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This study examines how the use of open questions in virtual reference interactions impacts the overall efficiency of the reference interview. Fifty virtual reference transcripts from the "Ask a Librarian" service at the University of North Carolina's Davis Library were analyzed to determine whether or not open questions were used. Next, the total number of interactions between patron and librarian was tabulated. The number of open questions was divided by the number of total number of interactions to determine an efficiency value for each transcript. While no conclusive correlation was found between open questions and efficiency, this study suggests that open questions are still an effective virtual reference interview strategy and that more research is needed in this area.

Headings:

College and university libraries – Reference services

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THE EFFECT OF OPEN QUESTIONS ON VIRTUAL REFERENCE INTERVIEW  
EFFICIENCY

by  
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## Introduction

Virtual reference has become an increasingly popular library service over the past decade. Used in a wide variety of library settings, the term virtual reference refers to a reference interview between patron and librarian (or other library employee) which is conducted by computer. Interactions most commonly occur through email or using some type of virtual reference software which supports real-time communication between the two parties. For the purposes of this study, virtual reference is the synchronous interaction between patron and librarian which is mediated by instant messenger technology. Increasingly, this type of communication is being called “chat reference” in the literature; in this paper, the two terms will be used interchangeably.

While a great deal of research exists on face-to-face reference interactions, the extent to which useful skills and strategies in this area can be transferred effectively to the virtual realm remains largely unknown. For instance, the importance of the types of questions used in a reference interview has been explored at length in the face-to-face literature. An open question is a query which does not limit the scope of a potential answer through its structure. For example, “What kind of materials are you looking for?” is an open question because the respondent may answer in any way he chooses, while “Are you looking for articles or books?” is closed because the question’s structure limits the respondent’s answer to either “articles” or “books.” The use of open questions over closed questions is a strategy that has long been recognized as a way to improve accuracy

and increase the patron's satisfaction with the results of a face-to-face interview.

However, the effects of open questions within the virtual reference interview have yet to be significantly explored.

### **The need for a reference interview**

By arguing for the use of open questions, I am obviously assuming that a reference interview (including the process of question negotiation) should take place in most virtual reference interactions. There is a preponderance of research documenting the reasons why a reference interview is necessary to clarify the patron's actual information need, so I include only one particularly well-explained example:

In a successful reference exchange, the librarian must navigate between the question the patron asks and what it is that will actually meet that user's information needs. For example, the student who asks, "Where are your books on Religion?" in reality may be trying to say "I am doing a ten page paper comparing and contrasting attitudes towards women as expressed in the religious writings of the Latter Day Saints and the Society of Friends and I need at least ten sources. Can you help me?"<sup>i</sup>

This example supports Nicholas Belkin's ASK (anomalous states of knowledge) model; according to Belkin, users typically do not completely understand their information problem and have to go through a process by which they progressively clarify their precise need.<sup>ii</sup> The implication of this model for reference work is that an interactive process must take place between librarian and patron in order for the patron's information need to become fully manifest. Therefore, when the librarian fails to conduct a reference interview, he may not understand the type of information the user actually needs and inadvertently recommend sources and strategies that fail to address the user's real question. Regrettably, research has shown that librarians frequently fail to perform a

reference interview; in fact, estimates of this “failure rate” in the literature are typically around fifty percent.<sup>iii</sup>

### **“Communication accidents” and the “low bandwidth problem”**

A great deal of debate exists in the library science literature regarding the extent to which face-to-face and virtual reference interactions differ from one another.<sup>iv</sup> Can the same analytic and evaluative techniques be applied to both practices? Do virtual and face-to-face reference have important underlying differences? One respect in which the two are undeniably different, however, is the frequency with which “communication accidents” occur. A communication accident is a misunderstanding between the two parties participating in a reference interview. In a face-to-face setting, these misunderstandings are more unusual because both parties have more information available to them. In addition to spoken dialogue, the librarian and patron can interpret one another’s body language, tone of voice, inflection, mood, and a wide variety of other non-verbal cues that provide valuable information regarding the speaker’s feelings and intent. In a virtual setting, however, both people must rely exclusively on the words that appear on their screens.

This reliance leads to what Nilsen and Ross term the “low bandwidth problem.”<sup>v</sup> Virtual discussions lack all the aforementioned contextual information taken for granted in face-to-face exchanges, thus leading to communication accidents which can hurt either party’s feelings or send the information search in the wrong direction. Discussing their findings from the Library Visit Study, Nilsen and Ross state that many patrons “thought

that the library staff sounded annoyed or irritated in circumstances when, had the same statement been spoken, they probably would not have come to a negative interpretation.”<sup>vi</sup> Because of this issue, the questions posed by the librarian become especially important. Perceived misunderstandings often result when we feel someone is making assumptions about us. The use of open questions can help avoid this problem, as their structure allows the patron more power over the direction of the conversation and assumes nothing about his information need.

### **The importance of efficiency**

Because participants in a virtual reference interview must type out all their responses and lack the non-verbal cues such as body language that facilitate communication in a face-to-face setting, the interview can become quite time-consuming. Thus, interview efficiency constitutes an important concern in this setting. Since open questions allow for a great range of possible responses (and potentially a larger number of paths the interview might take), they could hamper efficiency. On the other hand, if open questions allow the user to articulate more precisely his information need, they may reduce the number of overall questions the librarian needs to ask before effectively answering the patron’s query.

