

UNDERSTANDING INTERMEDIATION IN A DIGITAL  
ENVIRONMENT: AN EXPLORATORY CASE STUDY

By

Sílvia Barcellos Southwick

B.S. - Universidade de Brasília, 1976

M.S. - Instituto de Pesquisas Espaciais, 1981

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Approved by

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Professor Barbara Kwasnik

Date

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## **ABSTRACT**

The Internet provides individuals with the opportunity to access unprecedented amounts of information on any given subject. However, there remain barriers to retrieving the best and most relevant documents. The present study focuses on processes of resolving user (versus technical) issues. Information system users have traditionally relied on expert intermediaries for resolving problems. Face-to-face encounters have been the traditional form of human-expert intermediation. Increasingly, however, information-provision services have begun to offer human-mediated information services through computer networks – especially the Internet – recognizing the potential advantages in overcoming barriers of time and space in user-intermediary communications. Despite the likely increase in this trend into the future, there remains at this point an inadequate understanding of the effectiveness of these systems.

The present study investigates intermediation in the context of an asynchronous text-based computer-mediated medium, such as e-mail and web-forms. The goal of the research is in describing and gaining a further understanding of the processes of intermediation. The main objectives are to identify the factors that are perceived as affecting digital intermediation and to investigate how and under what circumstances these factors might affect digital intermediation. The research takes the form of an exploratory case study of a hospital library information service. The overall approach is naturalistic. Grounded theory provides a framework for data analysis. In order to elicit a rich and fully informed accounting of the phenomenon under investigation, the researcher interprets and relates the diverse human perspectives of the intermediaries, the users, and

the researcher herself. This provides a basis for highlighting potentially conflicting, as well as corroborating, evidence.

The study contributes at both the conceptual and practical levels to an overall understanding of digital intermediation by producing a descriptive framework of analysis. Nine categories of factors potentially affecting digital intermediation are identified. These factors form three broad aspects of digital intermediation: media use, question negotiation and personal communication preference. The researcher also proposes directions for future research in the area of reference intermediation in a digital environment.

# 1 INTRODUCTION

## 1.1 Introduction

The ubiquitous nature of the Internet allows information users unprecedented opportunities to access electronic resources. Various barriers, however, such as inadequate search engines, lack of system and domain expertise, or the inability of users to express their information needs, may prevent users from efficiently finding relevant and accurate information. In such situations, users may rely on a human intermediary to help them in their information-seeking activity. Such intermediation may occur through diverse media. The present study investigated intermediation that occurs through an asynchronous text-based computer-mediated medium. It aimed to gain an understanding of the intermediation process that occurs through a digital medium where intermediaries help users to find relevant information to help resolve their information problem.

The following sections give an overview of the study, addressing the nature of the investigated problem and background, methodology, benefits and limitations of the study.

## 1.2 Key concepts

This section introduces concepts important for better understanding of the scope of this research. Some of the concepts have a special meaning in the context of this study. The reasons for choosing these particular definitions are presented in the following sections. The reader should notice that the terms in the list below that are qualified as *digital* imply an asynchronous text-based computer-mediated medium. This terminology is adopted in this dissertation for the sake of simplicity, as there is no short term to name this medium.

- a) *Asynchronous text-based computer-mediated medium* – is a medium of central interest in this study. Examples of use of this medium for communication between users and intermediaries are e-mail and web-forms.
- b) *Intermediaries* – are information professionals or subject experts that respond to users' information requests. Intermediaries may use printed sources, electronic sources, another person's knowledge (informal information) or even their own expertise on the subject to respond to users' requests.
- c) *User-intermediary interaction* – is a dialogue between a user and an intermediary where an intermediary tries to understand the users' information problems and assist them in finding relevant information. The definition extends to the same dialogue interactions that occur between a user and more than one intermediary, as long as each intermediary participating in the process is aware of any previous question negotiation. Question negotiation is that portion of the intermediation process that refers to the clarification of the request.
- d) *Digital user-intermediary interaction* – is a user-intermediary interaction that occurs, at least in part, through an asynchronous text-based computer-mediated medium. Although the term *digital* has a broader meaning, it is used in a restricted sense in this document. A detailed conceptualization of the concept of digital user-intermediary interaction of interest in this study can be found in Chapter 2 (Section 2.2.2).
- e) *Intermediation* – is the entire process of intermediaries helping users to find information relevant to their information problems. It includes, but it is not restricted to, the user-intermediary interactions. It comprises other actions taken

by the intermediaries to help users, such as searching in databases, consulting other people, integrating information from various sources, evaluating information, etc.

