiarity with chat reference applications

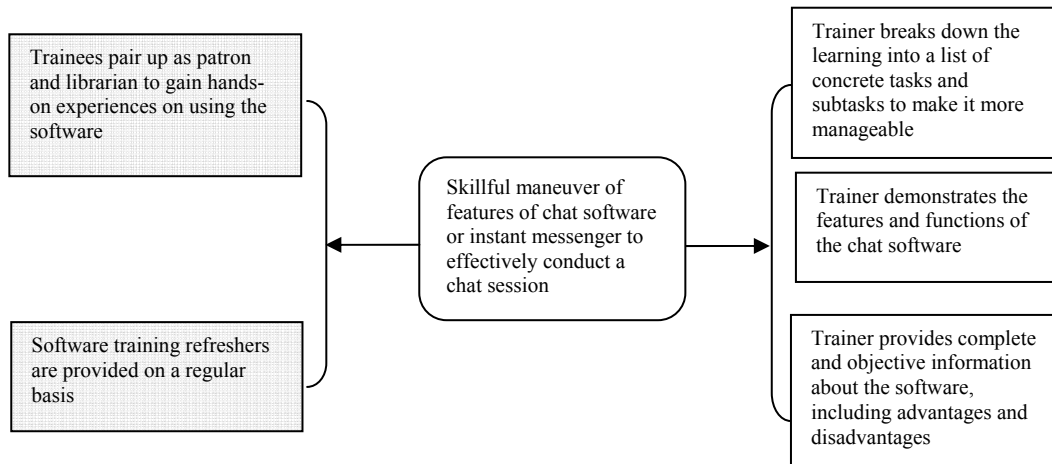


Figure 6-3. Mapping of chat software competencies and training techniques

Competency Area I. Familiarity with electronic resources

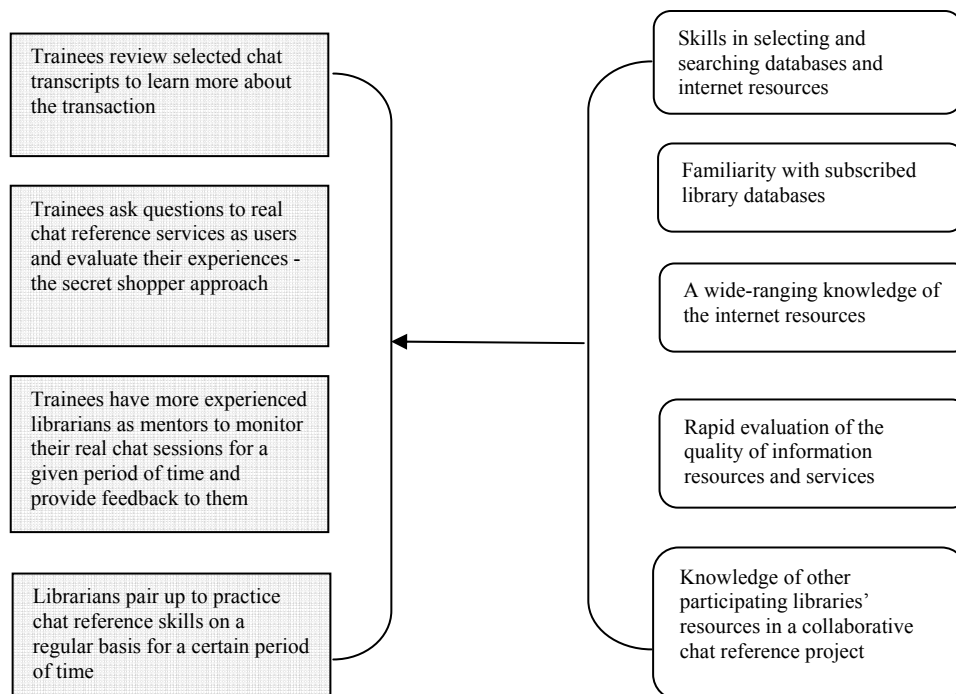


Figure 6-4. Mapping of electronic resource competencies and training techniques

Competency Area III. Reference interview skills

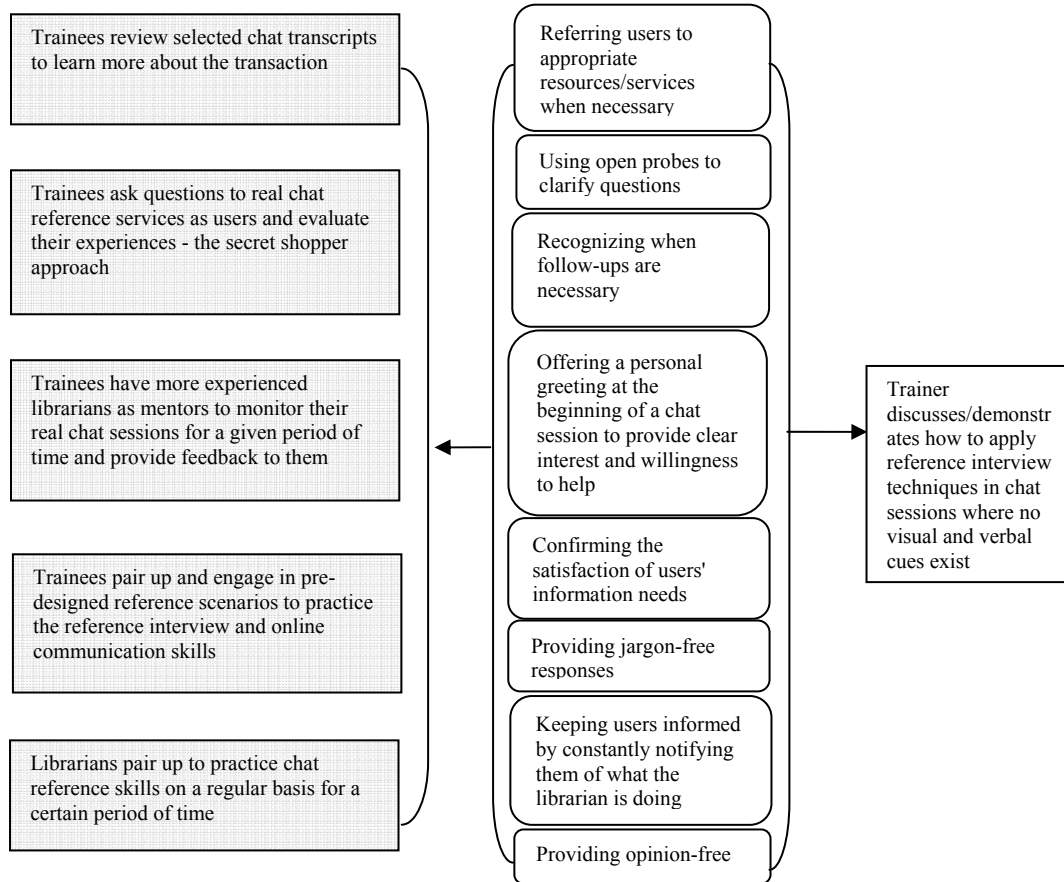


Figure 6-5. Mapping of reference interview competencies and training techniques

Competency Area IV. Customer service mentality

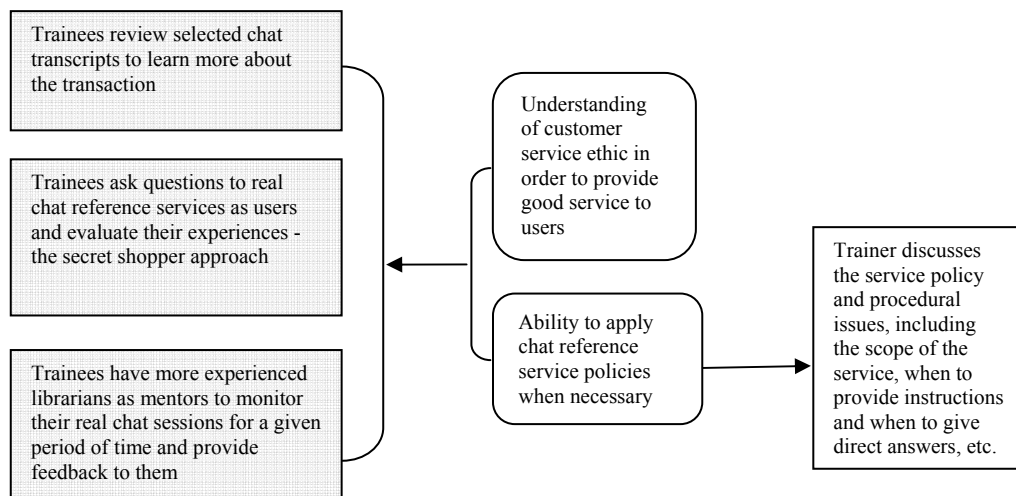


Figure 6-6. Mapping of customer service competencies and training techniques

Competency Area V. Online communication skills

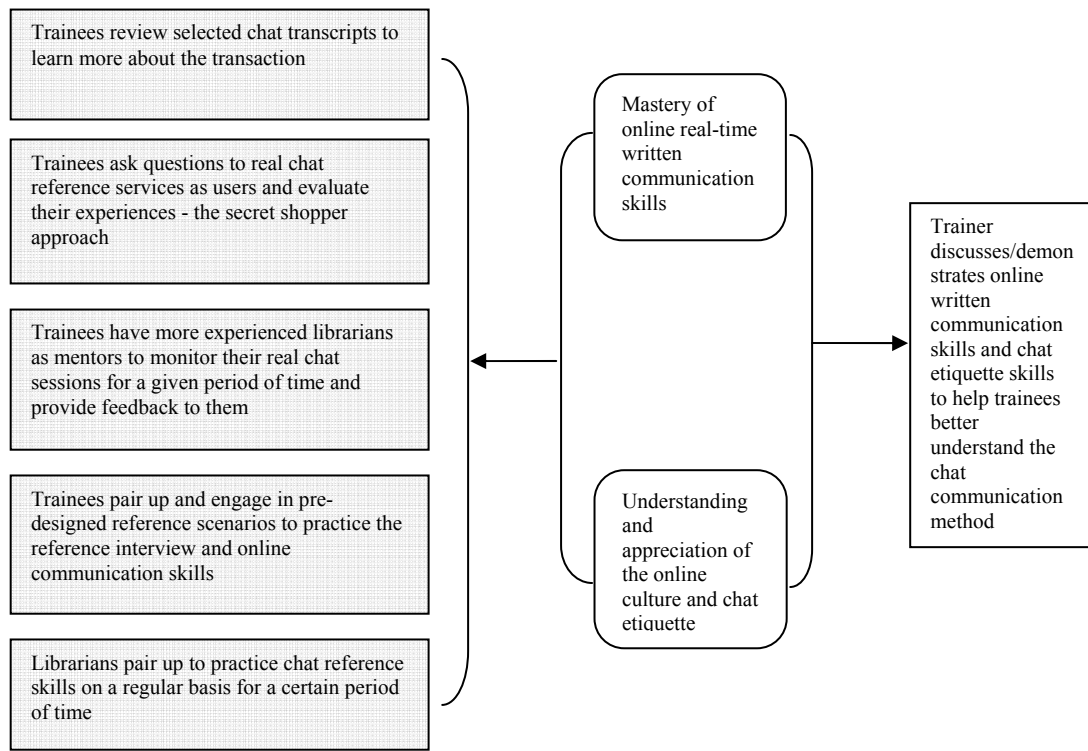


Figure 6-7. Mapping of online communication competencies and training techniques

Competency Area VI. Ability to work under pressure

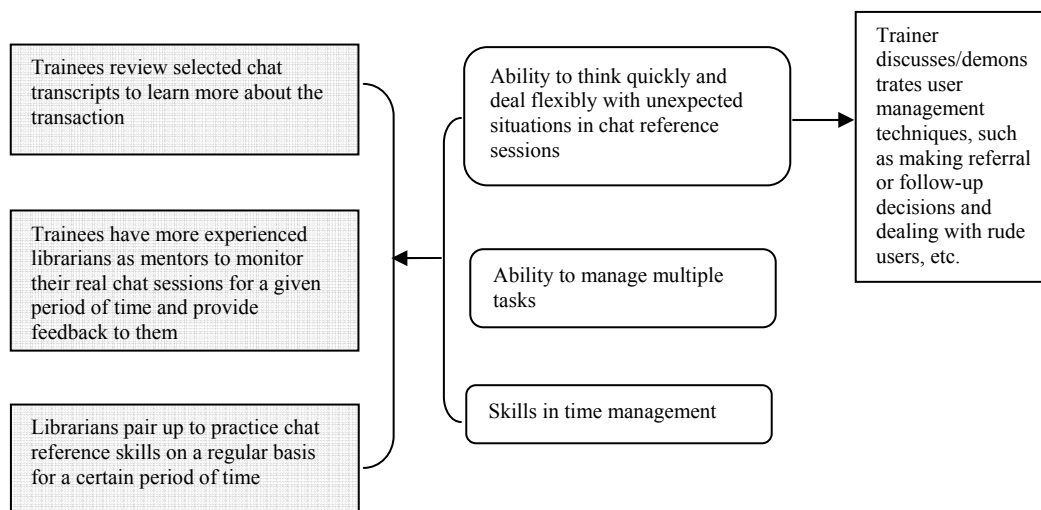


Figure 6-8. Mapping of pressure management competencies and training techniques

Training Elements Necessary for All Competencies

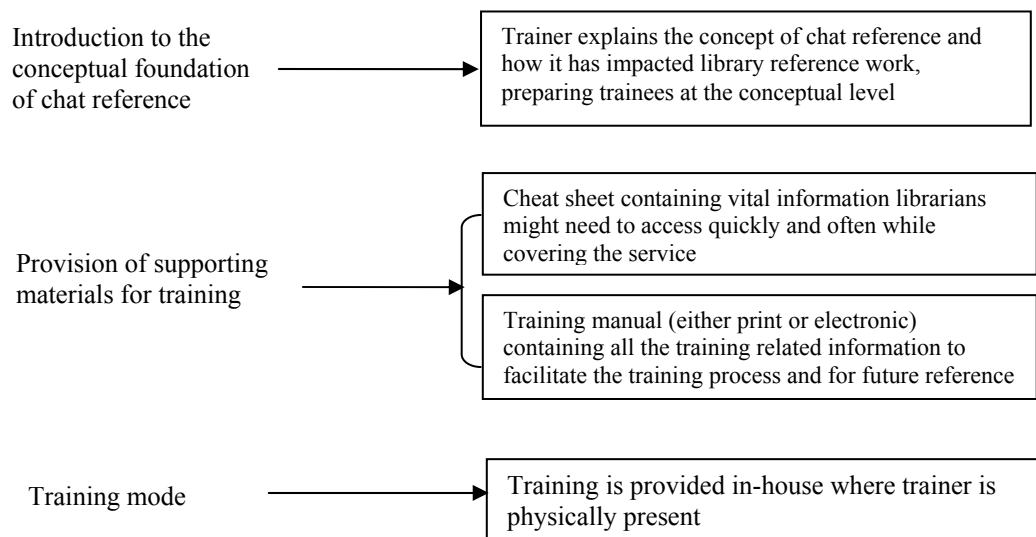


Figure 6-9. Competency-independent training techniques

6.4. Implications for Chat Reference Education

Although mostly beneficial to libraries and practitioners in designing training programs to prepare librarians for chat reference services, results from this dissertation study also have important implications in the education setting, where the reference curriculum can be revised accordingly to reflect the evolving needs of the reference field. Given the fact that chat reference has been an increasingly substantial part of library services, reference education should take into serious consideration how to incorporate the elements of chat reference in the curriculum so that future reference librarians can be best prepared for a dynamic working environment upon completion of a professional master's program. The essential competencies determined in this study can serve as the basis to develop course objectives associated with chat reference; and the effective training techniques can be drawn on to design pedagogical approaches to help students obtain the objectives.

As far as actual curriculum development goes, two pathways can lead to the same goal of effectuating chat reference education in a master's program. The first is to offer advanced reference courses that entirely focus on chat reference service so that those who are interested in the pursuit of reference librarianship can broaden their horizon by taking such a course. The second is to develop a chat reference module that could be included in a fundamental reference course so that everybody can gain a basic sense of what chat reference service is about.

Pathway I. Advanced reference course on chat reference

When designing an advanced reference course, the instructor may take the competency-based approach and structure the course based on objectives derived from the competencies that students are expected to achieve at the end of the course. The four types of essential competencies determined in this study, general reference competencies, competencies highlighted in chat, competencies specific to chat, and competencies not as important in chat can be used as the foundation upon which to build the course content. Then the training techniques targeting each specific competency can be tailored in the classroom setting as instructional conduits to deliver the content. In the end, students will be evaluated on how they have mastered the competencies as evidence of learning success.

Since hands-on practice and experiences are recognized by librarians to be the most effective training method, they deserve a sizable portion of the course as well. Thus, the instructor needs to make sure that all enrolled students have access to chat applications, including both commercial software and IM applications as both are the frequently used chat reference applications in the library world. However, there may be a

problem when it comes to accessing commercial software because they are proprietary products. A possible solution is to talk to software vendors, explain to them the purpose of the course, and ask for semester-long test accounts.

The goal of an advanced reference course on chat reference should be to enhance students' systematic understanding of the most recent reference progress and prepare them in the best possible ways for a chat reference job when they graduate. However, if circumstances do not permit it for such a course to be available, there is another option for students to embrace chat reference – a chat reference module in a regular reference course.

Pathway II. Chat reference module

A chat reference module is only a component in a basic reference course and covers far less than an advanced course on chat reference does in terms of knowledge and skills related to chat reference. Thus, the instructor cannot be ambitious when designing the content for the module since the goal is to introduce chat reference to students and have them understand the essence of the service so that when they receive chat reference training later in their career they could have a fairly easy transition. Content for this module should be selective rather than inclusive, with the emphasis on reference competencies highlighted in chat and specific to chat. Even though the length of the module is limited, hands-on practice cannot be skipped because it conveys a valuable message to students that cannot be replaced by any lecturing – the real experience.

Unlike a semester-long course, the chat reference module is not detail-oriented and only covers the very basics. The instructor's job is to lead students to the world of chat reference by adding the module into a regular reference course, and present to them

the nature of the service and the various scenarios associated with it. In other words, the instructor needs to equip students with an idea of what they are going to face when working with chat without necessarily teaching them all the skills they need in order to actually do the job.

Summary

