

# **Cordial Connections: Evaluating Virtual Reference from User, Non-User, and Librarian Perspectives using the Critical Incident Technique**

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**Abstract** Live chat virtual reference services (VRS) have become mainstream access points for seekers of online help from librarians over the past 10 years (Sloan, 2006). This paper reports results from the final phases of a multi-year grant project and compares perceptions of VRS users, non-users, and librarians by using the Critical Incident Technique (CIT) (Flanagan, 1954). Results indicate that VRS users and non-users find the following to be important to perceptions of successful encounters: accuracy of answers/information, in addition to the librarian demonstrating knowledge of sources and systems, a positive attitude, and good communication skills. All groups indicate that a combination of relational and content factors is critically important to perceptions of what determines successful and unsuccessful reference interactions. Users and non-users were found to highly value the attitude and personal qualities of the VRS librarians, their knowledge, as well as their ability to quickly and accurately provide requested information. Librarians greatly value the positive attitudes of users and were attuned to negative attitudes of users in recounting negative CIs. Librarians were also interested in the provision of information in positive CIs, and reported a high number of CIs in which lack of information caused an encounter to be unsuccessful.

**Keywords:** Virtual Reference Services, Digital Reference, Interpersonal Communication, Chat Reference, Critical Incident Technique

## **1.0. Introduction**

Virtual Reference Services (VRS) have become common offerings on library websites as a complement to the increasing number and variety of electronic resources. Sloan (2006) has reported that live chat has been offered for over 10 years as the increasingly technologically astute users have found these VRS to be convenient and effective ways to meet their information needs. Portability and remote access has hastened the growth of remote library use from the office, classroom, or home. This research is part of a large grant project "Seeking Synchronicity" which is evaluating live chat VRS from librarian, user, and non-user perspectives, funded by the Institute for Museum and Library Service (IMLS), Rutgers University, and OCLC. As part of this project online surveys were conducted with these three cohorts. In addition to collecting demographic and quantitative data, the Critical Incident Technique (CIT) (Flanagan, 1954) was used to elicit qualitative data to find out what the cohort groups perceived to be the most successful and desirable aspects of VRS along with the most unsuccessful, problematic aspects. The results of this CIT analysis are reported here. One significant contribution of this

work is the inclusion of an analysis of the perceptions of non-users of VRS, which has received little attention in the literature.

## 2.0. Literature Review and Theoretical Perspective

This research uses the theoretical foundations of Watzlawick, Beavin, and Jackson (1967) and Goffman (1959, 1967). These scholars have identified the dual nature of messages as having both content and relational dimensions. The perspective of Watzlawick et al. (1967) allows this research to focus on the reality that more than correct answers to reference questions are being communicated in virtual reference (VR) encounters. Along with the content information that is provided in response to a user's request, librarians are also communicating relational information in their verbal and nonverbal expression that has additional meaning for library users.

Watzlawick et al. defined content dimensions as the "report" aspect of a message indicating *what* is being said, or the information that is being provided. On the other hand, relational dimensions are known as the "command" aspect of a message, that are reflected in *how* the message is said and how it is interpreted within the context of the communication. Thus content dimensions are seen to center on the information exchange, while relational dimensions center on participants' feelings and attitudes, which define the relationship between participants in an encounter. Relational messages in VRS interactions are conveyed through the text of transcripts that indicate approachability, rapport building, impression management, and empathy. They influence the ability of the librarian to establish a positive relationship with the user and successfully clarify the question both to understand the user's information need and to provide an appropriate response.

Radford (1993, 1996, 1999, 2006a) found that relational messages are extremely important in users' and librarians' perceptions of success in face-to-face (FtF) reference interactions. For some users, relational aspects were perceived as being more important than their receipt of information. Furthermore, if relational messages were remembered as sour or problematic, the user may have left the reference interaction with a negative impression of the librarian and/or the library experience in general, even when the correct information or instruction was provided. Users reported relational aspects as being crucial to success of the interaction more frequently than the librarians. Librarians, in contrast, were found to be more concerned with the quality of the information exchanged (Radford, 1993, 1996, 1999).