Additionally, technical and logistical issues can arise during a virtual reference interview. Differences in connection speed or slow servers can cause delays for both parties. The librarian may have other responsibilities, such as patrons approaching the desk or the telephone ringing, which he has to handle. In a face-to-face interaction, none of these factors come into play. Communication is unmediated and in-person reference

interviews are typically given priority over other tasks that may arise. Therefore, because of the numerous complicating factors involved in virtual reference interactions, any strategy that can improve the efficiency of the interview without compromising other important factors such as accuracy is an important discovery.

### **Research question**

Very little research exists analyzing question types and how they affect various parameters of the virtual reference interview. For this study, I examined fifty virtual reference transcripts from the University of North Carolina at Chapel Hill's Davis Library. For each transcript, I determined how many open questions were asked by the librarian and how many total interactions took place between patron and librarian. The purpose of this analysis was to determine whether a correlation exists between the use of open questions and the overall efficiency of the interview.<sup>vii</sup> My research hypothesis was that interviews containing a greater number of open questions would be more efficient than interviews with a larger proportion of closed questions.

## Literature Review

The literature on virtual reference is still in a relatively early stage of development. Earlier research tends to focus on the technical aspects of implementing and using a chat reference system, while later literature examines virtual reference in terms of specific tools and strategies, certain audiences, or evaluation (often in light of the user's perspective). In the last couple of years, the research has shown signs of shifting to a higher level discussion of frameworks and models for thinking about virtual reference. For instance, Jeffrey Pomerantz offers a process-based framework for virtual reference. His model consists of seven processes: question submission, expert selection, questions negotiation, searching resources, archiving, tracking and evaluation, and resource creation.<sup>viii</sup> This type of analysis, however, is a new development and still the exception rather than the rule. The wide majority of the literature still focuses on practical advice and transcript analysis as a way of formulating best practices for virtual reference.

### Technical advice

Much of the early research (and some newer literature as well) explains the practicalities of implementing a virtual reference system and offers advice to information professionals who are considering introducing chat software into their libraries. Joshua Boyer, for example, describes the virtual reference interface used at North Carolina State University, and explains challenges that arose in the first hundred days of its use.<sup>ix</sup> He offers advice to librarians who are considering implementing a similar system in their libraries. Steve Coffman, on the other hand, provides an overview of a wide variety of

logistical issues related to establishing a chat reference service, including staffing, budget concerns, and software options.<sup>x</sup>

For librarians entering a setting where virtual reference services already exist, Karen Ciccone and Amy VanScoy (both librarians at North Carolina State University) discuss the most difficult issues they have encountered, stressing four in particular: rude patrons, dealing with numerous patrons simultaneously, improving virtual reference services, and training employees.<sup>xi</sup> Marlyse MacDonald, on the other hand, examines virtual reference practices within the context of Duke University's Medical Center Library. She describes how library personnel planned and executed a strategy for including virtual reference in the services they offered. MacDonald concludes that success in virtual reference service depends on three factors: the extent to which the service is needed by the community a library serves, the belief of library staff in the service's value, and the clarification of the service's goals.<sup>xii</sup>

Not surprisingly, more recent research in this vein tends to blend the discussion of logistical concerns with more popular recent topics in the virtual reference literature, such as evaluation and the user's perspective. Tammy Bobrowsky Lynne Beck, and Malaika Grant, for example, give advice on how to conduct a virtual reference interview and train employees who are going to answer chat reference queries, citing reference interview transcripts and user surveys from the University of Minnesota-Twin Cities' libraries.<sup>xiii</sup>

### **Specific tools and strategies**

Other researchers have stressed the importance of certain strategies and tools in a virtual environment. Joseph Straw examines the usefulness of canned messages, preconstructed messages designed to serve a specific purpose, in virtual reference interactions. Straw discusses the utility of canned messages in answering certain queries, such as those related to library policy or how to find a specific area of the library.<sup>xiv</sup> He then analyzes some of the advantages and disadvantages of using canned messages in a virtual setting and suggests some general principles which might govern their use. For example, he emphasizes that reference librarians must always “afford the highest respect to the user” and thus proposes that canned messages are “best used around the peripheral edges of a virtual encounter.”<sup>xv</sup>

Michelle Kazmer, Gary Burnett, and Michael Dickey, on the other hand, take a more general approach to strategies which can be useful in chat reference, as they examine the importance of identity representation in online synchronous chat settings. The authors studied online communications at an organization that provides messaging services to clients. They argue that “persistent identity markers” need to be used to maximize user satisfaction with the interaction.<sup>xvi</sup> For example, when the company’s customer service representatives used the same generic online pseudonym, patrons assumed that whoever was helping them was already familiar with their situation.<sup>xvii</sup> Thus, screen names that give the representative a unique identity and differentiate him from other workers can help the customer’s expectations for the interaction align with the representative’s knowledge of the situation. Extended to the virtual reference world, this idea suggests that each librarian needs a unique identifier to distinguish him from other

workers and avoid confusion from patrons who are returning to the service and assume the person they are working with is familiar with their information need.