Either in an advanced chat reference course or through a short chat reference module, the essential competencies and effective training techniques identified in this dissertation study can be of important value to the development of the curriculum. As a follow-up study of this dissertation, the researcher will explore the possibilities of developing syllabi for a chat reference course and an independent chat reference module so that results from the dissertation can be applied in the advancement of reference education.

6.5. Limitations and Future Work

Griffiths and King's (1986) model process of competency achievement involves five stages and this study only focuses on two of them -- "determination of competency needs and requirements" and "establishment of education & training requirements". Eliciting librarians' input on training approaches that can effectively deliver chat reference competencies is the prelude to the design and implementation of training programs that chat reference practitioners can actually benefit from. This study does not seek to develop a curriculum for chat reference training, but the results from the study can be utilized as the basis for general design of chat reference training programs.

The scope of the study is limited since only chat reference training is discussed and no efforts are incorporated to examine chat reference education. Although chat

reference competencies determined in this study definitely have implications for chat reference education, this study will leave the exploration of how these competencies can be delivered through education programs for future research.

As for the methodology, self-selection was employed as the sampling method due to the unknown size of the chat reference population. One weakness of this method is the sample's possible unrepresentativeness of the population. In order to reduce the bias, the study made various efforts to reach the widest possible population and recruit as many participants as possible.

For future research, an immediate follow-up study can be conducted to incorporate essential chat reference competencies determined in this dissertation into the revision of reference curriculum, and assess the effectiveness of such revisions. In the long run, research on professional development of chat reference librarians can be furthered by efforts seeking to bridge the gap between what is covered in reference courses and what is expected of a chat reference position so that educational objectives can synchronize with professional demands and the process of professional preparation for chat reference librarians can be optimized.

Appendix I. The Break-down of Griffiths and King's Definition of Competency

Defined by Griffiths and King (1986), competency is composed of knowledge, skills and attitude. The following table presents a detailed view on this definition.

Knowledge	Basic knowledge in such areas as language, communication, arithmetic operations, etc.
	Subject knowledge of primary subject fields of users served such as education, medicine, chemistry, law, etc.
	Library and information science knowledge such as the definition, structure and formats of information, etc.
	Knowledge about information work environments such as the information community, its participants and their social, economic and technical interrelationships, etc.
	Knowledge of what work is done such as the activities required to provide information services and produce information products, etc.
	Knowledge of how to do work such as how to perform various activities, apply techniques, use materials and technology, etc.
	Knowledge of the organization or user community served such as the mission, goals and objectives of the user or the organization, user's information needs and requirements, etc.
Skill	Basic skills such as cognitive, communication, analytical, etc.
	Skills related to each specific activity being performed such as negotiation of reference questions, evaluation of search outputs, etc.
	Other skills such as managing time effectively, budgeting and making projections, etc.
Attitude	Dispositional attitudes toward one's profession, the organization served, one's work organization, and other people such as users and co-workers.
	Personality traits/qualities such as confidence, inquisitiveness, sense of ethics, flexibility, etc.
	Attitudes related to job/work/organization such as willingness to accept responsibility, willingness to learn, desire to grow, etc.

Appendix II. Results of Preliminary Interviews with Chat Reference Librarians

Introduction

The topic of the dissertation is to determine essential competencies and effective training approaches for chat reference service by conducting survey studies among chat reference librarians. A thorough review of existing literature on chat reference competencies was used as the basis of the questionnaire. In the mean time, in order to expand the competency coverage and make the survey more inclusive, a set of preliminary interviews was conducted with a small sample of chat reference librarians as a supplementary source in establishing the questionnaire.

Methodology

From September 2005 to October 2005, a convenience sample of six librarians from a variety of libraries in North Carolina were interviewed regarding their perceptions of most important competencies for chat reference. The demographic information of the librarians is presented in Table A-1.

Librarians	Library	Chat service type	Number of years with chat reference
A	Public Library of Charlotte and Mecklenburg County	NCKnows(State-wide Collaborative)	4
B	Public Library of Charlotte and Mecklenburg County	NCKnows(State-wide Collaborative)	4
C	UNC Davis	NCKnows(State-wide Collaborative), LSSI (stand-alone), IM	4-5 with chat applications, less than 1 with IM
D	UNC Davis	NCKnows(State-wide Collaborative), LSSI (stand-alone), IM	4-5 with chat applications, less than 1 with IM
E	UNC Undergrad Library	IM	2

F	UNC Health Science Library	LSSI (stand-alone)	4
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Table A-1. Librarians Demographics

Two open-ended questions were asked during the interview:

- What do you think are the most essential competencies that librarians need to have in order to conduct effective chat reference service?
- What do you think are the competencies that you should've learned during the training but didn't, which turned out to be very important later on?