A second, closely related theoretical framework also used in this research comes from sociologist Erving Goffman, who believes that people shape their identity in the choices that are made in how they present themselves to others in interpersonal encounters. This publicly constructed identity is conceptualized as complex, fluid, and dependent on context as opposed to being fixed. In a seminal work, Goffman (1967) introduced the idea of face-work and how it functions in all human encounters and detailed its functions and types. He asserts that: "Much of the activity occurring during an encounter can be understood as an effort on everyone's part to get through the occasion and all the unanticipated and unintentional events that can cast participants in an undesirable light, without disrupting the relationship of the participants" (p. 41). Face-work is characterized as rooted in ritual and as a contract participants share to protect the face of others as well as of themselves. It provides a powerful frame for analysis to increase understanding of the interpersonal dynamics of live chat VR. Because live chat sessions automatically generate and archive an artifact (i.e., a complete transcript of the interaction),

evidence of the participants' face-work, located in the flow of the chat event, can be unobtrusively analyzed by examination of these transcripts.

Goffman's work has been used to explore interactions in school libraries (Chelton, 1997), academic libraries (Radford, 1993; Radford, 1999), and VRS encounters (Radford, 2006b). Interpersonal rituals (such as greetings and closings) and acts of deference have been identified as integral to successful FtF reference encounters (Chelton, 1997; Radford, 1993, 1999, 2006b). VRS users and librarians frequently perform ritual greetings and closings. They also express deference in chat by using polite expressions, offering repairs when there is a miscommunication (with an apology, explanation, or self-correction), and using self-deprecating remarks (Radford, 2006b). Mon (2005) has provided a summary of the concept of "face threat," which involves instances in which social gaffes, mistakes, and misunderstandings cause people to feel threatened, insulted, or hostile. She discusses face threat and repair strategies and how Goffman's work can be used to enhance the understanding of library interactions.

Westbrook (2007) extended Goffman's approach in an unobtrusive study of formality in VRS using politeness theory and face threat in reviewing 402 chat transcripts from a public university over one academic year. Westbrook found that the VRS librarians and users employed a number of text-based techniques to lower or raise formality levels including: abbreviations, self-disclosure, humor, apologies, and self-deprecation. Relationship development and ritual politeness behavior were deemed important in successful encounters.

As can be seen in this brief review, there is a small but growing body of research that is addressing interpersonal/relational aspects of VRS. Much is still left to be discovered and this research builds upon the extant literature and techniques in addressing several lingering questions. The theoretical perspectives of Watzlawick, Beavin, and Jackson (1967) and Goffman (1959, 1967) provide frameworks for a content analysis of the critical incidents, collected from VRS users, non-users, and librarian providers to address the following research questions:

- What are the critical factors that determine users' and librarians perceptions of success and satisfaction in VRS?
- How do users and librarians differ in their perception of factors critical to their perceptions of success and satisfaction in VRS?
- What is the relationship between information delivered/received (task/content) and interpersonal (relational) dimensions of VRS in determining perceptions of satisfaction/success?

### **3.0. Method**

The CIT (Flanagan, 1954) has been successfully used in many social science fields, including in the Library and Information Science (LIS) context (see Radford, 1993, 1996, 1999, 2006a, 2006b). A doctoral dissertation by Ozkaramanli (2005) used the CIT to study the perceptions of librarians of quality VRS. Critical Incidents (CIs) were collected through interviews with forty librarians from ten academic libraries offering chat VRS. Findings revealed that librarian and user attitudes, question negotiation, and availability of resources were critical to perceived success. Ozkaramanli provides a detailed explication of the CIT and her data analysis technique. Radford (2006a) also provides a step-by-step guide to using CIT and reviews additional LIS research that has employed this technique.