A few researchers have used tools from other disciplines to analyze reference interactions. Marilyn Domas White uses Arthur Graesser's typology of questions as a way to examine the reference interview. This typology includes five categories: short answer, long answer, assertion, request, and directive (with numerous subcategories within the short and long answer groups).<sup>xviii</sup> White points out that the short and long answer groups roughly correspond to the closed and open categories of questions, with about seventy-five percent of the questions asked by the librarian being the short answer type.<sup>xix</sup> She also finds that the librarian tends to control the direction of the conversation and dialogue in the reference interview.<sup>xx</sup> Although White's research in this article does not specifically concern synchronous virtual communication (the questions she analyzes are from face-to-face interactions preceding searches of electronic bibliographic databases), her findings are relevant to my research. If librarians tend to control the direction of a reference interview and also ask mostly closed questions (which are quite limiting themselves), then the role of open questions in an environment stripped of non-verbal and other contextual information becomes especially important.

### **Specific audiences**

A smaller subset of the virtual reference literature is research that discusses providing chat reference to specific groups. Jo Kibbee examines the various issues associated with providing virtual reference in an academic library to unaffiliated users (those who have no connection to the university). For example, should a librarian be

allowed to use commercial databases in order to satisfy an unaffiliated remote patron's information need?<sup>xxi</sup> Do libraries need to prioritize chat reference requests? Kibbee suggests giving priority to affiliated users when necessary and addressing particularly involved information requests from unaffiliated patrons through email.<sup>xxii</sup> Because of the egalitarian nature of virtual reference services (anyone with an internet connection can use them), a more complex array of potential issues exists than with its face-to-face counterpart.

Pnina Shachaf and Mary Snyder look at how cultural diversity affects virtual reference interactions. They performed content analysis on ninety-four virtual reference transcripts resulting from information requests sent by distance education students to an academic library (forty-seven from African Americans and forty-seven from Caucasians). They found that the types of questions asked vary according to ethnic group, as African Americans are nearly twice as likely to ask topical or known-item queries, while Caucasians ask more technical questions.<sup>xxiii</sup> The authors also note differences in habits during the interview, as African American students ask second and third questions more frequently than Caucasian students.<sup>xxiv</sup>

### **Evaluation and the user's perspective**

The largest segment of virtual reference research literature deals with the evaluation of chat services and the user's perspective during the reference interview. Kirsti Nilsen has done a great deal of work in this area. In an article from 2004, she discusses results from the Library Visit Study, a long-term research project on virtual reference interactions that took place at the University of Western Ontario.<sup>xxv</sup>

Participants in the study were given a questionnaire after their interactions, and Nilsen used the “willingness to return” criterion to establish whether or not each interaction was successful.<sup>xxvi</sup> She subsequently identifies three primary underlying issues which led to user dissatisfaction: the lack of a reference interview (defined as the presence of at least one question asked by the librarian in order to clarify the patron’s information need), the use of unmonitored referrals (the recommendation of a source by the librarian without first ensuring that source was relevant), and the lack of follow-up questions to determine that the information need had been fully met.<sup>xxvii</sup> Similar complaints are documented throughout the literature on face-to-face reference interactions, so it is not surprising that some of Nilsen’s later work compares user perspectives on both in-person and virtual reference.

Nilsen elaborates on these findings in an article she co-authored two years later with Catherine Sheldrick Ross. The authors, using results from the Library Visit Study, offer numerous tips they feel can be used to formulate some best practices for virtual reference interactions. These tips include using automatic responses that assure patrons their questions have been received, checking on links provided to make sure they are relevant to the user’s information search, letting the patron know what you are doing (i.e. “still looking for sources for your question”), and taking the time to clarify the user’s question.<sup>xxviii</sup> Nilsen further emphasizes the need for a reference interview in another article (also related to the Library Visit Study) which compares users’ perceptions (particularly satisfaction) with both virtual and face-to-face reference transactions.<sup>xxix</sup> She also highlights the importance of the Reference and User Services Association guidelines as a training tool for those learning to conduct virtual reference interviews (an

idea which appears fairly often in the virtual reference literature and which I will elaborate more on later).<sup>xxx</sup>

Joel Cummings, Lara Cummings, and Linda Frederiksen evaluate virtual reference in very general terms, asking whether users prefer chat reference to other sources of information. The authors distributed questionnaires to patrons at an academic library. Results showed that although students responded positively to the idea of potentially using virtual reference for information needs, very few actually used it.<sup>xxxi</sup> Possible explanations cited to explain this phenomenon include lack of awareness of the service's existence, limited hours of operation for the service, and the mindset that online chat was more appropriate for "personal use" than information seeking.<sup>xxxii</sup>

Kate Davis' findings regarding the usage of chat reference contrast sharply with those reported by Cummings, Cummings, and Frederiksen. Davis discusses the results of a six month trial of an instant message virtual reference system used in the National Library of Australia, concluding that current system architecture is sufficient for small-scale service, but that greater functionality is needed to support the large demand that appears to exist.<sup>xxxiii</sup> She also finds that users of the service demonstrated high levels of satisfaction, with ninety-one percent rating the service as "very good" or "excellent."<sup>xxxiv</sup> This type of result probably needs to be taken with a grain of salt, however, as researchers such as Ann Bristow have noted that users tend to be "overly positive" when evaluating reference quality.<sup>xxxv</sup>

Other researchers have more complex ways of evaluating virtual reference interactions. Pat Barbier and Joyce Ward examine Florida's Statewide Virtual Reference Desk using both patron surveys and a workgroup made up of librarians who analyzed

chat transcripts. The authors provide a six item list of criteria the group used to evaluate the transcripts, including accuracy, the presence of a reference interview, efficiency, and the use of appropriate sources.<sup>xxxvi</sup> Since most evaluative work on chat reference focuses on accuracy and/or user satisfaction, Barbier and Ward's methodology deserves special attention. They are also two of the only researchers to look specifically at the importance of efficiency in the virtual reference interview.