Results

The responses were analyzed and sorted into the following competencies:

1. Computer skills

- A & B. "be able to manipulate the computer, be comfortable with the computer"
- E. "be comfortable with technology"
- D. "typing proficiency"
- C. "technical skills, computer skills, multiple-window management, understanding of pop-ups, etc."
- F. "be a fast typist"

2. Software skills

- D. "the ability to use the software, master different feature of the software, the software is pretty complicated"

3. Knowledge of resources and searching skills

- E. "knowledge of both print and electronic resources"
- D. "High level of competency of reference work. Knowing bottom line resources that are available at UNC or NCKnows. Knowing different resources based on different user groups"; "Being able to quickly find information within a resource"
- C. "understanding the resources"
- A & B. "Be able to use resources quickly, knowing the subscriptions you have, knowing the avenues, knowing where to go, access them quickly, understand the special resources that the lib has"

F. “knowledge of the resources, being able to figure out a place to find the answer; understand your own lib’s webpage and everything”

4. Reference interview skills

E. “similar to desk reference”

D. “reference interview - finding out what the user really wants”

C. “reference skills – reference interview”

F. “make sure you understand the question”

B. “Actively question the patrons, satisfy users’ expectations and provide them the most appropriate resource”; “find out what resources that users have access to”

5. Online written communication skills *¹¹

E. “keep the language informal but professional, make the students feel comfortable”

D. “write short messages”

C. “talking to patrons a lot; typing in short phrases; communication skills specific to chat”

B. “Written communications; chat etiquette – different patrons want different things; keep the patron comfortable; avoid jargon; constantly telling the patrons what the librarians are doing: keep the patrons informed”

6. Evaluating resources and services

F. “evaluation of resources in order to make sure it’s reliable”

7. Multi-tasking skills

E. “multi-tasking ability; staff chat service and f2f reference desk at the same time”

D. “multi-taking ability to handle f2f and chat sessions at the same time”

B. “multi-tasking in terms of managing multiple queues”

8. Flexibility to work with the dynamics inherent in chat ref service *¹²

A & B. “being flexible in terms of dealing with vanished users”; “always have a plan B if technology fails”; “don’t use absolute language since it’s possible that

the technology isn't working"; "be flexible because there are things that you cannot control in the online environment and users from different libraries have different expectations"; "being flexible in terms of providing instructions to users: be able to tell whether they need the instructions or not"

D. "be more flexible, knowing follow-up is a choice."

9. Ability to handle pressure

D. "the confidence to not go crazy, to stay calm; know how to deal with dissatisfied users"

A & B. "staying calm: under a lot of pressure if the technology fails"; "being able to deal with rude users"

F. "be able to handle pressure"

10. Knowledge of other fields and resources available other libraries *¹³

D. "be comfortable with more subject field, be a generalist instead of subject specialist"; "knowing other library's website, be able to go to that site and find what users need pretty quickly"

A & B. "look at other member lib's website and make a professional guess: the ability to find information on member lib's websites"

11. Effective time management ability

E. "time management ability"

12. Friendliness

E & F. "be friendly"; "have friendly personality"

13. Patience

F. "be patient"

Results Summary

Competency	Mentioned by # of librarians
Computer skills	5
Software skills	1

Knowledge of resources and searching skills	6
Reference interview skills	5
Online written communication skills	4
Evaluating resources and services	1
Multi-tasking skills	3
Flexibility to work with the dynamics inherent in chat reference service	3
Ability to handle pressure	4
Knowledge of other fields and resources available other libraries	3
Effective time management ability	1
Friendliness	2
Patience	1

Table A-2. Interview results summary

Some of the interview findings overlap with the results of the literature review; some have never been discussed in the literature. The final questionnaire was based on results from both the interviews and the literature review.

Appendix III. Survey on Chat Reference Competencies

Introduction

This survey seeks to determine the most important competencies for chat reference service. A list of chat reference competencies identified from the literature is presented below. These competencies are grouped into 8 categories and a brief statement is provided for each category to explain what it is about. Each competency also has a definition stored in an external page. You can click on it to view the definition if you need clarification.

Please rate each competency on the seven-point scale. At the end of the survey, you will be asked to rate the competency categories as well.

This survey will probably take 10-15 minutes of your time. Thank you very much for filling out the survey!

Survey

Section 1. Demographic Information

How did you become a chat reference librarian?

- ☐ I volunteered to do chat reference because it is part of the future of reference librarianship.
- ☐ I agreed to do chat reference when asked by my supervisor or someone else in my library.
- ☐ I was assigned to do chat reference by my supervisor, but am not comfortable with that role.

Other ☐, please specify

How long have you been working as a chat reference librarian?

Less than a year ☐ 1-3 years ☐ More than 3 years ☐

What is your comfort level with chat reference service?

Not comfortable at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very comfortable

Do you have a professional degree in LIS?

No ☐ Yes – MLS ☐ Certificate ☐ Other ☐, please specify

(If the answer to the above question is Yes, please answer this question too; otherwise, please skip it) How long has it been since you got your LIS professional degree?

Less than a year ☐ 1-3 years ☐ 4-7 years ☐ More than 7 years ☐

What is the provision venue of the chat reference service you are staffing (multiple choices)?

Instant messenger ☐ Commercial chat software ☐ Home-grown software ☐
Other ☐ Please specify

What is your work setting?

Academic library ☐ Public library ☐ Medical library ☐ Law Library ☐
Other ☐ Please specify

What is the service mode of the chat reference service you are staffing (multiple choices)?

Stand-alone service ☐ Collaborative network ☐
Other ☐ Please specify

Section 2. Individual Competencies

Mastery of basic computer techniques

Chat reference librarians need to master the basic knowledge and skills to operate on a computer to effectively facilitate the reference work.

Typing proficiency

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Mastery of keyboard shortcuts

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Effective use of Windows operating system

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Technical troubleshooting skills

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Effective use of supporting tools (including both hardware and software) for chat reference system

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Please enter the competencies you consider important but not incorporated in the above list and rate them as well.

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Familiarity with chat reference applications

Chat reference librarians are expected to have abundant knowledge of chat reference applications (full-fledged chat software or text-based instant messenger), and be able to skillfully manipulate and critically evaluate them.

Skillful maneuver of features of chat software or instant messenger to effectively conduct a chat session

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Ability to critically evaluate chat software/instant messenger in terms of supporting chat reference service

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Please enter the competencies you consider important but not incorporated in the above list and rate them as well.

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Reference interview skills

Chat reference librarians are expected to master reference interview skills to clarify users' information needs through appropriate questioning.

Offering a personal greeting at the beginning of a chat session to provide clear interest and willingness to help

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Using open probes to clarify questions

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Keeping users informed by constantly notifying them of what the librarian is doing

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Providing jargon-free responses

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Providing opinion-free responses

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Recognizing when follow-ups are necessary

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Referring users to appropriate resources/services when necessary

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Confirming the satisfaction of users' information needs

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Please enter the competencies you consider important but not incorporated in the above list and rate them as well.

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Online communication skills

Chat reference librarians should have the basic knowledge of online communication culture and master the online communication skills to effectively interact with chat reference users.

Understanding and appreciation of the online culture and chat etiquette

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Mastery of online real-time written communication skills

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Please enter the competencies you consider important but not incorporated in the above list and rate them as well.

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Familiarity with electronic resources

Chat reference librarians are expected to have abundant knowledge of electronic resources, including both proprietary databases and free Internet resources, and the ability to search them effectively and evaluate them critically.

Familiarity with subscribed library databases

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

A wide-ranging knowledge of the internet resources

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Skills in selecting and searching databases and internet resources

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Knowledge of other participating libraries' resources in a collaborative chat reference project

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Mastery of knowledge in as many fields as possible

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Rapid evaluation of the quality of information resources and services

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Please enter the competencies you consider important but not incorporated in the above list and rate them as well.

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Instructional role

Chat reference librarians should take the instructional role to both assist users in improving their level information literacy, and help colleagues in obtaining chat reference skills.

Ability to take the instructional role to educate users to augment their level information literacy

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Ability to provide peer instructions to colleagues in obtaining chat reference skills

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Please enter the competencies you consider important but not incorporated in the above list and rate them as well.

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Ability to work under pressure

Pressure comes from a variety of aspects of chat reference service, such as the need to multi-task, or the possibility of software failure, etc. Thus, chat reference librarians should have exceptional capability to work under pressure while providing high-quality services to users.

Skills in time management

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Ability to manage multiple tasks

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Ability to think quickly and deal flexibly with unexpected situations in chat reference sessions

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Please enter the competencies you consider important but not incorporated in the above list and rate them as well.

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

“Customer Service” Mentality

Chat reference librarians should have the mindset of customer service representatives, respect their users and keep in mind that they deserve high-quality services.

Understanding of “customer service” ethic in order to provide good service to users

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Ability to apply chat reference service policies when necessary

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Please enter the competencies you consider important but not incorporated in the above list and rate them as well.

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Section 3. Competency Areas

Now, you have finished rating the individual competencies for chat reference. Please rate the competency categories as well so that we can determine which competency areas are more important than others. Thanks.

Mastery of basic computer techniques

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Familiarity with chat reference applications

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Reference Interview skills

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Online communication skills

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Familiarity with electronic resources

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Ability to work under pressure

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Customer Service Mentality

Not important at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very important ☐ N/A

Thank you very much for taking your time completing the survey! Your input is highly appreciated!

If you have any comment on the survey, please contact the researcher at luo@unc.edu.
Thanks again!

Have a good summer!

Appendix IV. Definitions of Competency Areas and Individual Competencies

Mastery of basic computer techniques

Chat reference librarians need to master the basic knowledge and skills to operate on a computer to effectively facilitate the reference work.

Typing proficiency

Chat reference librarians need to have proficient typing skills for computer input in order to ensure smooth and effective written communications with users in a chat session. Librarians' typing skills cannot be considered proficient if a chat session will be significantly hindered by slow input.

Mastery of keyboard shortcuts

In order to efficiently maneuver in computer applications, chat reference librarians are expected to master frequently used shortcut keys, such as “ctrl+c” for copy, “ctrl+v” for paste, “ctrl+n” for opening a new document, tab key to switch between windows, etc.

Effective use of Windows operating system

Chat reference software is mostly mounted on Windows operating systems. Thus, librarians need to be familiar with the operating system and know how it works as a platform for different applications.

Technical troubleshooting skills

Chat reference sessions might fail due to technical problems of network or computers. Librarians are expected to have the basic troubleshooting skills to handle technical difficulties, such as opening up the “task manager” to shut down a program when it is frozen on the screen, running anti-virus programs if a computer is suspected to be affected by virus, etc.

Effective use of supporting tools (including both hardware and software) for chat reference system

Ability to effectively use supporting applications for chat reference service such as scanner, question tracking software, scheduling software, librarian-to-librarian back-channel communicating application and other auxiliary software that is included in chat reference systems, etc.

Familiarity with chat reference applications

Chat reference librarians are expected to have abundant knowledge of chat reference applications (full-fledged chat software or text-based instant messenger), and be able to skillfully manipulate and critically evaluate them.

Skillful maneuver of features of chat software or instant messenger to effectively conduct a chat session

Chat reference librarians need to know the chat application so well that chat reference transactions can be effectively facilitated instead of hindered by unskillful manipulation of the application. Thus, librarians need to master the frequently used features of the application, such as logging in and off, picking up patrons' questions, changing settings/modes, creating/using pre-scripted messages, and co-browsing/escorting users during the chat session, etc., and use them skillfully.

Ability to critically evaluate chat software/instant messenger in terms of supporting chat reference service

Chat reference librarians not only need to know how to effectively use the application, but also need to have the ability to critically evaluate its features, such as ease-of-use, functionality, cost-effectiveness, etc., to determine whether or not a particular application is able to address the needs of a chat reference service.

Reference Interview skills

Chat reference librarians are expected to master reference interview skills to clarify users' information needs through appropriate questioning.

Offering a personal greeting at the beginning of a chat session to provide clear interest and willingness to help

At the onset of each chat session, chat reference librarians need to greet users to make them feel welcomed by sending thoughtfully scripted messages.

Using open probes to clarify questions

In order to find out what the user is really looking for, chat reference librarians need to use open-ended questions to elicit more information from the user to determine users' actual information needs.

Keeping users informed by constantly notifying them of what the librarian is doing

Chat reference librarians need to maintain constant communications with users and keep them informed while searching for information to answer their questions.

Providing jargon-free responses

Chat reference librarians should phrase their answers in plain language instead of library jargon so that their responses to users' questions can be easily understood.

Providing opinion-free responses

Chat reference librarians are expected to provide unbiased and objective information to users, and no subjective opinions should be involved that is likely to mislead users.

Recognizing when follow-ups is necessary

Chat reference librarians should be able to make the decision on whether or not users' questions can be better answered by offline searching and providing follow-ups to users. They are expected to make such decisions by taking into consideration contextual variables like the number of users waiting in queue, the degree of difficulty of current users' questions, and the availability of the library's resources, etc.