### 3.1. Recruitment of Participants

The recruitment process used several different methods to access a diverse population for participation in the online surveys. Librarians were recruited by postings on professional listservs, which provided communication to the national and international librarians. Additionally postings were made on VR librarian personal networks, and public announcements at conferences were made to encourage librarians to participate. Non-user participants were recruited via college listservs and flyers that were posted at two large universities; one in New Jersey and another in Ohio, both based in suburban settings. Professional librarian listservs were used to seek help in recruiting teenaged non-users. Public libraries in Ohio and Colorado aided the recruitment process by posting a link to our research on their homepages. Personal connections with adults, as well as school and public librarians were used in an effort to increase the representation of teenagers and adults over college age. The user population was the most difficult to recruit, as the VR process is constructed to shield user's identities, so targeted recruitment was not viable. The largest VRS network, OCLC's QuestionPoint, posted advertisements on their homepages and listserv. Many school, public, and academic libraries also distributed recruitment flyers. State-wide VR consortia asked users to participate in chat closing scripts and one state-wide sent a recruitment e-mail directly to users of their service.

### 3.2. Data Collection

Participants completed web-based online surveys which contained two CI questions. Librarian and user participants were asked to describe an experience in which they felt that a VR encounter achieved (or did not achieve) a positive result. Librarians were asked to "Think about one experience in which you felt a chat reference encounter *achieved* (or *did not achieve*) a *positive result*, to describe the circumstances and nature of the reference query, and to describe why you felt this encounter was a success (was not a success)." Users were also asked "Did the chat format help your experience to be successful/unsuccessful? If yes, how?"

Non-users were asked two CI questions about their successful and unsuccessful FtF reference encounters, since they have not yet had experience with virtual reference (VR). Similar to the librarians and users, they were asked to "Think about one experience in which you felt you achieved (did not achieve) a *positive result* after seeking library reference services in any format," to "describe the circumstances and nature of your question", and to "describe why you felt the encounter was successful/unsuccessful." They were also asked: "Did the format (face-to-face, telephone, email, or text messaging) help your experience to be successful/contribute to your lack of success? If yes, how?"

### 3.3. Data Analysis

Qualitative analysis of each CI involved repeated reading, identification, comparison, and categorization of themes. The categories and coding method were developed in a previous study (see Radford, 1993, 1999) and applied to VRS in prior research (Radford, 2006b) and in earlier phases of the current grant project (Connaway & Radford, 2007; Radford & Connaway, 2007).

The CI coding scheme possesses a hierarchy of codes for both positive (Facilitators) and negative (Barriers) relational and content elements. Relational Facilitators are defined as: interpersonal aspects of the chat conversation that have a *positive* impact on the librarian-client interaction and that *enhance* communication. Relational Barriers are defined as: interpersonal aspects of the chat conversation that have a *negative* impact on the librarian-client interaction and that *impede* communication (Radford, 2006b).

Negative CIs were coded using the Barrier themes while positive CIs were coded using the Facilitator themes. Each CI was sorted into appropriate categories and also coded as having primarily “relational,” primarily “content,” or an equal combination of “both” aspects (see also Radford 1993, 1999, 2006a, 2006b). See Appendix A for the complete *Expanded Critical Incident Coding Scheme for Face-to-Face and Virtual Reference and Explanation of Category Placement*. Three coders were involved in data analysis with a preliminary intercoder reliability of 90% that went to 98% after discussion to resolve differences. Coding was done both manually and by using NVivo qualitative software (<http://www.qsrinternational.com>).

#### 4.0. Results

Tables 1-6 show the demographics for online survey participants. The participants were predominantly female and Caucasian, from academic and public libraries, and from urban and suburban locales. Librarians as a group were older than the users and non-users which is to be expected as there was effort made to recruit teenage and college users and non-users because of results from earlier phases of the research suggesting that their orientations toward reference services, and their information-seeking behaviors were different than older groups of users and non-users.