White, Abels, and Kaske report on a study designed to evaluate chat reference from the user's perspective. The study was unobtrusive, as trained questioners pretended to be virtual reference clients and asked a set of questions in two settings (one public library and one academic library).<sup>xxxvii</sup> White's results suggest that answer accuracy may be higher for virtual interactions and that using different types of questions may be a useful strategy for the reference interview.<sup>xxxviii</sup> This research builds on the previous work White had done using Graesser's typology of questions; although she does not use it as an analytical framework for this article, it is clear that she believes question types should be an important evaluative measure for virtual reference interactions.

Marie Radford discusses the results of a pilot study which examined forty-four transcripts nominated for an exemplary virtual reference award and two hundred forty-five transcripts randomly chosen from Maryland's statewide virtual reference service. Citing communication theory, Radford discusses barriers to effective communication between patron and librarian. She concludes that barriers created by patrons, such as rudeness, tend to differ greatly from those created by librarians, such as "negative closure" (tactics used by librarians to end a reference interview, even when an adequate answer to the information need has not been provided).<sup>xxxix</sup> Radford further suggests that

interpersonal strategies useful in face-to-face reference interactions also work (sometimes with important modifications) in the virtual realm.<sup>xl</sup> For example, the librarian can aid in “rapport building” through the use of informal language and conventions which mirror the patron’s tendencies.<sup>xli</sup>

Some scholars have focused on concrete, established guidelines as a way to evaluate chat reference quality. The principles most commonly used in these assessments are the Reference and User Services Association’s Guidelines for Behavioral Performance of Reference and Information Service Providers. Ronan, Reakes, and Ochoa examined a random sample of fifty transcripts from virtual reference services across the country, finding that librarians frequently fail to conduct a reference interview according to RUSA principles.<sup>xlii</sup> Zhuo et al. applied these same guidelines to chat transcripts taken from a library at Central Missouri State University and found numerous areas for improvement, most notably concerning response time on the part of reference librarians.<sup>xliii</sup>

### **Open questions**

While a substantial amount of literature exists on both virtual reference and open questions, there is very little published research that examines the effects of open questioning on different parameters of the reference interview. Mary Jo Lynch was one of the first scholars to distinguish between open and closed questions and suggest that this distinction be used as a way to evaluate the performance of the reference librarian, though her analysis appears well before the advent of virtual reference.<sup>xliv</sup>

Patricia Dewdney has written extensively on the importance of open (or neutral) questions in the reference interview. She first suggested open questioning as a viable approach to conducting the reference interview in 1986.<sup>xlv</sup> Dewdney elaborated on this idea two years later, arguing that the reference librarian can use open questions to help the patron better describe his information needs.<sup>xlvi</sup> In her later work, Dewdney collaborated with Gillian Michell on two articles. The first argues for the use of open questions in the reference interview to combat misunderstandings between patron and librarian,<sup>xlvii</sup> while the second analyzes how librarians use “why” questions during reference interactions.<sup>xlviii</sup> Kalvee extends this line of thought, citing open questions as an important training tool for librarians.<sup>xlix</sup>

Several authors have written manuals on how to conduct the reference interview. The most exhaustive of these manuals (and the one with the best explication how to use open questions) is written by Catherine Sheldrick Ross, Kirsti Nilsen, and Patricia Dewdney. The authors offer three specific situations when open questions may be especially beneficial: when the librarian needs to hear an information need in the patron’s own words, when the librarian wants to encourage the patron to talk more, and when the librarian is unsure of something and wants to avoid making assumptions about the patron’s needs.<sup>1</sup> The authors also assert that open questions are typically preferable to closed questions in the reference interview, since open queries allow the librarian to give up control of the discussion and encourage elaboration from the patron.<sup>li</sup> Among the especially alarming findings is Dewdney’s research, which has shown that in eighty percent of reference interactions, either no open questions are asked at all or the open questions are quickly changed by the librarian into closed questions (the example given is

“What would you like to know about antique dolls? The price?”).<sup>lii</sup> Also emphasized is the utility of open questions in conjunction with Brenda Dervin’s sense-making methodology, since open questions can help the librarian determine the patron’s situation (the context from which the information need arises), gaps in understanding, and uses (ideas or sources which help the patron bridge these gaps).<sup>liii</sup>

## **Methodology**

### **Operational definitions**

For the purposes of this experiment, “virtual reference interview” refers to a real-time, electronic reference (or “chat”) interaction between a librarian or other staff member at UNC’s Davis Library and an online patron using an instant message chat service. “Open questions” mean questions that do not limit the range of potential answers given by a patron. For example, “Are you looking for books or magazines?” is a closed question because its structure limits the patron’s responses to either “books” or “magazines.” A question like “What type of sources are you looking for?” is an open question because it allows the patron to give any response that he sees fit. Although I use the term “reference librarian” in my research hypothesis, this can refer to an actual reference librarian or any employee who conducts a virtual reference interview. I use the term both for convenience and because the results of this experiment have the largest practical implications for reference librarians. Finally, “efficiency” refers to the overall length of the interview, as measured by the total number of interactions between patron and reference librarian. An interaction is defined as one question by either party in the interview and the resultant answer given by the other party.