Referring users to appropriate resources/services when necessary

Chat reference librarians should be able to determine when to refer users to other resources/services and what appropriate resources to refer them to.

Confirming the satisfaction of users' information needs

At the end of each chat session, chat reference librarians are expected to ask whether the information provided is satisfactory or if there are other questions, and express appreciation and encourage further use of the service.

Online communication skills

Chat reference librarians should have the basic knowledge of online communication culture and master the online communication skills to effectively interact with chat reference users.

Understanding and appreciation of the online culture and chat etiquette

Chat reference librarians should be able to understand the culture of online communication and appreciate the chat etiquette when they are conducting a chat reference session, for example, a sentence in all capitals indicates anger, a variety of feelings can be represented by different emoticons, acronyms are frequently used in online chat such as "lol", "ttyl", etc.

Mastery of online real-time written communication skills

Chat reference librarians need to master the online real-time written communication skills and use online communication language when interacting with chat reference users. Online communication skills include "use short frequent messages", "don't sweat a few typos", "drop the formality, but don't get too cute", "be concise, but don't be rude", and "use scripted messages, but don't become librario-bot" (Meola & Stormont, 2002)¹⁴.

Familiarity with electronic resources

Chat reference librarians are expected to have abundant knowledge on electronic resources, including both proprietary databases and free Internet resources, and the ability to search them effectively and evaluate them critically.

Familiarity with subscribed library databases

Chat reference librarians need to know the database resources subscribed in their library very well, including both the database subjects and the remote access and licensing restrictions for the databases.

A wide-ranging knowledge of the internet resources

Chat reference librarians need to be keenly aware of what is out there on the tremendous free Web and have a solid knowledge of frequently used Web resources of their own subject field.

Skills in selecting and searching databases and internet resources

Chat reference librarians should have the ability to skillfully search library databases and communicate the searching process to users, and search the internet efficiently and effectively for information to answer users' questions.

Knowledge of other participating libraries' resources in a collaborative chat reference project

For librarians who work for regional collaborative chat reference services where questions come from all the participating libraries in a certain area, knowledge of other libraries' resources and policies and the ability to effectively search within other libraries' website is a requisite competency.

Mastery of knowledge in as many fields as possible

Chat reference librarians are expected to be generalists rather than specialists, so that they need to work on increasing the range of their knowledge.

Rapid evaluation of the quality of information resources and services

Chat reference librarians should have the ability evaluate information resources and services based on certain criteria, and to identify the authoritative and appropriate ones for users.

Instructional role

Chat reference librarians should take the instructional role to both assist users in improving their level information literacy, and help colleagues in obtaining chat reference skills.

Ability to take the instructional role to educate users to augment their level information literacy

Chat reference librarians are expected to assume the responsibility of an instructor and assist users in applying critical thinking skills in locating, using and evaluating information during the information seeking process.

Ability to provide peer instructions to colleagues in obtaining chat reference skills

Chat reference librarians with advanced chat reference skills are expected to provide appropriate chat reference training to other staff in order to help

them ease into the chat reference scenario and obtain basic skills in staffing the service.

Ability to work under pressure

Pressure comes from a variety of aspects of chat reference service, such as the need to multi-task, or the possibility of software failure, etc. Thus, chat reference librarians should have exceptional capability to work under pressure while providing high-quality service to users.

Skills in time management

Chat reference librarians are expected to have the capability in managing time effectively and efficiently when conducting a chat reference session.

Ability to manage multiple tasks

Multi-tasking scenario include working on multiple windows in a chat session (chat window, search windows, etc.) and juggle between online users and users appearing at the reference desk (if reference librarians staff chat sessions at the reference desk), etc. Thus, chat reference librarians are expected to have exceptional skills in managing multiple tasks.

Ability to think quickly and flexibly deal with unexpected situations in chat reference sessions

Chat reference librarians should be able to react calmly and quickly to unexpected situations such as when chat software malfunctions or users vanish in the middle of a conversation, etc.

Customer Service Mentality

Chat reference librarians should have the mindset of customer service representatives, respect their users and keep in mind that they deserve high-quality services.

Understanding of “customer service” ethic in order to provide good service to users

Chat reference librarians are expected to project a welcoming environment when users initiate a chat session. During the chat reference encounter, the “customer service” mindset will encourage librarians to friendly, patiently and enthusiastically respond to users’ questions and actively help them in the information seeking process.

Ability to apply chat reference service policies when necessary

Each chat reference service has its own specific policies, such as how to deal with inappropriate user requests and how to follow up with users, etc. Librarians should have a clear understanding of the policies and the ability to apply them in chat reference service to ensure the service consistency.

Appendix V. Survey on Chat Reference Training Techniques

Introduction

This survey seeks to determine the most effective training techniques to deliver the essential competencies for chat reference services. In this survey, the training techniques are expected to deliver some of the 21 essential competencies identified from a previous survey. You can click [here](#) to read more about the competencies.

In order for chat reference practitioners to achieve the essential competencies, effective training programs are indispensable. Thus, a list of chat reference training techniques identified from the literature is presented below, and you are asked to rate the effectiveness of each training technique that was part of training experience on a seven-point scale.

If you need definitions/clarifications on the training techniques, please click on each item to see a more detailed explanation of that training technique.

This survey will probably take 10-15 minutes of your time. Thank you very much for filling out the survey

Survey

Section 1. Demographic Information

How did you become a chat reference librarian?

☐ I volunteered to do chat reference because it is part of the future of reference librarianship.

☐ It is part of my job.

☐ I was assigned to do chat reference by my supervisor, but am not comfortable with that role.

Other ☐ please specify

How long have you been working as a chat reference librarian?

Less than a year ☐ 1-3 years ☐ More than 3 years ☐

What is your comfort level with chat reference service?

Not comfortable at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very comfortable

Do you have a professional degree in LIS?

No ☐ Yes – MLS ☐ Certificate ☐ Other ☐ please specify

(If the answer to the above question is Yes, please answer this question too; otherwise, please skip it) How long has it been since you got your LIS professional degree?

Less than a year ☐ 1-3 years ☐ 4-7 years ☐ More than 7 years ☐

What is the provision venue of the chat reference service you are staffing (multiple choices)?

Instant messenger ☐ Commercial chat software ☐ Home-grown software ☐
Other ☐ Please specify

What is your work setting?

Academic library ☐ Public library ☐ Medical library ☐ Law Library ☐
Other ☐ Please specify

What is the service mode of the chat reference service you are staffing (multiple choices)?

Stand-alone service ☐ Collaborative network ☐
Other ☐ Please specify

From what perspective would you like to evaluate the training techniques listed in this survey? (multiple choices)?

I'd like to provide my input as a chat reference trainer. ☐
I'd like to provide my input as a chat reference trainee. ☐
Other ☐ Please specify

Section 2. Training Techniques

Please rate the the chat reference training techniques listed below on a seven-point scale, in terms of their effectiveness in delivering competencies for chat reference librarians. If you are not sure what a training technique means, please click on it to see its definition. Thanks!

Training on Chat Software

Chat software training is usually provided by software vendors (or other trainers) to help librarians master the features and functions of the software to be used in the chat reference service. In the competency survey, the mean rating of "Skillful maneuver of features of chat software or instant messenger to effectively conduct a chat session" is ranked 14 among 30 competencies. Training techniques listed in this section are expected to facilitate trainees' mastery of chat software skills.

Trainer demonstrates the features and functions of the chat software.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Trainer provides complete and objective information about the software, including advantages and disadvantages.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Trainer breaks down the learning into a list of concrete tasks and subtasks to make it more manageable.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Trainees pair up as patron and librarian to gain hands-on experiences on using the software.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

If you have experienced other effective software training, please enter it here:

Please rate the effectiveness of the training technique you just entered:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Training on chat reference transaction

A chat reference transaction involves a variety of skills that librarians need to effectively interact with users, such as the reference interview skills, online communication skills, and search strategies, etc. In the competency survey, all these reference transaction-related skills are determined as essential competencies for chat reference. Listed below are the training techniques identified from the literature that could help librarians gain these competencies.

Trainer explains the concept of chat reference and how it has impacted library reference work, preparing trainees at the conceptual level.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Trainer discusses/demonstrates how to apply reference interview techniques in chat sessions where no visual and verbal cues exist.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Trainer discusses/demonstrates online written communication skills and chat etiquette skills to help trainees better understand the chat communication method.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Trainer discusses/demonstrates user management techniques, such as making referral or follow-up decisions and dealing with rude users, etc.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Trainer discusses the service policy and procedural issues, including the scope of the service, when to provide instructions and when to give direct answers, etc.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Trainees review selected chat transcripts to learn more about the transaction.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Trainees pair up and engage in pre-designed reference scenarios to practice the reference interview and online communication skills.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Trainees ask questions to real chat reference services and evaluate their experiences – the secret shopper approach.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Trainees have more experienced librarians as mentors monitor their real chat sessions for a given period of time and provide feedback to them.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Trainer discusses/demonstrates database and the Internet searching skills.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

If you have experienced other effective training on chat reference transaction, please enter it here:

Please rate the effectiveness of the training technique you just entered:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Supporting training materials

Needless to say, trainer's lectures and trainees' exercises are the pivotal part of a training program. But the training activities cannot be accomplished without the facilitation of supporting materials, such as the training manual, cheat sheet and relevant tutorials.

Training manual (either print or electronic) containing all the training related information to facilitate the training process and for future reference.

Was such a document included in your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training document:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Cheat sheet containing vital information librarians might need to access quickly and often while covering the service.

Was such a document included in your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training document:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Online tutorials created by software vendors on learning how to use the chat software.

Did you use such tutorials in your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training material:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Communication venues like email-listserv, online discussion board, or regular feed-back meetings for trainers and trainees to exchange their thoughts on the training program.

Did you have such a communication channel during your training? (if yes, please answer the next question; if no, please skip it.)

Yes ☐ No ☐

Please rate the effectiveness of the above training component:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Self-training materials, such as Lipow's "The Virtual Reference Librarians' Handbook".

Did you use self-training materials? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

If you used other self-training materials than Lipow's book, please specify it:

Please rate the effectiveness your self-training materials:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

If you were assigned any readings during the training, could you think of the most helpful ones and enter them here:

If you have used other effective training material, please enter it here:

Please rate the effectiveness of the training material you just entered:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Ongoing training

Chat reference training is an ongoing process where chat reference skills need to be refreshed once in a while. Listed below are the training activities held on a regular basis for trainees to hone their skills.

Software training refreshers are provided on a regular basis.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Librarians pair up to practice chat reference skills on a regular basis for a certain period of time.

Was this part of your training? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training technique:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

If you have experienced other effective ongoing training, please enter it here:

Please rate the effectiveness of the training technique you just entered:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Training mode

Chat reference training can be provided in a number of different ways – in-house, tele-conferencing, or online.

Training is provided in house, where trainer is physically present with trainees.

Was your training provided this way? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training mode:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Training is provided through tele-conferencing or web-conferencing.

Was your training provided this way? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training mode:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Training is provided online, through software such as WebCT or BlackBoard.

Was your training provided this way? (if yes, please answer the next question; if no, please skip it.) Yes ☐ No ☐

Please rate the effectiveness of the above training mode:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

Was your training provided in any other mode than the above ones? If so, please enter it here:

Please rate the effectiveness of the training mode you just entered:

Not effective at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very effective ☐ N/A

If you have any comments on the surveyed items, on your own training experience and on how training programs should be designed and implemented for chat reference, please enter them in the following box. Thank you!

Thank you very much for taking your time completing the survey! Your input is highly appreciated!

If you have any comment on the survey, please contact the researcher at luo@unc.edu. Thanks again!

Have a good summer!

Appendix VI. Definitions of Training Techniques

Training on chat reference software

Chat software training is usually provided by software vendors (or other trainers) to help librarians master the features and functions of the software to be used in the chat reference service. In the competency survey, the mean rating of “Skillful maneuver of features of chat software or instant messenger to effectively conduct a chat session” is ranked 14 among 30 competencies. Training techniques listed in this section are expected to facilitate trainees' mastery of chat software skills.