Table 1 Gender

<b>Gender</b>	<b>Librarians</b>	<b>Users</b>	<b>Non-users</b>
Female	132	85	125
Male	42	52	59
Unknown	1	0	0
Total	175	137	184

Table 2 Library Affiliation Type

<b>Library type</b>	<b>Librarians</b>	<b>Users</b>	<b>Non-users</b>
Academic	104	27	32
Public	54	92	108
School	0	15	44
Special	7	2	0
Consortium	2	0	0

Table 3 Ethnicity

<b>Ethnicity</b>	<b>Librarians</b>	<b>Users</b>	<b>Non-users</b>
Caucasian	160	107	131
Other	13	30	53

Table 4 Geographic Locale

<b>Geographic locale</b>	<b>Librarians</b>	<b>Users</b>	<b>Non-users</b>
Urban	94	38	67
Suburban	52	85	107
Rural	26	13	10

Table 5 Age of Librarians

Age	Librarians
21-30	34
31-40	39
41-50	50
51-60	41
61+	10

Table 6 Age of Users & Non-users

Age	Users	Non-users
12-18	26	60
19-28	23	62
29-45	51	29
46-65	33	29
65+	4	4

#### 4.1. CIT Analysis Results

From the 175 librarian online survey participants, 143 positive and 82 negative CIs were collected and analyzed. 102 positive and 100 negative CIs were collected and analyzed from the 184 non-users. From the 137 users, 124 positive and 71 negative CIs were elicited and analyzed. It should be noted that a portion of the CIs from librarians and non-users have not yet been analyzed and that these are preliminary results.

The CI coding scheme possess a hierarchy for both positive (Facilitators) and negative (Barriers) for relational as well as content elements as seen below in Tables 7-12. Negative CIs were coded using the Barrier themes, while positive CIs were coded using the Facilitator themes.

Table 7

	Positive Critical Incidents (CI)		
	Librarian (N=143)	User (N=124)	Non-User (N=102)
Relational	3	9	13
Content	56	74	53
Both	84	41	39
Total	143	124	102

Depending on the assigned codes, each CI was determined to have primarily “relational,” primarily “content,” or an equal combination of “both” aspects (see also Radford 1993, 1999, 2006a). As can be seen above in Table 7, for positive CIs, primarily content themes were more numerous for users and non-users, followed by incidents in which content and relational aspects were equally present. For librarians, incidents in which content and relational aspects were equally present were more numerous, followed by primarily content themes. To illustrate the differences among primarily relational, primarily content, and both aspects, the following representational CI examples from librarians are provided.

Primarily Relational CI – Librarian “The patron wanted to know what the laws or regulations regarding age of majority were as they pertained to her son's participating in an adult education program. Even though the child was a minor, the school insisted on maintaining student confidentiality when asked by the parent for help in helping her own child. The student was apparently placed there by the parents in an effort to provide him with the extra attention his learning disability required. Even though the patron did not receive a definitive answer, she (I think it was a she) knew that I had done a great deal of work for her, and more importantly, had cared.” (L OS 23390)

Primarily Content CI - Librarian “User was asking for home sale records and did not know the county in which the home was sold. Based on the address she provided, I searched the online records for two different counties. I was able to find the address in the 2nd database which had historical sales information loaded.” (L OS 18790)

Both Relational & Content - Librarian “I helped an older woman who was trying to write a term paper. She had very little experience in this and was amazed when I showed her how she could print articles from our databases. She thanked and thanked me. She was definitely converted to using our databases instead of just any Internet site. One more for our side!” (L OS 19092)

Table 8

	<b>Major Facilitators, Content Themes - Positive CI</b>		
	<b>Librarian<sup>1</sup> (N=143)</b>	<b>User (N= 124)</b>	<b>Non-User (N=102)</b>
Providing Information	125	113	96
Demonstrating Knowledge	16	12	16
Providing Instruction	50	11	30
Convenience/Multitasking/ Time Saving/Money Saving	11	21	29

1. Note that columns do not total to N because CIs can be coded into more than one theme.

The CI counts for major Facilitators, content themes can be seen above in Table 8. All three groups are highly interested in the Providing of Information, which is not surprising. There are a high number of counts for both librarians and non-users for Providing Instruction. For non-users, the second highest category is Instruction, followed closely by Convenience. Users rank Convenience much higher than Instruction. To illustrate the differences among the major Facilitators, content themes, the following representational CI examples are provided from the different types of participants.