### **Setting and procedure**

The setting for this study was Davis Library at the University of North Carolina at Chapel Hill. This experiment did not involve interaction with human subjects. Rather, I studied and analyzed transcripts of virtual reference interactions resulting from the use of the online “Ask a Librarian” instant message service at Davis Library. I asked Pamela

Sessoms, a reference librarian at the library, to provide me with a sample of fifty transcripts of virtual reference interviews that took place during the Spring 2008 semester. The sample was random, with one caveat: I asked her to exclude ready reference queries, since these usually do not necessitate a reference interview at all (i.e. a patron asks what years Abraham Lincoln served as President, and the reference librarian provides a straightforward answer after consulting a source such as an encyclopedia). I chose to leave out these questions because, unlike other reference interactions, they do not require any kind of in-depth research on the part of the librarian. Interactions which initially appear to be ready reference and end up being more complex (for example, a patron asking a question about Lincoln's years in office and, after receiving an answer, asking a more detailed question about his actions during the Civil War) were not excluded, however.

To eliminate "ready reference" queries, Mrs. Sessoms and I selected only files from Spring 2008 which were two kilobytes or larger in size. We also eliminated files from patrons who used instant messaging services such as America Online and Yahoo! so that the transcripts used for analysis would be easier to anonymize. We were left with our raw data set, a total of 760 transcripts. Next, we copied these transcripts into a new directory, organized them by date, and output a text file of the filenames and file creation dates. We then input this text file into Excel, thus giving us a row number which uniquely identified each transcript. Using the random number generator at <http://random.org>, we created a sequence of random numbers between one and 760 that allowed us to randomly select transcripts from the list created in our Excel spreadsheet.<sup>liv</sup>

Finally, I matched each random number generated with its counterpart on the

spreadsheet and read the corresponding text file. If the interactions recorded in the text file were appropriate for this experiment, the file was saved. If not, the file was discarded. I then moved on to the next random number generated and repeated the process. While the size restriction (two kb or greater) on files eliminated most “ready reference” questions, it was also necessary to discard transcripts for a variety of other reasons. An explanation of all the reasons why transcripts were excluded from this study is included below, under “Reasons for discarding transcripts.” Once I had a final data set of fifty transcripts, I counted both the number of open questions and the total number of interactions in each transcript. I then divided the number of open questions by the total number of interactions, thus giving me an efficiency value for each interview (for example, a reference interview with five open questions asked by the reference librarian and twenty total interactions would result in an efficiency value of 0.25 ( $5/20=0.25$ )). If my research hypothesis was correct, interviews which contained more open questions would also yield higher efficiency values.

### **Reasons for discarding transcripts**

Once I began reading the transcripts, it became clear that many virtual interactions in this setting were not appropriate for this experiment. For example, I rejected several transcripts because they consisted of the librarian simply referring the patron to another source for help (i.e. the user asks a question related to law and the librarian gives him contact information for the law library). I also rejected interactions which consisted of only a straightforward directional question or simple question about

library policy. One patron asked if he needed a library card in order to check out a book. Once the librarian replied “Yes,” the interaction was over.

I also did not use transcripts which contained any simple “yes or no” question. For example, one user provided the title and ISBN number of a book and simply wanted to know if Davis Library had it in stock. Another patron asked for the name of the Head of Personnel. I do not think throwing out these transcripts reflects any kind of bias on my part. Rather, these are the equivalent of “ready reference” queries, questions which require a brief answer (and for which question negotiation is not necessary). In fact, using open questions in many of these circumstances could be considered highly inappropriate (imagine a patron asking for a library’s hours of operation and the librarian responding “Why would you like to have this information?”).

## Results

The transcripts had less variation among them in terms of open question content than I expected. Of the fifty transcripts analyzed, forty-eight contained either zero, one, or two open questions (see Table One).

Table One—Summary of Results

Number of Open Questions	Average No. of Interactions	Average Efficiency Value
0	6.44	0
1	4.62	0.265
2	5.11	0.459
4	7	0.571
5	11	0.455

Eighteen transcripts contained no open questions (making this data set the second largest). The highest number of interactions for any transcript in this group was twelve, while the lowest was one. The mean number of interactions for the group was 6.44. The mode for number of interactions in the group was four, with a total of five transcripts matching this criterion. Because efficiency value is calculated by dividing number of

open questions by total number of interactions, all transcripts in this set had an efficiency value of zero.

The largest data set among the fifty samples I studied were transcripts containing exactly one open question. Twenty-one transcripts (or forty-two percent of the total sample) contained only one open question. In this group, two transcripts tied for the highest number of interactions with nine, while three transcripts contained only two interactions (the lowest number in the group). The mean number of interactions in this group was 4.62. The modes for number of interactions among this cluster were three and five, both of which occurred in five transcripts. The highest efficiency value in this set was 0.5 (shown by three different transcripts), while two transcripts had efficiency values of 0.111, the lowest value. The mean efficiency value for this cluster was 0.265, and the most commonly occurring values were 0.333 and 0.2, both of which appeared in five transcripts.