- f) *Digital intermediation* – is an intermediation where user-intermediary interactions occur, at least in part, through an asynchronous text-based computer-mediated medium.
- g) *Information-provision service* – is a service that answers users' information requests. Services of interest in this study were those that use intermediaries to help users in finding information.
- h) *Digital information-provision service* – is an information-provision service that offers intermediation through an electronic network where interactions between users and intermediaries are, at least in part, through an asynchronous text-based computer-mediated medium.
- i) *Digital reference service* – is a specific kind of digital information-provision service that responds to reference requests.
- j) *Information seeking* – “a process in which humans purposefully engage in order to change their state of knowledge.” (Marchionini, 1995, p.5) Intermediation is, then, considered as part of an information-seeking process.

### **1.3 Problem statement**

A new information-seeking scenario has been created with the pervasive use of the Internet: users from remote locations can have direct access to information resources and human expertise. Although this situation apparently empowers users in their ability to access information, users may experience inefficiency in their search activities and



uncertainty in the quality of the retrieved resource (Vishik, 1999). The lack of organization of information resources on the Internet, inadequate search engines and difficult database interfaces (Borgman, 1996) are, among others, contributors to such inefficiency. Furthermore, the user cannot count on traditional mechanisms, such as peer review, for quality control of Internet resources. In such an electronic environment, intermediaries may play an important role in helping users with their information-seeking activities, using their own subject expertise or their knowledge as information professionals.

Traditionally, human intermediation occurs in a face-to-face mode where users express their information problems (or what they know about them) to intermediaries. The Internet brought a potential facilitator to user-intermediary communication as users may use an electronic medium, such as e-mail, to interact with intermediaries from remote locations. In recent years, this potential flexibility seems to be prompting information-provision services (libraries, information centers, help desks and others) to offer human-mediated information services through the Internet. Despite this trend, there remains a lack of knowledge concerning the effectiveness of this medium. Information providers' success, measured by the number of users using their services, range from an extremely low use of academic libraries' digital reference services (Schilling-Eccles & Harzbecker, 1998) to an increasing growth of demand of AskA<sup>1</sup> services (Lankes, 1998a, 2000). Such a discrepancy in information providers' experiences calls for a better

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<sup>1</sup> AskA services are "question and answer services that seek to fulfill the reference needs of the K-12 education community" (Lankes, 1998b, p.9).

understanding of intermediation in digital environments. Unfortunately, researchers have given very little attention to this problem.

The understanding of the nature of intermediation in digital environments and the identification of factors that may be affecting it would make important theoretical and pragmatic contributions toward information-services design and operation. This exploratory study aimed to gain such knowledge.

### 1.3.1 Conceptual background

The literature of user-intermediary interactions originated in library science. Various studies investigated interactions between users and intermediaries during reference interviews. While face-to-face intermediation has been extensively studied, little research addresses intermediation in digital environments. This study investigated the intermediation where user-intermediary interactions occurred through an electronic medium that is likely to attenuate social cues (non-verbal communications) such as gesture and voice tone (Kiesler, Siegel, & McGuire, 1984). Thus, it seemed reasonable to assume that the models developed for face-to-face would not hold in digital environments, at least not in their entirety (additional support for this assumption can be found in Sections 2.4 and 3.2). However, one may expect that the nature of users' information problems and the intermediary's need for understanding users' information problems is not entirely dependent on the medium by which the interaction is processed. The nature and goals of the human intermediation should remain fundamentally the same. So, although this study did not investigate face-to-face interactions, this literature is informative in the sense that it draws a picture of the extension and eventual complexity that user-intermediary interactions in the information problem-solving process can reach.