Providing Information Theme – Librarian “User wanted to know how to cite PowerPoints in MLA style. It went well. I was able to find the answer online in a pretty short amount of time. The user was satisfied.” (L OS 20201)

Demonstrating Knowledge Theme – Non-User “I was looking for books on theoretical physics. My question was, ‘What would be the latest and most comprehensive book on quantum electrodynamics?’ I felt the encounter was successful because the librarian apparently had a background in physics. He was up to date in his physics knowledge and was aware of the latest books.” (N OS 98125)

Providing Instruction Theme - User "I was looking for achievements of [the] Celtic civilization. I needed one more category. I came out not with the answer, but the MEANS of finding the answer. ...I managed to find a topic on which there was SO much, I could hardly believe I missed it." (U OS 51182)

Convenience Theme – User "The chat format did help my experience to be successful because I was able to multi-task while the librarian did the search. If I was in a FtF situation, I may have gotten frustrated with the amount of time it took for the librarian to find what I needed and would have just said 'never mind.'" (U OS 43528)

Table 9

	<b>Major Facilitators, Relational Themes - Positive CI</b>		
	<b>Librarian<sup>1</sup> (N= 143)</b>	<b>User (N= 57)</b>	<b>Non-User (N=102 )</b>
Attitude	70	45	42
Relationship Quality	30	25	35
Approachability	1	0	17
Impact of Technology	0	2	4
Familiarity	4	0	3

1. Note that columns do not total to N because CIs can be coded into more than one theme.

The CI counts for major Facilitators, relational themes can be seen above in Table 9. All groups highly regarded a positive attitude on the part of the other. Relationship Quality was second for all groups. Non-users were much more likely to regard approachability as important. To illustrate the differences among the major Facilitators, relational themes, the following representational CI examples are provided from the different types of participants.

Attitude Theme – Librarian "Student gave immediate feedback that I was helpful and thanked me!" (L W 56249)

Relationship Quality Theme - User "The librarian was able to guide me through a research problem clearly and thoroughly, assisting me step-by-step. The librarian helped me step-by-step, instead of rushing me through, she was able to work slowly with me. Yes, because I was able to view a transcript of the results at the end of the chat." (U OS 25429)

Familiarity Theme – Librarian "I had a patron use chat to ask about connecting to Library databases. Due to my position, I was able to add the patron so he could connect. He then came back to ask for guidance in selecting appropriate articles. He returned a third time to be guided through finding what he could get online and what he needed to request via ILL. The patron went away satisfied that he could get what he needed. Also, he felt that he could ask for help when and where he needed help. He has returned at other times with other questions." (L OS 17592)

Table 10

	Negative Critical Incidents (CI)		
	Librarian (N=82)	User (N=71)	Non-User (N=100)
Relational	32	9	33
Content	23	47	52
Both	27	15	15
Total	82	71	100

Turning now to negative CIs, as can be seen in Table 10, above, relational dimensions played a much more significant role for librarians and non-users, while users remained largely focused on content issues.

Table 11

	Major Barriers, Content Themes - Negative CI		
	Librarian <sup>1</sup> (N= 82)	User (N=71 )	Non-User (N=100 )
Information (Lack of)	49	55	60
Lack of Knowledge	6	11	24
Instruction (Lack of)	0	0	9
Task Unreasonable	1	0	4

1. Note that columns do not total to N because CIs can be coded into more than one theme.

To illustrate the differences among the major Barriers, Content Themes, the following representational CI examples are provided from the different types of participants.

Information (Lack of, Time Pressure Sub-theme) - Librarian “The user had typed many questions and I could not help him or her with all of them. I picked one or two and then told them I had to help another customer. I had to end the call because I could not possibly answer all those questions. In the end, I referred them to ipl.org [Internet Public Library], but I think the customer was not happy I ended the call. They expected answers, not help locating the answers.” (L OS 71008)

Information (Lack of) Theme – User “I needed information on the West for a book a student was reading. The person did not listen to the question and gave the wrong information. The person did not listen to my needs and did not answer the question.” (U OS 33261)

Lack of Knowledge Theme – Non-User “She was only able to start the program, a step I already knew how to do. However, she was not knowledgeable about the software that was on the computers at the library.” (N OS 67314)

Instruction (Lack of) Theme – Non-User “I went to get help to access the databases and the librarian just handed me a piece of paper with instructions. The instructions were not clear and I found them rather confusing.” (N OS 67443)

Table 12

<b>Major Barriers, Relational Themes - Negative CI</b>			
	<b>Librarian<sup>1</sup> (N= 82)</b>	<b>User (N=71)</b>	<b>Non-User (N=100)</b>
Attitude (Negative)	50	17	47
Relationship Quality (Poor)	20	13	24
Approachability (Lack of)	1	0	3
Impact of Technology (Negative)	5	2	2

1. Note that columns do not total to N because CIs can be coded into more than one theme.

To illustrate the differences among the major Barriers, relational themes, the following representational CI examples are provided from the different types of participants.