Trainer demonstrates the features and functions of the chat software.

Trainer introduces the software to trainees by explaining its features and functions and demonstrating how to use the software. This part of training involves mostly lecturing and demonstration, and aims at presenting an overview of how the software works.

Trainer provides complete and objective information about the software, including advantages and disadvantages.

No software is perfect. Trainer needs to objectively describe the advantages and disadvantages of the software in delivering chat reference service. This part of training is to provide trainees with a thorough view of the software so that they can be more aware of what the software can or can't do (well), and thus be better prepared when they need to use certain functions of the software in real chat sessions.

Trainer breaks down the learning into a list of concrete tasks and subtasks to make it more manageable.

Learning how to use complex chatting software might seem a bit daunting, especially to those who are less comfortable with computers. Thus, in order for trainees to ease into the mastery of the software, trainer creates a list of small steps to make the task more manageable. The list usually starts with simple steps like how to log on and off, and how to accept a user's call, then gradually advances to skills like how to transfer a user to another librarian, etc. With such a list, trainees can achieve the learning objectives step by step, without being overwhelmed.

Trainees pair up as patron and librarian to gain hands-on experiences on using the software.

Hands-on experiences are important for trainees to master the features and functions of the software. After trainer introduces the software basics, trainees are asked to pair up with one another and practice using the software in a chat session, learning how to maneuver it through hands-on experiences.

Training on chat reference transaction

A chat reference transaction involves a variety of skills that librarians need to effectively interact with users, such as the reference interview skills, online communication skills, and search strategies, etc. In the competency survey, all these reference transaction-related skills are determined as essential competencies for chat reference. Listed below are the training techniques identified from the literature that could help librarians gain these competencies.

Trainer explains the concept of chat reference and how it has impacted library reference work, preparing trainees at the conceptual level.

Understanding the concept of chat reference is the first step for trainees to be prepared toward chat reference work. Trainer delineates the big picture of chat reference by introducing the history and current practice of this service, how it is different from other reference options, and what kind of mindset that librarians need to have when staffing the service. Sometimes trainer assigns readings in this respect in order for trainees to have a better grip on the conceptual ground of chat reference.

Trainer discusses/demonstrates how to apply reference interview techniques in chat sessions where no visual and verbal cues exist.

Reference interview skills are the core skills in all the reference venues. Chat reference has posed more challenges in conducting a reference interview with users since there are no visual and verbal cues in the chat environment. Trainer explains to trainees how to apply reference interview techniques to identify users' real information needs in a chat session, and demonstrate the skills (especially those specific to chat, e.g., keeping users informed of what the librarian is doing) through a number of examples.

Trainer discusses/demonstrates online written communication skills and chat etiquette skills to help trainees better understand the chat communication method.

Chat reference transactions are achieved through written communications, which are quite different from the face-to-face communication. Thus, trainer helps trainees understand the characteristics of online chat culture, such as the massive usage of acronyms, especially among younger users; and provide chat communication tips to them, such as keeping the message short and responding quickly, etc.

Trainer discusses/demonstrates user management techniques, such as making referral or follow-up decisions and dealing with rude users, etc.

Chat is not the ideal medium for all kinds of reference questions. Trainer explains to trainees that there are options like referral or email follow-up to take care of questions that couldn't be thoroughly answered in a chat session, thus, trainees should take advantage of the immediacy of the service and leave complicated, time-consuming questions to the other options. Trainer also teaches trainees the skills in dealing with difficult users, such as not to take their comments personally, and responding calmly, etc.

Trainer discusses the service policy and procedural issues, including the scope of the service, when to provide instructions and when to give direct answers, etc.

Every service has its own policy. Trainer discusses with trainees the chat reference service policy, such as the scope of the service, the availability of the service, and when to provide instructions or direct answers in a chat session, etc., so that when trainees start staffing the service they can do so under the guidance of the policy and keep the service consistent.

Trainees review selected chat transcripts to learn more about the transaction.

Reviewing actual chat transcripts could bring trainees closer to the real chat reference experience. Trainer selects transcripts of a variety of reference scenarios, such as helping with homework, citing sources, offering opinions and clarifying the question, etc., and asks trainees to examine and evaluate them using certain standards like Reference and User Services Association's reference guidelines. The purpose of this activity is to increase trainees' awareness of reference standards and obtain a more practical sense of how to conduct a chat reference session.

Trainees pair up and engage in pre-designed reference scenarios to practice the reference interview and online communication skills.

Trainer develops several reference scenarios, each specifying the reason for the request, the type of information needed and the background of the requestor, etc. Then trainees pair up, one playing the user and the other the librarian, and initiate a chat session based on each reference scenario. All the scenarios are developed so that a reference interview is essential to understanding the user's true information needs; in other words, if the librarian took the request at face value, the true information need would not be met. This activity provides each trainee with an opportunity to practice a real reference interview in the chat environment from both the perspective of a user and of a librarian.

Trainees ask questions to real chat reference services and evaluate their experiences – the secret shopper approach.

Trainees are asked to visit a real chat reference service and ask questions as a user, and then evaluate the interaction afterwards. This is similar to the secret shopper approach employed in the retail sector to assess customer service. In this activity, trainees can ask a question that interest themselves, or use a sample scenario provided by trainer.

Trainees have more experienced librarians as mentors monitor their real chat sessions for a given period of time and provide feedback to them.

Trainees each have a mentor to help them ease into the actual chat reference practice. For a given period of time, the mentor monitors the trainee's sessions with a user and provides private feedback as needed.

Trainer discusses/demonstrates database and the Internet searching skills.

Electronic resources are greatly used in chat reference services, thus training is provided on two types of frequently used resources – the Internet and library databases. Trainer gives detailed instructions on using search engines such as Google and primary directory sites, and chooses a core list of databases from a variety of disciplines and demonstrates how to conduct searches in these databases. Searching tips and short-cuts for the various databases are provided as well.

Supporting training materials

Needless to say, trainer's lectures and trainees' exercises are the pivotal part of a training program. But the training activities cannot be accomplished without the facilitation of supporting materials, such as the training manual, cheat sheet and relevant tutorials.

Training manual (either print or electronic) containing all the training related information to facilitate the training process and for future reference.

A training manual documents every step of the training process and incorporate all the training related information, such as the instructions on how to use the software, reference interview techniques, online communication tips, and service policy, etc. Such a manual not only facilitates the training process, but also serves as a reference source when trainees start covering real chat service.

Cheat sheet containing vital information librarians might need to access quickly and often while covering the service.

A concise cheat sheet is provided to trainees, which contains only vital information librarians might need to access quickly and frequently while covering the chat service, such as the software how-tos, and handy URLs and contacts. Such a cheat sheet can take multiple formats – a PDF file, a Web-site or a print copy, in order to satisfy varying needs and learning styles.

Online tutorials created by software vendors on learning how to use the chat software.

Some chat software vendors (e.g. Tutor.com's Virtual Reference Tool Kit) create online tutorials to instruct trainees in using the software. Trainees can access the tutorial on the vendor's website and learn about the software by following the tutorial.

Communication venues like email-listserv, online discussion board, or regular feed-back meetings for trainers and trainees to exchange their thoughts on the training program.

Trainees' feedback on an ongoing training program can help trainer adjust the training activities to better meet their needs. Email-listserv, online discussion board or regular feedback meetings provide a space for everybody involved in the training process to exchange their thoughts and ideas, and therefore make the training program better.

Self-training materials, such as Lipow's “The Virtual Reference Librarians' Handbook”.

Librarians can teach themselves about chat reference by reading self-training manuals like Lipow's "The Virtual Reference Librarians' Handbook", where almost every aspect of chat reference is covered and exercises are provided for librarians to practice software skills, reference interview skills, online communication skills and other chat skills that are necessary in staffing the service.

Ongoing training

Chat reference training is an ongoing process where chat reference skills need to be refreshed once in a while. Listed below are the training activities held on a regular basis for trainees to hone their skills.

Software training refreshers are provided on a regular basis.

The chat software can be quite complicated and it is not likely that trainees will master all the commands at once. The purpose of the refreshers is to help trainees practice the software commands and skills that might not be used every day but are likely to be used on certain occasions.

Librarians pair up to practice chat reference skills on a regular basis for a certain period of time.

Skill comes from practice. It takes constant practice for trainees, especially those who are new to chat, to master the variety of techniques requisite for chat reference service. Trainees can find a partner and practice with each other and critique each other's chat skills on a regular basis until they become accustomed to online communication and skillful in conducting chat reference sessions.

Training mode

Chat reference training can be provided in a number of different ways – in-house, tele-conferencing, or online.

Training is provided in house, where trainer is physically present with trainees.

Training sessions are held in-house and trainer provides training through face-to-face interaction with trainees.

Training is provided through tele-conferencing or web-conferencing.

Trainer and trainees are geographically separated and training is provided through tele-conferencing or web-conferencing sessions.

Training is provided online, through software such as WebCT or BlackBoard.

Trainer and trainees are geographically separated and training is provided online, through course management software such as WebCT or BlackBoard, where all the training activities bear a resemblance to chat reference service itself – the interaction is based on online written communication.

Appendix VII. Invitation Letters

Invitation letter for the competency survey

Subject: Call For Participation In A Survey Of Chat Reference Competencies

Hi all,

This is Lili Luo, a doctoral student at UNC-Chapel Hill. I'm currently doing a study to determine the essential competencies for chat reference service in the attempt to inform the design of training and education programs for chat reference librarians

I created a survey incorporating all the competencies proposed in the literature so far and would like to find out which of them are considered more important than others. I cordially invite librarians who are serving or have served chat reference services to participate in the study.

In the survey, you will be asked to rate 30 chat reference competencies on a 7 point Likert scale and it will only take you 10-15 minutes. Your participation will be completely anonymous, and will be highly appreciated. If you are not a chat reference librarian yourself, please forward the message to chat reference librarians at your library/institution.

Among all the participants, one will be randomly selected and win \$100 as a gift in his/her name donated to his/her library's acquisition department.

Your participation in the study will make significant contribution to the growth of chat reference, especially in the education/training aspect. Your efforts will be highly appreciated.

Here's the survey URL: <http://www.surveymonkey.com/s.asp?u=992772140014>

Please contact me at luo@unc.edu if you have any questions regarding the survey. You may also contact my faculty advisor, Dr. Claudia Gollop, at gollop@ils.unc.edu.

Thank you very much!

(All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu)

Regards,

Lili

Invitation letter for the training technique survey

Subject: Call For Participation In The Survey On Chat Reference Training

Hi all,

This is Lili Luo, a doctoral candidate at UNC-Chapel Hill. I sent out an email about a month ago calling for participation in a survey study I conducted to determine the essential chat reference competencies. Now the survey has closed and 21 (out of 30) competencies have been identified by the participants as the essential ones for chat reference (more detailed summary of the results can be found at http://www.ils.unc.edu/~luolili/diss_surveys/survey1_summary1.htm). I'd like to extend my greatest gratitude to those who participated in this survey.

Based on the essential competencies identified in the previous survey, I created another one aiming to determine the most effective training techniques to achieve those competencies. This survey is based on a thorough literature review on chat reference training. You will be asked to rate them on a 7 point Likert scale and it will only take you about 10-15 minutes.

Again, I cordially invite all who are serving or have served chat reference services to participate in the study. If you are not a chat reference practitioner yourself, please forward the message to chat reference librarians/staff at your library/institution.

Among all the participants, one will be randomly selected and win \$100 as a gift in his/her name donated to his/her library's acquisition department.

Your participation in the study will make significant contribution to the growth of chat reference, especially in the education/training aspect. Please take 10 minutes or so to fill out the survey. Your efforts will be highly appreciated.

Here's the survey URL: <http://www.surveymonkey.com/s.asp?u=75402394709>

Please contact me at luo@unc.edu if you have any questions regarding the survey. You may also contact my faculty advisor, Dr. Claudia Gollop, at gollop@ils.unc.edu.

Thank you very much!