Since this research focused on the intermediation process where user-intermediary communications were asynchronous, text-based and computer mediated, the body of literature in computer mediated communications (CMC) related to e-mail use in organizations seemed relevant to the present study. Although this literature is extensive, unfortunately the theories and models emerging from these studies are neither conclusively supported nor refuted (Carlson & Zmud, 1999; Carlson & Davis, 1998; D'Ambra, Rice, & O'Connor, 1998; El-Shinnawy & Markus, 1998; Fulk & Boyd, 1991; Fulk, Schmitz, & Steinfield, 1990; Garton & Wellman, 1995; Markus, 1994; Rice, Kraut, & Fish, 1994; Rudy, 1996; Steinfield, 1992; Walther, 1992). Two major streams of such literature were considered: (1) those that study how individuals choose a medium to convey a message and (2) those that study the impacts that an elected medium has on communication.

Two bodies of literature were, then, identified as the most informative for this study: the literature that addresses interactions between users and intermediaries in intermediation processes and the computer-mediated communication literature. Additionally, literature on information seeking behavior in medical settings was also taken into account, since the chosen research site is a hospital library. Chapter 2 includes an overview of these bodies of literature, indicating their usefulness for the present study.

### 1.3.2 Rationale for choosing the focus of the study

Various reasons led the researcher to choose, among other options, the text-based asynchronous medium as the focus of this research:

- (a) Asynchronous text-based computer-mediated communication technologies, such as e-mail and the web, are well known and have already passed the initial stages of adoption.
- (b) Applications using other media, such as videoconferencing or chat rooms for intermediated information-provision services, are recent and still with uncertain results. The researcher believes that even if synchronous media were, in the future, largely adopted as a medium to promote interactions between users and intermediaries, it would not diminish the value of using text-based asynchronous media for such interactions. Synchronizing time schedules between users and intermediaries seems a strong restrictive feature of synchronous communication, although the researcher acknowledges that it may have some advantages over asynchronous media as it simulates more closely face-to-face interactions.
- (c) There is already a large number of information-provision services successfully giving assistance to users through the Internet using text-based computer-mediated media (Lankes, 1998b). There is also a large number of libraries trying to implement text-based reference services through the Internet and these libraries are facing diverse difficulties.
- (d) Most digital information-provision services restrict their operations to questions that do not require negotiations (Gray, 2000; Ryan, 1996; White, 1999). The feasibility and nature of question negotiation in digital intermediation is still an open question.

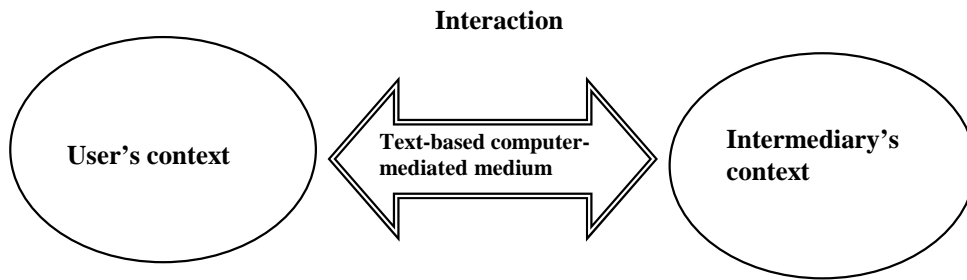
#### **1.4 Purpose and scope of the study**

This research had the goal of describing and gaining a further understanding of intermediation where users and intermediaries were, at least in part, using a text-based

computer mediated medium to communicate. Its main objectives were (1) to identify factors perceived as affecting digital intermediation and (2) to investigate how and in what circumstances these factors might affect digital intermediation.

Various researchers have acknowledged that context is an essential element for understanding the information-seeking process (e.g., Belkin, 1984; Dervin & Nilan, 1986; Oddy et al., 1992; Hert, 1995; Marchionini, 1995; Allen, 1996; Davenport, 1997). Marchionini, for example, has developed a framework that identifies factors affecting information-seeking processes based on various studies conducted by diverse researchers in the area. He has identified factors such as characteristics of the information seeker (experience, abilities, preferences), task (the expression of the information seeker's problem), search system, domain, context or situation, and search outcomes.

In considering the goal of the present study, new elements in the framework should be taken into account: (1) the activity is collaborative, meaning that at least two people are participating in the seeking process, and (2) the participants are located in different settings (contexts). Thus, not only factors belonging to the user's contexts but also factors belonging to the intermediary's context should be considered. The researcher, therefore, investigated both contexts in order to explore potential factors affecting digital intermediation. Figure 1-1 below is a representation of the research scope.