In nine transcripts, the librarian used exactly two open questions. The highest number of interactions in this set was twelve, while the lowest was three (demonstrated by two transcripts). The mean number of interactions in this group was 5.11, and the mode was four. The highest and lowest efficiency values for this set were 0.667 (two transcripts) and 0.167, respectively. The mean efficiency value in this data set was 0.459, with 0.5 being the most commonly occurring value.

Only two transcripts out of fifty did not have either zero, one, or two open questions. One transcript contained four open questions and seven total interactions (with an efficiency value of 0.571), while the other had five open questions and eleven total interactions (with an efficiency value of 0.455).

## Discussion

### Research Hypothesis

My research hypothesis was that interviews containing a greater number of open questions would be more efficient than interviews with a larger proportion of closed questions. Unfortunately, the tight clustering of the data (with ninety-six percent of the transcripts containing zero, one, or two open questions) makes establishing a correlation between the use of open questions and efficiency very difficult (and certainly not significant in any statistical sense). I initially hypothesized that transcripts with more open questions would also contain fewer total interactions. This turned out to be incorrect, as transcripts containing one open question contained an average of 4.62 interactions while those with two open questions averaged 5.11 total interactions. Interviews with no open questions, however, did also contain the highest average of total interactions (6.44), a result that matches the trend I predicted in the research hypothesis.

I also hypothesized that transcripts with more open questions would have higher efficiency ratings, and this held true for the interactions I examined. Transcripts with one open question had a mean efficiency value of 0.265, while those with two open questions had a value of 0.459. Since there were only two transcripts with more than two open questions asked by the librarian, it is impossible to determine with any certainty whether or not efficiency values continue to increase in proportion to the number of open questions.

### **Potential explanations for results**

Obviously, there are numerous possible reasons why my research hypothesis was incorrect. First of all, the sample size used for this study was necessarily (in terms of available resources) small; therefore, its results and their applicability to other situations is limited. It is also possible that there is a better way to measure efficiency than what I used for this study's methodology. No literature exists on the relationship between open questions and virtual reference interview efficiency, so the experiment design was my own. The efficiency value, which I arrived at by dividing the number of open questions in a transcript by the total number of interactions that took place, was my best effort to quantify interview efficiency. However, there may be more accurate or meaningful ways of measuring this variable.

Another possibility is that open questions are not, in fact, as necessary to conducting a good virtual reference interview as the literature would suggest. In the course of this study, I found information requests for which the use of open questions would be wholly inappropriate and perhaps irksome to the patron. For example, in one exchange, the librarian determined that the library did not have any of the materials a patron wanted, so she walked the patron through the interlibrary loan process. From the beginning, the patron's information need was well-defined and clear. She had a list of sources and simply needed to know if the library carried them. At no point would it have been appropriate for the librarian to ask open questions in this interview, considering that the patron knew exactly what she wanted and then needed to be walked through the process of completing an interlibrary loan. In fact, it is entirely possible (based on my limited experience with these transcripts) that many of the queries submitted to virtual

reference services do not require the use of open questions by the librarian. If it is obvious that a patron has already conducted a great deal of research herself and is contacting the librarian for help with a specific issue, then it is the librarian's job to help the patron with that issue.

Consider this exchange from one of the transcripts I examined:

**Patron:** Is it possible to view the Duff Green Papers online?

**Librarian:** hey this is xxxx—i'm assuming you want to view the duff green papers from unc's manuscripts department?

**Patron:** yes

**Patron:** or do you only have microfiche available?

Again, this is an example of an interview in which, in my opinion, the use of open questions would be rather unwelcome. The librarian could have responded to the patron's initial query with the open question "What are you using the Duff Green Papers for?" While this question might help the librarian learn more about the patron's information need, it also seems unavoidably meddlesome. Based on this example, the use of open questions and their appropriateness in a given situation should typically rely on good judgment, rather than being a tactic the librarian always uses regardless of the patron's query.

Furthermore, in many of the transcripts, the patron took on a more dominant role in the exchange than one might expect in a traditional face-to-face reference interview, asking questions and directing the flow of the interview more than the librarian. Since a great deal of face-to-face reference literature has documented the tendency of patrons to be intimidated during reference interviews, it makes sense that they might feel more

emboldened to take an active role in a virtual interview, given the anonymity that chat communication provides.

I also noted in several interviews that the librarian used surrogates for open questions which seemed just as effective as the open questions themselves:

**Patron:** hello.

**Librarian:** Hi there! How can I help?

**Patron:** I am trying to write a paper on the evolution of the census.

**Librarian:** Tell me

**Patron:** I need to pick a few cities to focus on, and I was wondering how I would find the actual census info

Here, the librarian says “Tell me” as a way of getting the patron to reveal more about exactly what information she needs. “Tell me” thus serves as a surrogate for the open question “What else can you tell me about your paper?” While not technically an open question, the librarian’s statement accomplishes the same purpose as one. While it is unlikely that a librarian would ever use this short statement in a face-to-face encounter, communication in a virtual medium is understood on both sides to be less formal, so shorter statements that might seem rude in person can be completely acceptable in this setting.