Attitude Theme – Non-User “At one point when I had asked for service from a librarian, it seems like her attitude downplayed my intelligence and because she was older and wiser my question wasn't of importance. The attitude of the librarian was not friendly and welcoming and I sort of felt embarrassed after asking for assistance.” (N OS 22030)

Attitude Theme - User “I do not remember the question, but it was on World War II. I had waited until the last minute and the person seemed like they were not paying attention to me. Finally they just stopped the session without a goodbye. I simply signed in again and received a different person. They were much more help. If anything it was a waste of my time, but when I re-logged in I found someone who did know what I was talking about.” (U OS 51447)

Relationship Quality Theme – Non-User “I tried to explain that I wasn't interested in doing a general search on my topic, but that instead I needed this specific article, but she never really listened, and instead I ended up wasting a significant amount of time. The librarian was so overzealous with helping me that she lost sight of what I actually needed, which in this case was quite limited in scope, a specific item.” (N OS 32648)

Approachability Theme – Librarian “I tried to let the user know that this was not something I would be able to help with during the chat interaction because it needed the help of a subject specialist and print materials. However the user was convinced that I \*should\* be able to help during the chat session and that I was somehow not trying and being intentionally unhelpful by referring to a subject specialist.” (L OS 20705)

Impact of technology Theme – Librarian “Someone logged on whose typing skills were severely lacking, and I could not understand the question. When i finally understood, the patron got angry and said he was not able to type. I couldn't figure out why someone who was uncomfortable typing would choose virtual reference as a conduit. Instead of, for example, phone or in-person reference. We did not understand each other and the technology (even a keyboard) was prohibitive for the patron.” (L OS 62096)

## 5.0. Discussion of Results and Implications for Practice

This analysis has demonstrated that VRS users as well as non-users find the following to be important to their perceptions of successful encounters: accuracy of answers/information, as well as the librarian demonstrating knowledge of sources and systems, a positive attitude, and good communication skills. One of the research questions asked: “What is the relationship

between information delivered/received (task/content) and interpersonal (relational) dimensions of VRS in determining perceptions of satisfaction/success?" CIs for all three groups indicate that a combination of relational and content factors is critically important to their perceptions of success. Evidence suggests that users as well as non-users highly value the attitude and personal qualities of the VRS librarians as well as their knowledge and ability to quickly, as well as accurately, provide the information that is requested.

Librarians need to be aware that users are particularly interested in content provision, especially for the specific information they request. Users were not as focused on instruction as the librarians, so it is recommended that librarians provide the specific information requested and then ask if users want to know how to find it themselves. This finding and recommendation resonates with research by Arnold and Kaske (2005) conducted in an academic VR setting. However, more non-users of VRS did discuss CIs in which the FtF librarian provided instruction that added to their perceptions of success. This finding suggests that perhaps users have less patience for instruction in VR settings than they would in FtF settings.

Librarians were found to greatly value the positive attitudes of users in perceptions of successful encounters. They also were highly attuned to negative attitudes of users in recounting negative CIs. Like the users and non-users, librarians were also interested in the provision of information in positive CIs, and reported an extremely high number of CIs in which Lack of Information caused an encounter to be unsuccessful. These findings regarding librarian perceptions for positive and negative CIs echo that of Radford (1993, 1999) who had similar results with CIs elicited regarding FtF reference.

Data collection for this project has been completed. However, analysis is in progress for the final phase in which over 200 phone interviews were conducted with VRS users, non-users, and librarians. CIs were also collected through the phone interviews which will be compared and contrasted with these results from the online survey CI analysis. Additional quantitative data and qualitative data from open-ended questions posed in the online survey is also undergoing analysis and is approaching completion.