(All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu)

Regards,
Lili

Appendix VIII. Overlapping Competency Suggestions

Among the 510 competencies suggested by respondents, 360 (70.6%) overlapped with the ones that have been covered in the survey already. Though these suggestions did not present new information, the number of times each competency was suggested could reinforce their ratings. This appendix contains a summary of such suggested competencies in a table that is organized in the following fashion:

Competency area			
Competency	# of times suggested	Mean rating	Standard deviation
Sub-category (optional)			
<i>“an example quote from respondents’ suggestions”</i>			

Table of Suggested Competencies Overlapping with Surveyed Competencies

Mastery of basic computer techniques			
Typing proficiency	2	6.5	0.71
<i>“speed of typing - not necessarily accurate typing”</i>			
Technical troubleshooting skills	2	5	1.41
<i>“Trouble shooting skills for Productivity Software (Word, PowerPoint, etc.) and University software (courseware, intranets)”</i>			
Familiarity with chat reference applications			
Skillful maneuver of features of chat software or instant messenger to effectively conduct a chat session	7	6	1
<i>“Ability to use basic features of chat software”</i>			
Reference interview skills			
General reference interview skills	29	6.93	0.37
<i>“good reference interview skills”</i>			
Offering a personal greeting at the beginning of a chat session to provide clear interest and willingness to help	3	7	0
<i>“expressing interest in question”</i>			
Confirming the satisfaction of users’ information needs	3	7	0
<i>“Must remember to check w/patron to see if resources found are what the patron needs. Easy to misinterpret the need in online environment.”</i>			
Providing jargon-free responses	1	7	0
<i>“Using as little library jargon as possible, such as 'holdings' or 'serials'.”</i>			
Using open probes to clarify questions	11	6.73	0.47
<i>“Knack for cutting through incoherently stated information needs, using targeted questioning & encouragement”</i>			
Providing opinion-free responses	1	5	0
<i>“Use of neutral language in the response - this can be very tricky and requires some training of the novice librarian.”</i>			

Keeping users informed by constantly notifying them of what the librarian is doing	1	7	0
<i>"Informing the patron of what you are doing and how much time it will take"</i>			
Referring users to appropriate resources/services when necessary	9	6.67	0.5
<i>"knowledge of limitations; when to refer the question elsewhere"</i>			
Recognizing when follow-up is necessary	4	6.67	0.58
<i>"Recognize when chat service is insufficient communication mode for users question and follow up with alternate method of communication"</i>			
Online communication skills			
General communication skills	13	6.17	0.67
<i>"Effective communication techniques through writing"</i>			
Understanding and appreciation of the online culture and chat etiquette	45	5.64	1.20
<i>"Having a knowledge of that clipped, abbreviated nonsense that passes for 'language' in these IM programs."</i>			
Mastery of online real-time written communication skills	17	6.59	0.80
<i>"ability to answer succinctly--not long drawn out paragraphs"</i>			
Familiarity with electronic resources			
Exceptional skills in selecting and searching databases and internet resources	13	6.85	0.38
<i>"online searching literacy and proficiency"</i>			
Familiarity with subscribed library databases & a wide-ranging knowledge of the Internet resources	46	6.67	0.56
<i>"comprehensive knowledge of the Internet, proprietary online resources, print resources, the information cycle"</i>			
Knowledge of other participating libraries' resources in a collaborative chat reference project	9	7	0
<i>"ability to scan other library's web sites for relevant tools, when working with patrons from multiple libraries"</i>			
Expanding the mastery of general knowledge rather than subject-specific knowledge	2		
<i>"Working knowledge of a broad range of topics, beyond the area of specialty within the library"</i>			
Rapid evaluation of the quality of information resources and services	1	7	0
<i>"Thorough evaluation skills - not superficial - addendum to #47 - quickly but not shabbily"</i>			
Instructional role			
Ability to take the instructional role to educate users to augment their level information literacy	14	6.42	1.16
<i>"Library instruction skills, in order to clearly explain database searching, the online catalog, etc."</i>			
Ability to work under pressure			
Ability to manage multiple tasks			
Ability to multi-task	21	6.67	0.67
<i>"multitasking!!!!"</i>			
Ability to track multiple topics	1	7	0

<i>"Ability to track multiple topics simultaneously; bit different than multi-tasking"</i>			
Ability to handle multiple patrons	4	6.25	0.96
<i>"ability to manage multiple conversations"</i>			
Ability to operate multiple windows	13	6.08	0.95
<i>"ability to work comfortably in multiple windows"</i>			
Ability to think quickly and flexibly deal with unexpected situations in chat reference sessions			
Flexibility to work in the dynamic chat environment	21	6.14	1.01
<i>"Ability to stay calm and try work-arounds when the system screws up."</i>			
Ability to think and act quickly in response to users' questions	18	6.76	0.44
<i>"ability to think quickly and on your feet"</i>			
Exceptional skills in time management	1	7	
<i>"time management"</i>			
"Customer Service" Mentality			
Understanding of customer service ethic in order to provide good service to users			
General customer service skills	9	0.689	0.33
<i>"customer service skills"</i>			
Willingness to help	1	7	0
<i>"Willingness to help every patron with his/her information need, and not to give less attention to a question the librarian might consider trivial or outside of his or her subject area"</i>			
Patience	22	6.32	0.99
<i>"patience with self and patron"</i>			
Friendliness	2	6.5	0.71
<i>"friendliness"</i>			
Open-mindedness	1	7	0
<i>"being non-judgmental and friendly while still maintaining professional demeanor"</i>			
Willingness to be thorough	1	6	0
<i>"Willingness to be thorough."</i>			
Tolerance	1	7	0
<i>"not sure if this is a competency - but tolerance is required"</i>			
Sense of humor	4	6	2
<i>"good sense of humor"</i>			
Empathy	2	5	1.41
<i>"empathy - ability to visualize what the customer might be seeing/experiencing during the whole transaction"</i>			
Dedication	1	3	0
<i>"DEDICATION"</i>			
Understanding of service policies and ability to apply them	4	6.75	0.5
<i>"Ability to decipher complex policies, library and consortium, quickly"</i>			

References

- Abels, E. G. (1996). The e-mail reference interview. *RQ*, 35(3), 345-356.
- Arnold, S. E., & Arnold, E. S. (1997). Vectors of change: Electronic information from 1977 to 2000. *Online*, 21(4), 18-22. Babbie, E. R. (1990). *Survey research methods* (2nd ed.). Belmont, CA: Wadsworth.
- Auster, E., & Chan, D. C. (2003). Factors contributing to the professional development of reference librarians. *Library and Information Science Research*, 25(3), 265-286.
- Babbie, E. R. (1990). *Survey research methods* (2nd ed.). Belmont, CA: Wadsworth.
- Bauner, R. E. (1990). Ready reference beyond the M.L.S. *Reference Librarian*, 30, 45-59.
- Benefiel, C. R., Miller, J. P., & Ramirez, D. (1997). Baseline subject competencies for the academic reference desk. *Reference Services Review*, 25(1), 83-93.
- Bertot, J. C., McClure, C. R., & Jaeger, P. T. (2005). *Public libraries and the Internet 2004: Survey results and findings*. Retrieved Jan 6, 2006, from <http://www.ii.fsu.edu/projectFiles/plinternet/2004.plinternet.study.pdf>
- Billings, H., Carver, I. E., Racine, J. D., & Tongate, J. (1994). Remote reference assistance for electronic information. *Library Hi Tech*, 12(1), 77-86.
- Bonham, M. (1987). Library services through electronic mail. *College & Research Libraries News*, 48, 537-538.
- Bourne, C. P., & Robinson, J. Education and training for computer-based reference services: review of training efforts to date. *Journal of the American Society for Information Science*, 31(1), 25-35 s.
- Bowden, J. A., & Masters, G. N. (1993). *Implications for higher education of a competency-based approach to education and training*. Canberra, Australia: Australian Government Publishing Service.
- Boye, M. (1996). The impact of CD-ROM on reference service. *Library Review*, 45(7), 35-41.
- Boyer, J. (2001). Virtual reference at the NCSU libraries: The first one hundred days. *Information Technology and Libraries*, 20(3), 122-128.
- Brandt, d. S. (2000). E-mail makes the world go round. *Computers in Libraries*, 20(10), 64-66.
- Brod, C. (1982). Managing technostress: Optimizing the use of computer technology. *Personnel Journal*, 61, 754.

- Broughton, K. (2001). Our experiment in online, real-time reference. *Computers in Libraries*, 21(4), 26-31.
- Brunelle, B. S., & Cuyler, A. E. (1983). Adapting online database systems for reference service. *Reference Librarian*, (5/6), 93-98.
- Bry, L. (2003). Simple and sophisticated methods for processing large volumes of question and answer information through the World Wide Web. In R. D. Lankes, J. W. I. Collins & A. S. Kasowitz (Eds.), *Digital reference service in the new millennium: Planning, management, and evaluation* (pp. 111-123). New York, NY: Neal-Schuman Publishers Inc.
- Burkhardt, R. R. (1995). *A role transformed? Technology's challenge for job responsibilities of the reference librarian*. University of Alabama, United States -- Alabama.
- Bushallow-Wilber, L., DeVinney, G., & Whitcomb, F. (1996). Electronic mail reference service: A study. *RQ*, 35(3), 25-36.
- Buttlar, L., & Du Mont, R. R. D. (1989). Assessing library science competencies: soliciting practitioner input for curriculum design. *Journal of Education for Library and Information Science*, 30(1), 3-18.
- Buttlar, L., & Du Mont, R. (1996). Library and information science competencies revisited. *Journal of Education for Library and Information Science*, 37(1), 44-62.
- Canelas, D. B. (1971). Task analysis of library jobs in the state of Illinois: A working paper on the relevance of the study to academic libraries. Washington, D.C.: ERIC Document Reproduction.
- Carter, D. S., & Janes, J. (2000). Unobtrusive data analysis of digital reference questions and service at the internet public library: An exploratory study. *Library Trends*, 49(2), 251-265.
- Chandler, Y. J. (1995). *Professional preparation competences for law librarianship: A survey of experts in law librarianship and private law librarians*. Unpublished Doctoral Dissertation, University of Michigan, Ann Arbor, MI.
- Chaudhry, A. S., & Yeen, L. S. (2001). Identification of competencies for professional staff of public libraries. *Public Library Quarterly*, 20(1), 17-43.
- Coffman, S. (2003). *Going live: Starting & running a virtual reference service*. Chicago: American Library Association.
- Coffman, S., & McGlamery, S. (2000). The librarian and Mr. Jeeves. *American Libraries*, 31(5), 66-69.

- Christine, E. R. (1980). Curriculum design competencies for school librarians. *International Library Review*, 12(4), 343-357.
- Crawford, S. D., Couper, M. P., & Lamias, M. J. (2001). Web surveys: Perception of burden. *Social Science Computer Review*, 19, 146-162.
- Creth, S. (1986a). *Effective on-the-job training: Developing library human resources*. Chicago, IL: American Library Association.
- Creth, S. (1986b). University research libraries. In H. S. White (Ed.), *Education for professional librarians*. White Plains, NY: Knowledge Industry Publications.
- Crowe, V. (1973). *Guidelines for curriculum revision based on selected role competencies perceived as valuable by graduates of the library science program at Edinboro State College*. Unpublished Doctoral Dissertation, University of Pittsburgh, Pittsburgh, PA.
- Dalkey, N., & Helmer, O. (1963). An Experimental application of the Delphi method to the use of experts. *Management Science*, 9(3), 458.
- Dane, F. c. (1990). *Research methods*. Pacific Grove, CA: Brooks/Cole Publishing Company.
- Daniel, E., & Ely, D. P. (1977). *A process for developing a competency-based educational program for media professionals*. Syracuse, NY: Syracuse University.
- Daniel, E., & Ely, d. P. (1983). Competency-based education for school library media specialists. *Journal of Education for Librarianship*, 23(4), 273-278.
- Dee, C. R. (2003) Chat reference service in medical libraries part 2 – Trends in medical school libraries. *Medical Reference Services Quarterly*, 22(2), 15-27.
- Dent, V. F. (2000). Technology provides innovative reference services at University of Michigan libraries. *Research Strategies*, 17, 187-193.
- Digital Reference Education Initiative. (2004). *Rubrics for Digital Reference Service Providers*. Retrieved June 1, 2005, from <http://drei.syr.edu/pdf/DREICompetenciesDraft092004.pdf>
- Dyson, R., & Kjestine, C. (1993). User preference for CD-ROMs: Implications for library planners. *CD-ROM Professional*, 6(3), 86-89.
- Elias, T., & Morrill, S. (2003). Our virtual reference Training camp. *Computers in Libraries*, 23(4), 10-12, 70-72.
- Fischer, R. G. (1978). The Delphi method: A description, review, and criticism. *Journal of Academic Librarianship*, 4(2), 64-70.