### **Future research**

There are a number of research avenues relevant to this study that have yet to be explored in-depth. As I mentioned in the literature review, the library science literature lacks significant scholarship on how the use of open questions affects various parameters

of the virtual reference interview. Because open questions are an accepted part of the face-to-face literature (as well as an integral tool for the application of Dervin's sense-making methodology to the reference interview), one might assume that research related to face-to-face interviews also holds true for the virtual realm. However, after reading the transcripts in my study, I am convinced that further research needs to be done to determine whether this is actually the case.

Specifically, future research might examine whether open questions affect accuracy or patron satisfaction in virtual reference interactions. Based on the research in my study, I think it would also be helpful to analyze whether open questions negatively impact certain interview parameters, depending on the type of query they are used to address. Also, I would be interested in seeing whether virtual strategies which serve as surrogates for open questions have the same desirable effects that open questions do in face-to-face interviews. While I found evidence in my research that surrogates can be equally effective, seeing whether this holds true in other settings and for different types of information needs is a promising research avenue.

## **Conclusions**

Virtual reference use has increased drastically in the last decade, and the research literature associated with it has grown a great deal as well. While this literature initially dealt with the logistical and technical issues associated with implementing a virtual reference program in the library, it has shifted to a focus on the evaluation of virtual reference and the importance of the user's perspective. Still, virtual reference literature is in a relatively early phase of development, so the effectiveness of various strategies

remains uncertain and clear-cut “best practices” for virtual librarians have yet to be elucidated.

I analyzed fifty transcripts from Davis Library’s “Ask a Librarian” service at the University of North Carolina to determine whether a correlation exists between the librarian’s use of open questions and the overall efficiency of the reference interview. Though the results of my research were ultimately inconclusive, there are signs that open questions can have beneficial effects on different aspects of the virtual reference interview. It is my hope that my research will motivate others to further examine the utility of open questions in a virtual environment.

## NOTES

- <sup>i</sup> Vibiana Bowman, "The Virtual Librarian and the Electronic Reference Interview," *Internet Reference Services Quarterly* 7, no. 3 (2002): 4.
- <sup>ii</sup> Nicholas Belkin, "Anomalous States of Knowledge as a Basis for Information Retrieval," *The Canadian Journal of Information Science* 5 (1980): 136.
- <sup>iii</sup> David F. Kohl, *Reference Services and Library Instruction: A Handbook for Library Management* (Santa Barbara: ABC-CLIO, 1985), 193.
- <sup>iv</sup> See, for example, Jeffrey Pomerantz, "A Conceptual Framework and Open Research Questions for Chat-Based Reference Service," *Journal of the American Society for Information Science and Technology* 56, no. 12 (2005): 1288-1302. Pomerantz argues "that it is a fallacy that reference conducted at a physical desk and reference conducted online are fundamentally different" (1299).
- <sup>v</sup> Kirsti Nilsen and Catherine Sheldrick Ross, "Evaluating Virtual Reference from the Users' Perspective," *The Reference Librarian* 46, nos. 95/96 (2006): 74.
- <sup>vi</sup> Nilsen and Ross, "Evaluating Virtual Reference," 75.
- <sup>vii</sup> Precise definitions for all research terms are provided in the Methodology section.
- <sup>viii</sup> Pomerantz, "A Conceptual Framework," 1298-99.
- <sup>ix</sup> Joshua Boyer, "Virtual Reference at the NCSU Libraries: The First One Hundred Days," *Information Technology and Libraries* 20, no. 3 (2001): 122-28.
- <sup>x</sup> Steve Coffman, ed., *Going Live: Starting and Running a Virtual Reference Service* (Chicago: American Library Association, 2003).
- <sup>xi</sup> Karen Ciccone and Amy VanScoy, "Managing an Established Virtual Reference Service," *Internet Reference Services Quarterly* 8, nos. 1/2 (2003): 95.
- <sup>xii</sup> Marlyse MacDonald, "Planning, Implementing, and Using a Virtual Reference Service," *Medical Reference Services Quarterly* 22, no. 2 (2003): 75.
- <sup>xiii</sup> Tammy Bobrowsky, Lynne Beck, and Malaika Grant, "The Chat Reference Interview: Practicalities and Advice," *The Reference Librarian* 89/90 (2005): 179-91.
- <sup>xiv</sup> Joseph Straw, "Using Canned Messages in Virtual Reference Communication," *Internet Reference Services Quarterly* 11, no. 1 (2006): 41-42.
- <sup>xv</sup> Straw, "Using Canned Messages," 43-44.
- <sup>xvi</sup> Michelle Kazmer, Gary Burnett, and Michael Dickey, "Identity in Customer Service Chat Interaction: Implications for Virtual Reference," *Library and Information Science Research* 29, no. 1 (2007): 26.
- <sup>xvii</sup> Kazmer, Burnett, and Dickey, "Identity in Customer Service," 25.
- <sup>xviii</sup> Marilyn Domas White, "Questions in Reference Interviews," *Journal of Documentation* 54, no. 4 (1998): 451.
- <sup>xix</sup> White, "Questions," 460-61.
- <sup>xx</sup> *Ibid.*
- <sup>xxi</sup> Jo Kibbee, "Librarians without Borders? Virtual Reference Service to Unaffiliated Users," *The Journal of Academic Librarianship* 32, no. 5 (2006): 471.
- <sup>xxii</sup> *Ibid.*
- <sup>xxiii</sup> Pnina Shachaf and Mary Snyder, "The Relationship between Cultural Diversity and User Needs in Virtual Reference Services," *The Journal of Academic Librarianship* 33, no. 3 (2007): 365.
- <sup>xxiv</sup> *Ibid.*
- <sup>xxv</sup> Kirsti Nilsen, "The Library Visit Study: User Experiences at the Virtual Reference Desk," *Information Research* 9, no. 2 (2004), <http://informationr.net/ir/9-2/paper171.html> (accessed September 4, 2008).
- <sup>xxvi</sup> Nilsen, "The Library Visit Study," under "User perceptions of success."
- <sup>xxvii</sup> Nilsen, "The Library Visit Study," under "Reference behaviour resulting in user dissatisfaction."
- <sup>xxviii</sup> Kirsti Nilsen and Catherine Sheldrick Ross, "Evaluating Virtual Reference from the User's Perspective," *The Reference Librarian* 46, nos. 95/96 (2006): 76-77.
- <sup>xxix</sup> Kirsti Nilsen, "Comparing Users' Perspectives of In-person and Virtual Reference," *New Library World* 107, nos. 3/4 (2006): 101.
- <sup>xxx</sup> *Ibid.*