Future research will include examination of other VR modes for reference including Instant Messaging (IM), Text-Messaging (SMS), and via social networking sites such as Facebook and MySpace. One phenomenon that is of interest is the possible increase of telephone reference due to the proliferation of cell-phones. Difference in VR use by members of different generations also has surfaced as an important variable. Another is the increasing merging and crossing-over of different reference modes as a chat encounter morphs into e-mail or FtF. These rapidly evolving reference practices are challenging scholars to provide insights to understand users, attract non-users, and provide research-based guidelines and recommendations to VRS practitioners. Research informing LIS practice and education is critical for sustaining the relevance of digital library services in these rapidly expanding virtual environments.

## Appendix A

### Expanded Critical Incident Coding Scheme for Face-to-Face & Virtual Reference & Explanation of Category Placement (Radford, 1999, pp. 73-34 & Seeking Synchronicity, April 28, 2008)

#### **Facilitators - Content Themes**

Critical incidents (CI) were categorized as content (C) if user, non-user, or librarian *primarily* discussed one or more of the following as associated with his/her perception of interaction's success:

#### FC 1. Providing information

- 1.1 Assisting information delivery/retrieval
  - 1.11 Answering question (ready reference, technical questions, holdings)
  - 1.12 Quickly providing answers
  - 1.13 Locating specific resources
  - 1.14 Providing accurate answer/information
- 1.2 Providing information access
  - 1.21 Access to other geographic locations
  - 1.22 Access to those with disabilities
  - 1.23 Access to speakers of languages other than English or language difficulties
  - 1.24 Access for those unable to come in person
  - 1.25 Access to non-traditional users
- 1.3 Being product oriented (e.g., concerned with finished product such as speech or paper, rather than with the process of research)
- 1.4 Making referral
  - 1.41 Making referral to come in to physical library or phone
  - 1.42 Making referral to other electronic service (e.g., email, SMS)
- 1.5 Using software/interface to assist information seeking process (technology worked)
  - 1.51 Co-browsing worked

#### FC 2. Demonstrating knowledge (e.g., provides specialized knowledge of sources or systems)

- 2.1 General knowledge
- 2.2. Specialized knowledge
  - 2.21 Subject knowledge (other than library science)
  - 2.22 Knowledge of library science (including e-resources)
  - 2.23 Knowledge about information need
  - 2.24 Knowledge of how to articulate need
    - 2.241 Spelling and grammar
  - 2.25 Knowledge of search process (including time needed to search)
  - 2.26 Knowledge/ability to speak languages other than English
  - 2.27 Knowledge/ability to use chat conventions
  - 2.28 Knowledge of tools, information sources
- 2.3 Technical knowledge
  - 2.31 Solving technical problems (or working around them)

#### FC 3. Providing instruction - teaching process/resources

- 3.1 Guiding user through search process
- 3.2 Introducing new resources
- 3.3 Providing appropriate level of instruction
- 3.4. Librarian learned new resource/process

#### FC 4. Convenience/Multitasking/Time saving/Money saving

- 4.1 Specific technological interface benefits (e.g., drawing a graph)

### **Facilitators - Relational Themes**

Critical incidents were categorized as relational (R) if the user, non-user, or librarian *primarily* discussed one or more of the following as associated perceptions of the interaction's success:

- FR 1. Attitude – Displaying positive attitude
  - 1.1 Toward other (e.g., supportive, friendly, helpful, patient, grateful)
    - 1.11. Provides positive feedback (in service's survey or in chat transcript)
  - 1.2 Toward task (e.g., persistent)
    - 1.21 Receptive toward instruction
    - 1.22 Positive impact of anonymity
  - 1.3 Toward VR service
- FR 2. Relationship quality
  - 2.1 Good communication skills
    - 2.11 Ability/use of question clarification/feedback/responsive
    - 2.12 Use of humor
  - 2.2 Good orientation toward process (e.g., librarian or user concerned primarily with teaching/learning the research process)
  - 2.3 Willingness to self-disclose to provide context for query (e.g., age, personal info)
- FR 3. Approachability
  - 3.1 Positive nonverbal behavior (e.g., smiling, nodding, use of positive re-representation, chat speak, emoticons)
- FR 4. Impact of technology assisting relationship formation/development
- FR 5. Familiarity (repeat user)

### **Facilitators - Content/Relational Combination**

CIs were categorized as combination (C/R) only if user, non-user, or librarian discussed both content and relational dimensions as contributing equally to perceptions of interaction's success.