- Fisher, W. (2001). Core competencies for the acquisitions librarian. *Library Collections, Acquisitions, and Technical Services*, 25(2), 179-190.
- Florida State University Ask a Librarian (2004). *FSU checklists for Ask a Librarian*. Retrieved June 1, 2005, from http://drei.syr.edu/pdf/FSU_AskaLibrarian_checklist.pdf
- Folger, K. M. (1997). *The virtual librarian: Using desktop videoconferencing to provide interactive reference assistance*. Retrieved August 11, 2005, from <http://www.ala.org/ala/acrlbucket/nashville1997pap/folger.htm>
- Ford, C. (2002). *An exploratory study of the differences between face-to-face and computer-mediated reference interactions*. Unpublished Doctoral Thesis, Indiana University at Bloomington.
- Foyster, J. (1990). *Getting to grips with competency-based training and assessment*. Adelaide, Australia: TAFE National Centre for Research and Development.
- Francoeur, S. (2001). An analytical survey of chat reference services. *Reference Services Review*, 29(3), 189-203.
- Friedrich, A. E. (1985). *Competencies for the information professional in the coming decade: A Delphi study*. Unpublished Doctoral Dissertation, University of Pittsburgh, Pittsburgh, PA.
- Goetch, L., Sowers, L., & Todd, C. (1999). *SPEC kit 251: Electronic reference service*. Retrieved July 25, 2005, from <http://www.arl.org/spec/251sum.html>
- Goldhor, H. (1971). *Education for librarianship: The design of the curriculum of library schools*. Urbana, IL: University of Illinois.
- Gonczi, A., Hager, P., & Oliver, L. (1990). *Establishing competency-based standards in the professions* (No. 1). Canberra, Australia: AGPS, National Office of Overseas Skills Recognition Research Paper.
- Gorman, M. (2001). Values for human-to-human reference. *Library Trends*, 50, 168-182
- Green, S. S. (1876). Personal relations between librarians and readers. *Library Journal*, 1(2/3), 74-81.
- Griffiths, J.-M., & King, D. W. (1986). *New directions in library and information science education*. White Plains, NY: Knowledge Industry Publications.
- Hahn, K. (1997). *An investigation of and e-mail-based help service*. Retrieved July 25, 2005, from <http://www.clis.umd.edu/research/reports/tr97/03/9703.html>
- Hahn, K. (1998). Qualitative investigation of an e-mail mediated help service. *Internet Research*, 8(2), 123-135.

- Hahn, T. B. (1996). Pioneers of the online age. *Information Processing & Management*, 32(1), 33-48.
- Haines, A., & Grodzinski, A. (1999). Web forms: Improving, expanding and promoting remote reference service. *College & Research Libraries News*, 60(4), 271-272.
- Hall, G. E., & Jones, H. L. (1976). *Competency-based education: A process for the improvement of education*. Englewood Cliffs, NJ: Prentice Hall.
- Harris, L. E. (2004). Software is not enough: Teaching and training digital reference librarians. In R. D. Lankes, J. Janes, L. C. Smith & C. M. Finneran (Eds.), *The virtual reference experience: Integrating theory into practice* (pp. 109-120). New York, NY: Neal-Schuman Publishers.
- Harris, R., Guthrie, H., Hobart, B., & Lundberg, D. (1995). *Competency-based education and training: Between a rock and a whirlpool*. South Melbourne, Australia: Macmillan Education Australia PTY LTD.
- Hauptman, R. (1983). Computers, reference, and revolution. *Reference Librarian*, (5/6), 71-75.
- Hermann, G. D., & Kenyon, R. J. (1987). *Competency-based vocational education: A case study*. London: Further Education Unit.
- Heise, J., & Kimmel, S. (2003) Reading the river: the state of the art of real-time virtual reference. *Internet Reference Services Quarterly*, 8 (1/2), 1-7.
- Hirko, B., & Ross, M. B. (2004). *Virtual reference training: the complete guide to providing anytime, anywhere answers*. Chicago: American Library Association.
- Horn, A. (1971). Time for decision: Library education for the 1970s. *Special Libraries*, 62, 515.
- Hodges, P. R. (1989). Reference in the age of automation: Changes in reference service at Chemical Abstracts Service Library. *Special Libraries*, 251-257.
- Hope, C. B., Kajiwarra, S., & Liu, M. (2001). The impact of the Internet: Increasing the reference librarian's role. In D. Su (Ed.), *Evolution in Reference and Information Services* (pp. 13-35). New York, NY: The Haworth Press.
- Horowitz, L. R., Flanagan, P. A., & Helman, D. L. (2005). The viability of live online reference: An Assessment. *portal: Libraries and Academy*, 5(2), 239-258.
- Howard, E. H., & Jankowski, T. A. (1986). Reference services via electronic mail. *Bulletin of the Medical Library Association*, 74, 41-43.
- Hulshof, R. (1999). Providing services to virtual patrons. *Information Outlook*, 3(1), 20-23.

- 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. (2003). *Introduction to reference work in the digital age*. New York, NY: Neal-Schuman Publishers, Inc.
- Janes, J., Carter, d., & Memmott, P. (1999). Digital reference services in academic libraries. *Reference & User Services Quarterly*, 39(2), 145-150.
- Janes, J., & Hill, C. (2001). Finger on the pulse: Librarians describe evolving reference practice in an increasingly digital world. *Reference & User Services Quarterly*, 42(1), 54-65.
- Janes, J., Hill, C., & Rolfe, A. (2001). Ask-an-Expert services analysis. *Journal of the American Society for Information Science and Technology*, 52(13), 1106-1121.
- Jones, R. (2003). Competencies for Information Professionals of the 21st Century. *Information Outlook*, 7(10), 11-20.
- Jordan, M. W. (2004). *Survey research*. Unpublished manuscript, Chapel Hill, NC.
- Kawakami, A., & Swartz, P. (2003). Digital reference: training and assessment for service improvement. *Reference Services Review*, 31(3), 227-236.
- Kaye, B. K., & Johnson, T. J. (1999). Research methodology: Taming the cyber frontier. *Social Science Computer Review*, 17, 323-337.
- King, G. B., & Mahmoodi, S. H. (1991). Peer performance appraisal of reference librarians in a public library. In *Evaluation of public services and public services personnel* (pp. 167-203). Urbana-Champaign, IL: University of Illinois Graduate School of Library and Information Science.
- Kittle, P. W. (1985). Putting the medical library online: Electronic bulletin boards...and beyond. *Online*, 9(3), 25-30.
- Kong, L. M. (1996). Academic reference librarians: under the microscope. *Reference Librarian*(54), 21-27.
- Koyama, J. T. (1998). <http://digiref.scenarios.issues>. *Reference & User Services Quarterly*, 38(1), 51-53.
- Krentz, R. F. (1986). *A study of selected competencies of full-time school district media directors as perceived by three groups of educators*. Unpublished Doctoral Dissertation, University of Wisconsin-Madison, Madison, WI.
- Lagace, A., & McClennen, M. (1998). Questions and quirks: Managing an Internet-based distributed reference service. *Computers in Libraries*, 18(2), 24-27.

- Lagace, N. (1999). Establishing online reference services. In J. Janes, D. Carter, A. Lagace, M. McClennen, S. Ryan & S. Simcox (Eds.), *The Internet Public Library Handbook* (pp. 153-183). New York, NY: Neal-Schuman Publishers, Inc.
- Lancaster, F. W., Elszy, C., Zeter, M. J., Metzler, L., & Low, Y.-M. (1994). Searching databases on CD-ROM: Comparisons of the results of end-user searching with results from two modes of searching by skilled intermediaries. *RQ*, 33(3), 370-386.
- Lankes, R. D. (1998a). *Building & maintaining internet information services: K-12 digital reference services*. Syracuse, NY: ERIC Clearinghouse on Information & Technology.
- Lankes, R. D. (1998b). *Building the virtual reference desk*. Retrieved August 11, 2005, from <http://www.vrd.org/TelEd.shtml>
- Lankes, R. D. (2000). The birth cries of digital reference. *Reference & User Services Quarterly*, 39(4), 352-354.
- Larson, C. A., & Dickson, L. K. (1994). Developing behavioral desk performance standards. *RQ*, 33(349-357).
- Lee, S. (1993). Organizational change in research libraries. *Journal of Library Administration*, 18(3/4), 129-143.
- Lenck, F. (1991). History of the PC. *Computing Now*, 9(5), 12-15, 37.
- Lessick, S., Kjaer, K., & Clancy, S. (1997). *Interactive Reference Service (IRS) at UC Irvine: Expanding reference service beyond the reference desk*. Retrieved August 11, 2005, from <http://www.ala.org/ala/acrlbucket/nashville1997pap/lessickkjaer.htm>
- Liming, J. E. P. (1981). *Competence of professional media staff as a predictor of instructional use of library media program in selected public schools*. University of Michigan, Ann Arbor, MI.
- Linstone, H. A., & Turoff, M. (1975). *The Delphi method: Techniques and applications*. Reading, MA: Addison-Wesley.
- Lipow, A. G. (2003). *The virtual reference librarian's handbook*. Berkeley, Calif.; New York: Library Solutions Press; Neal-Schuman.
- Mahmoodi, M. H. (1978). Identification of competencies for librarians performing public services functions in public libraries. Unpublished Doctoral Dissertation, University of Minnesota, Twin Cities, MN.
- Martin, J. (2003). Ask a Librarian virtual Reference services at the Boeing library. *Internet Reference Services Quarterly*, 8(1/2), 127-135.
- Melin, N. (1986). The

- New Alexandria: CD-ROM in the Library. In S. Lambert & S. Ropiequet (Eds.), *CD-ROM: the New Papyrus* (pp. 509-516). Redmond, WA: Microsoft Press.
- Maryland AskUsNow. (2003). *Behaviors for librarians providing Maryland AskUsNow!* Retrieved June 1, 2005, from <http://drei.syr.edu/pdf/MDBehaviorsChecklistWithExamples.pdf>
- Massey-Burzio, V. (1991). Education and experience: Or, the MLS is not enough. *Reference Services Review*, 19, 72-74.
- McClennen, M., & Memmott, P. (2001). Roles in digital reference. *Information Technology and Libraries*, 20(3), 143-148. Retrieved 17 March 2005, from Library & Information Technology Association Website: http://www.ala.org/Content/NavigationMenu/LITA/LITA_Publications4/ITAL_Information_Technology_and_Libraries/2003_McClennen.htm.
- Melin, N. (1986). The new Alexandria: CD-ROM in the library. In S. Lambert & S. Ropiequet (Eds.), *CD-ROM: the new papyrus* (pp. 509-516). Redmond, WA: Microsoft Press.
- Meola, M., & Stormont, S. (2002). *Starting and operating live virtual reference services: a how-to-do-it manual for librarians*. New York: Neal-Schuman Publishers.
- Moore, S. (1998a). Weaving the Web: The Impact of the Internet and other electronic technologies on reference Service. *Louisiana Library Association Bulletin*, 60(3), 114-118.
- Moore, A. (1998b). As I sit studying: WWW-Based reference services. *Internet Reference Services Quarterly*, 3(1), 29-36.
- Morgan, E. L. (1996). *See You See A Librarian final report*. Retrieved July 25, 2006, from <http://sunsite.berkeley.edu/~emorgan/see-a-librarian>
- Mouer, S. (1997). The Australian library industry competency standards: Present perspectives and future prospects. *Australian Library Journal*, 46(2), 136-146.
- Naughton, J. (2000). *A brief history of the future: From radio days to Internet years in a lifetime*. Woodstock, NY: Overlook Press.
- Neufeld, M. L., & Cornog, M. (1986). Database history: From dinosaurs to compact discs. *Journal of the American Society for Information Science*, 37(4), 183-190.
- Nitecki, D. (1984). Competencies required of public services librarians to use new technologies. *Clinic on Library Applications of Data Processing*, 43-57.
- Nofsinger, M. M. (1999). Training and retraining reference professionals: core competencies for the Twentyfirst century. *Reference Librarian*(64), 9-19.