- xxx<sup>i</sup> Joel Cummings, Lara Cummings, and Linda Frederiksen, "User Preferences in Reference Services: Virtual Libraries and Academic Libraries," *Portal: Libraries and the Academy* 7, no. 1 (2007): 91.
- xxx<sup>ii</sup> Cummings, Cummings, and Frederiksen, "User Preferences," 94.
- xxx<sup>iii</sup> Kate Davis, "AskNow Instant Messaging: Innovation in Virtual Reference," *Australian Library Journal* 56, no. 2 (2007): 173.
- xxx<sup>iv</sup> Davis, "AskNow Instant Messaging," 168.
- xxx<sup>v</sup> Cummings, Cummings, and Frederiksen, "User Preferences," 85.
- xxx<sup>vi</sup> Pat Barbier and Joyce Ward, "Ensuring Quality in a Virtual Reference Environment," *Community and Junior College Libraries* 13, no. 1 (2004): 58.
- xxx<sup>vii</sup> Marilyn Domas White, Eileen G. Abels, and Neal Kaske, "Evaluation of Chat Reference Service Quality," *D-Lib Magazine* 9, no. 2 (2003), under "Methodology," <http://www.dlib.org/dlib/february03/white/02white.html> (accessed September 4, 2008).
- xxx<sup>viii</sup> White, Abels, and Kaske, "Evaluation of Chat," under "Conclusions."
- xxx<sup>ix</sup> Marie Radford, "Encountering Virtual Users: A Qualitative Investigation of Interpersonal Communication in Chat Reference," *Journal of the American Society for Information Science and Technology* 57, no. 8 (2006): 1055.
- xl Radford, "Encountering Virtual Users," 1046.
- xli Radford, "Encountering Virtual Users," 1055.
- xlii Jana Ronan, Patrick Reakes, and Marilyn Ochoa, "Application of Reference Guidelines in Chat Reference Interactions: A Study of Online Reference Skills," *College and Undergraduate Libraries* 13, no. 4 (2006): 18.
- xliii Fu Zhuo et al., "Applying RUSA Guidelines in the Analysis of Chat Reference Transcripts," *College and Undergraduate Libraries* 13, no. 1 (2006): 87.
- xliv Mary Jo Lynch, "Reference Interviews in Public Libraries," *Library Quarterly* 48, no. 2 (1978): 119-42.
- xl<sup>v</sup> Patricia Dewdney, "Neutral Questioning: A New Approach to the Reference Interview," *Reference Quarterly* 25, no. 4 (1986): 506-13.
- xl<sup>vi</sup> Patricia Dewdney, "The Effective Reference Interview," *Canadian Library Journal* 45, no. 3 (1988): 183-84.
- xl<sup>vii</sup> Patricia Dewdney and Gillian Michell, "Oranges and Peaches: Understanding Communication Accidents in the Reference Interview," *Reference Quarterly* 35, no. 4 (1996): 520-23, 526-36.
- xl<sup>viii</sup> Patricia Dewdney and Gillian Michell, "Asking 'Why' Questions in the Reference Interview: A Theoretical Justification," *Library Quarterly* 67.1 (1997): 50-71.
- xl<sup>ix</sup> Debbie Kalvee, "Successful Reference Training on a Shoestring," *Library Administration and Management* 10, no. 4 (1996): 210-13.

<sup>1</sup> Catherine Sheldrick Ross, Kirsti Nilsen, and Patricia Dewdney, *Conducting the Reference Interview: A How-To-Do-It Manual for Librarians* (New York: Neal-Schuman Publishers, Inc., 2002), 85.

<sup>ii</sup> *Ibid.*

<sup>iii</sup> Ross, Nilsen, and Dewdney, *Conducting the Reference Interview*, 87.

<sup>iiii</sup> Ross, Nilsen, and Dewdney, *Conducting the Reference Interview*, 94.

<sup>liv</sup> The steps described in this paragraph were Mrs. Sessom's idea, informed by her previous experience aiding students in conducting research. The use of the Excel spreadsheet made transcript selection much easier than it could have been, and I am very grateful for the input she offered regarding the methodology we used.

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