### **Barriers - Content Themes**

CIs were categorized as content (C) if the user, non-user, or librarian *primarily* discussed one or more of the following as associated with perceptions of the interaction being unsuccessful:

- BC 1. Information (Lack of)
  - 1.1 Impeding information delivery/retrieval
    - 1.11 Problematic for complex, obscure, highly specific questions
    - 1.12 Not answering question
    - 1.13 Slow in providing answers
    - 1.14 Not locating specific resources
      - 1.141 Missing or unavailable resources
    - 1.15 Shortage of library staff
    - 1.16 Waiting a long time in queue for response
  - 1.2 Lack of information access
    - 1.21 No local library access
  - 1.3 Lack of accuracy (e.g., wrong information provided/searching for wrong information )
  - 1.4 Information technology- impeding process
    - 1.41 Limited availability of resources (number, type, no paper, etc.)
    - 1.42 Time pressure (e.g., users in queue)
    - 1.43 Multi-tasking, distraction
    - 1.44 Lack of proximity to physical library, librarian

- 1.45 Poor usability or unclear/misleading information
- 1.5 Negative software/interface impact
  - 1.51 Limitations of software (e.g., IM, chat, e-mail)
  - 1.52 Software problems (e.g., co-browsing)
- BC 2. Lack of knowledge
  - 2.1 General knowledge
  - 2.2. Specialized knowledge
  - 2.3 Technical knowledge (including knowledge of chat/computer skills/typing)
- BC 3. Instruction (Lack of)
  - 3.1 Lack of instruction
  - 3.2 Level of instruction inappropriate
  - 3.3 Amount of instruction inappropriate
- BC 4. Task unreasonable (e.g. school assignment too difficult)

### **Barriers - Relational Themes**

CIs were categorized as relational (R) if the user, non-user, or librarian *primarily* discussed one or more of the following as associated with perceptions of the interaction being unsuccessful:

- BR 1. Attitude – Displaying negative attitude
  - 1.1 Toward other (e.g., angry, impatient, resisting, rude)
  - 1.2 Toward task (e.g., uninterested)
    - 1.21 Unreceptive toward instruction, demand for answer
    - 1.22 Unrealistically high expectations for quick & full answers
    - 1.23 Fear of being overwhelmed
    - 1.24 Fear of transcript evaluation/presence
    - 1.25 Detrimental impact of anonymity
    - 1.26 Librarian points or does not come out from behind desk
    - 1.27 Busy/does not commit time to question
    - 1.28 Detrimental impact of FtF
      - 1.281 Feeling intimidated, vulnerable, or uncomfortable
  - 1.3 Toward VR service
- BR 2. Relationship quality (poor)
  - 2.1 Poor communication skills
    - 2.11 Inability/poor use of question clarification/lack of feedback/response
    - 2.12 Abrupt sign off
    - 2.13 Different than FtF (in a negative way)
  - 2.2 Poor orientation toward process (e.g., not concerned primarily with teaching/learning the research process)
  - 2.3 Unwilling to self-disclose to provide context for query (e.g., age, personal info)
  - 2.4 Lack of personal response
  - 2.5 No follow-up
- BR 3. Approachability (Lack of)
  - 3.1 Negative nonverbal behavior (e.g., frowning, staring, use of negative chat speak)
  - 3.2 Disclaimer
- BR 4. Impact of technology impeding relationship formation/development

### **Barriers - Content/Relational Combination**

CIs were categorized as combination (C/R) only if user, non-user, or librarian discussed both content and relational dimensions as contributing equally to perceptions of the interaction being unsuccessful.

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