- Oder, N. (2001). The shape of e-reference. *Library Journal*, 126(2), 46-50.
- Ontario Collaborative Virtual Reference Project. (2004). *Competencies Checklist for VR*. Retrieved June 1, 2005, from http://drei.syr.edu/pdf/OVRP_competencies2004.pdf
- Pagell, R. A. (1996). The virtual reference librarian: Using desktop videoconferencing for distance reference. *The Electronic Library*, 14, 21-26.
- Peters, T. (1990). Train and retrain. *Library Administration & Management*, 4(3), 127-130.
- Peters, T. A. (2000). Current opportunities for the effective meta-assessment of online reference services. *Library Trends*, 49(2), 334-349.
- Philip, B. (1997). *mayihelpyou@theelectronicreferencedesk?: An examination of the past, present and future of electronic mail reference service*. Retrieved July 25, 2005, from <http://hollyhock.slis.ualberta.ca/598/brenda/emailref.htm>
- Pfister, F. C. (1982). Competencies essential for school media specialists. *Journal of Education for Librarianship*, 23(1), 29-42 s.
- Pitkin, G. M. (1997). Technostress in libraryland. *Colorado Libraries*, 23(3), 58-61.
- Pomerantz, J. (2003). *Question taxonomies for digital reference*. Unpublished Doctoral Thesis, Syracuse University.
- Pomerantz, J. (2006). Collaboration as the norm in reference work. *Reference & User Services Quarterly*, 46(1), 45-55.
- Prestamo, A. M. (2000). *A comprehensive inventory of technology and computer skills for academic reference librarians*. Unpublished Doctoral Dissertation, Oklahoma State University, Stillwater, OK.
- Q and A NJ.org. (2004). *Competencies Checklist*. Retrieved June 1, 2005, from <http://www.qandanj.org/manual/competencies.htm>
- Reference and User Services Association (RUSA). (2003). Professional competencies for reference and user services librarians: RUSA Task Force on Professional Competencies. *Reference and User Services Quarterly*, 42(4), 290-295.
- Reference and User Services Association. (2004a). *Guidelines for implementing and maintaining virtual reference services*. Retrieved July 1, 2005, from <http://www.ala.org/ala/rusa/rusaprotools/referenceguide/virtrefguidelines.htm>
- Reference and User Services Association. (2004b). *Guidelines for behavioral performance of reference and information service providers*. Retrieved July 1,

- 2005, from
<http://www.ala.org/ala/rusa/rusaprotools/referenceguide/guidelinesbehavioral.htm>
- Rettig, J. (1996). Future reference - "Sired by a hurricane, dam'd by an earthquake". *Reference Librarian*, (54), 75-94.
- Rietdyk, R. J. (1988). Creation and distribution of CD-ROM databases for the library reference desk. *Journal of the American Society for Information Science*, 39(1), 58-62.
- Ronan, J. (2003). *Chat reference: A guide to live virtual reference services*. Westport, Conn.: Libraries Unlimited.
- Roose, T. (1988). Computerized reference tools of the next decade: Taking the plunge with CD-ROM. *Library Journal*, 113(17), 56, 61.
- Roysdon, C. M., & Elliott, L. L. (1988). Electronic integration of library services through a campus wide network. *RQ*, 28, 82-93.
- Ryan, S. (1996). Reference service for the Internet community: A case study of the Internet Public Library reference division. *Library and Information Science Research*, 18(3), 241-259.
- Salem, J. A. J., Balraj, L. E., & Lilly, E. B. (2004). Real-time training for virtual reference. In R. D. Lankes, J. Janes, L. C. Smith & C. M. Finneran (Eds.), *The virtual reference experience: Integrating theory into practice* (pp. 121-138). New York: NY: Neal-Schuman Publishers.
- Salomon, K. (1988). The impact of CD-ROM on reference departments. *RQ*, 28(2), 203-211, 214-219.
- Schardt, C. M. (1983). Electronic mail service: Applications in the pacific northwest region. *Bulletin of the Medical Library Association*, 71, 437-438.
- Schneider, K. G. (2000). The distributed librarian: Live, online, real-time reference. *American Libraries*, 31(11), 64.
- School Library Manpower Project. (1970). *School Library Manpower Project phase I - Final report*. Chicago, IL: American Library Association.
- Schwartz, J. (2003). Toward a typology of e-mail reference questions. *Internet Reference Services Quarterly*, 8(3), 1-15.
- Sloan, B. (1997). *Service perspectives for the digital library: Remote reference services*. Retrieved July 25, 2005, from <http://www.lis.uiuc.edu/~b-sloan/e-ref.html>
- Sherrer, J. (1996). Thriving in changing times: competencies for today's reference librarians. *Reference Librarian*(54), 11-20.

- Smith, K. (1999). *Delivering reference services to users outside the library*. Retrieved July 25, 2005, from <http://www.csu.edu.au/special/raiss99/papers/ksmith.html>
- Smith, N., Marchant, M. P., & Nielson, L. F. (1984). Education for public and academic librarians: A view from the top. *Journal of Education for Librarianship*, 24, 233-245.
- Snook, I. A. (1973). Philosophy of education. In J. V. D. Cruz & P. J. Sheehan (Eds.), *Concepts of education*. Melbourne, Australia: Mercy Teachers' College and Twentieth Century.
- Solomon, D. J. (2001). *Conducting Web-based surveys*. Retrieved November, 20, 2005, from <http://www.ericdigests.org/2002-2/surveys.htm>
- Stacy-Bates, K. K., Fryer, J., Kushkowski, J. D., & Shonrock, D. D. (2003). Competencies for bibliographers: a process for writing a collection development competencies document. *Reference and User Services Quarterly*, 42(3), 235-241.
- Stafford, C. D., & Serban, W. M. (1990). Core competencies: recruiting, training, and evaluating in the automated reference environment. *Journal of Library Administration*, 13(1/2), 81-97.
- Stahl, J. (2001). Online, virtual, e-mail, digital, real Time: The next generation of reference services. *Art Documentation*, 20(1), 26.
- Stemper, J. A., & Butler, J. T. (2001). Developing a model to provide digital reference services. *Reference Services Review*, 29(3), 172-188.
- Still, J., & Campbell, F. (1993). Librarian in a box: The use of electronic mail for reference. *Reference Services Review*, 21, 15-18.
- Stevens, N. D. (1983). Skim milk masquerades as cream: The myth of online database searching. *Reference Librarian*, (5/6), 77-81.
- Stone, C. W. (1973). *Needs for improvement of professional education in library and information sciences* (No. OEG-0-72-5405). Syracuse, NY: Syracuse University Center for the Study of Information and Education.
- Stormont, S. (2001). Going where the users are: Live digital reference. *Information Technology and Libraries*, 20(3), 129-134.
- Straw, J. E. (2000). A virtual understanding: The reference interview and question negotiation in the digital age. *Reference & User Services Quarterly*, 39(4), 376-382.
- Straw, J. E. (2001). From magicians to teachers: The development of electronic reference in libraries: 1930-2000. In D. Su (Ed.), *Evolution in reference and information services* (pp. 1-12). New York, NY: The Haworth Press.

- TAFE National Centre for Research and Development. (1990). *Competency-based training in TAFE: An inventory and report of competency-based approaches in TAFE vocational courses and programs in Australia*. Adelaide, Australia: TAFE National Centre for Research and Development.
- Tai, T. C. (1925). *Professional education for librarianship: A proposal for a library school at the University of Iowa*. University of Iowa, Iowa City, Iowa.
- Tenopir, C. (1988). Decision making by reference librarians. *Library Journal*, 113(16), 66-67.
- Tenopir, C. (1989). What's happening with CD-ROM, part I. *Library Journal*, 114(2), 50-51.
- Tenopir, C. (1993). Choices for electronic reference. *Library Journal*, 118(12), 52-54.
- Tenopir, C. (1994). Changes and choices in the online year. *Library Journal*, 119(21), 32-34.
- Tenopir, C. (1995). Internet issues in reference. *Library Journal*, 120(16), 28-30.
- Tenopir, C. (1996). Database producers go online. *Library Journal*, 121(6), 31-33.
- Tenopir, C., & Neufang, R. (1992). The impact of electronic reference on reference librarians. *Online*, 16(3), 54-59.
- Tenopir, C. (1997). Beyond the CD-ROM model. *Library Journal*, 122(14), 129-130.
- Tenopir, C., & Ennis, L. (1998). The Digital reference world of academic libraries. *Online*, 22(4), 22-28.
- Tenopir, C., & Ennis, L. A. (2001). Reference services in the new millennium. *Online*, 25(4), 40-45.
- Tenopir, C., & Ennis, L. (2002). A Decade of digital reference: 1991-2001. *Reference & User Services Quarterly*, 41, 264-274.
- Todaro, J. B. (1984). *Competencies of children's librarians: An attitudinal assessment*. Unpublished Doctoral Dissertation, Columbia University, New York, NY.
- Trump, J. F., & Tuttle, I. P. (2001). Here, There, and Everywhere: Reference and the Point-of-need. *Journal of Academic Librarianship*, 27(6), 464-466.
- Tucker, J. C. (2004). Developing a chat reference training program. *Internet Reference Services Quarterly*, 8(4), 11-25.
- Tunender, H., & Horn, J. (2002). *Bring it all together: Training for integrating electronic reference*. Retrieved December, 21, 2005, from <http://www.vrd.org/conferences/VRD2002/proceedings/tunender-horn.shtml>

- Turner, P. M. (1981). Instructional Design Competencies Taught at Library Schools. *Journal of Education for Librarianship*, 22(4), 275-282.
- Unruh, B. (1983). Online reference...no longer an option. *Reference Librarian*, (5/6), 83-91.
- Vann, S. K. (1961). *Training for librarianship before 1923: Education for librarianship prior to the publication of Williamson's report on training for library service*. Chicago, IL: American Library Association.
- Viles, A. (1999). *Virtual reference interview: Equivalences*. Retrieved August 11, 2005, from <http://www.ifla.org/VII/dg/dgrw/dp99-06.htm>
- Virtual Reference Desk. (2003). *Facets of Quality*. Retrieved June 1, 2005, from <http://www.vrd.org/facets-06-03.shtml>
- Waldhart, T. J., & Bellardo, T. (1979). User fees in publicly funded libraries. *Advances in Librarianship*, 9, 31-61.
- Walters, R., & Barnes, S. (1985). Goals, objectives, and competencies for reference service: A training program at the UCLA biomedical library. *Bulletin of the Medical Library Association*, 73, 160-167.
- Wang, X. (2005). *Competency-based education*. Retrieved December 2, 2005, from http://www3.baylor.edu/~Xin_Wang/pdf/competency.pdf
- Weaver, C. G. (1983). Free online reference and fee-based online services: allies, not antagonists. *Reference Librarian*, (5/6), 111-118.
- Weise, F. O., & Borgendale, M. (1986). EARS: Electronic access to reference service. *Bulletin of the Medical Library Association*, 74, 300-304.
- Williams, M. E. (1978). Online retrieval: Today and tomorrow. *Online Review*, 2(4), 353-366.
- White, M. D. (2001). Diffusion of innovation: Digital reference service in Carnegie Foundation Master's (Comprehensive) Academic Institution Libraries. *Journal of Academic Librarianship*, 27, 211-231.
- Yue, J. (2000). *The use of ICQ in providing real time reference services*. Retrieved July 25, 2005, from <http://www.vrd.org/conferences/VRD2000/proceedings/Yue11-20.shtml>