**Figure 1-1: Scope of the research**

## 1.5 Assumptions and guiding questions

Based on the literature, this study relied on two main assumptions:

- 1) Face-to-face and remote user-intermediary interactions differ in some ways.
- 2) Users' and intermediaries' contexts play an important role in understanding intermediation.

Considering the users' and intermediaries' perspectives, the study was guided by the following questions:

*What are the factors that are perceived as affecting digital intermediation?*

*How and under what circumstances might these factors affect digital intermediation?*

## 1.6 Research Design

This research was an exploratory case study of a digital information-provision service. It took a bottom-up approach, and was aligned with naturalistic and grounded-theory methodologies for collecting and analyzing data (Glaser & Strauss, 1967; Strauss & Corbin, 1990). This study was not formally based on existing theories; rather it aimed

to discover characteristics of the phenomenon through inductive analysis of data gathered in the field.

In investigating digital intermediation, various sources of evidence were used:

- Interaction logs,
- Data gathered during interviews with users,
- Data gathered during interviews with intermediaries,
- Field notes, and
- Organizational publications (print or electronic), such as organizational documents, the information service's brochures, forms and website interfaces.

Interviews, observations and publications served as complementary information to the interaction logs. Interviews collected information about the contexts in which these interactions had occurred. Observations of intermediaries and users contributed with additional contextual information to these interactions and, finally, organizational documents, brochures, forms and website interfaces contributed to identifying organizational policies that might be affecting interactions.

The research was conducted in three stages: preliminary, implementation and final stages. The preliminary stage comprised activities that preceded the fieldwork. The researcher reviewed the literature, selecting and making contacts with the information-provision service that was used as the study setting, a hospital library.

An iterative process involving emergent design, purposive sampling, data collection, and inductive data analysis characterized the implementation stage. Data

analysis was not seen as a separate stage of the research; rather it was an activity that informed data collection. It was based on the constant-comparative method (Glaser & Strauss, 1967) and it involved coding (conceptual labeling and discovery of categories) and identification of the relationships among codes. Analysis also generated working hypotheses that were, as much as possible, verified in the course of the study.

The emergent design refers to evolving decisions during the research process of what information to look for next and where to gather it. The purposive sampling was a reflection of the emergent design and guided the following step of data collection in the iterative process. The process stopped when saturation was reached (see Chapter 3, Section 3.4.3.8.3).

The final stage of the research comprised reviewing and integrating findings in a case report. Drafts of preliminary results were submitted to some respondents for feedback. The researcher negotiated outcomes with respondents at two levels: individual and group. At the individual level the researcher conducted, when necessary, follow-up interviews to probe unclear information. Checking also was done with the library staff in the more advanced stages of the study, when the researcher started integrating the collected data and producing preliminary results.

## **1.7 Benefits and limitations of the research**

This section briefly presents some of the limitations and contributions of the study at the research and pragmatic levels.

### **1.7.1 Limitations of the study**

- Transferability of findings is restricted;



- Part of data elicitation was based on participant's recall of situations, which might have restricted the validity of the information gathered;
- Most participants in this study were those who had participated in digital interactions. Only four users who had decided not to use such a mode of interaction participated in the study. So, the spectrum of factors that may inhibit the use of this medium found in this study is limited.

## 1.7.2 Contributions of the study

### 1.7.2.1 Research level

Contributions at the research level include:

- Augmenting our understanding of digital intermediation.
- Providing preliminary framework that can guide future studies of digital intermediation.
- Unlike most studies, the investigation of both sides of the communication (users and intermediaries).
- Identification of areas in need of further investigation.

### 1.7.2.2 Pragmatic level

At the pragmatic level, the study:

- Provides helpful information to improve existing information-provision services.
- Provides insights for training programs for intermediaries planning to work at networked information-provision services using a text-based medium.
- Informs organizations that are planning to implement electronic reference services or other similar kind of services, such as, help desks.

- Gives insights to designing systems to manage electronic information-provision services.

## **1.8 Chapter summary**

This chapter provides a brief and general introduction to the study and its goals. It introduces key concepts and gives an overview of the relevant literature, demonstrating the need for research in this area. A rationale for site selection and an introductory discussion of methodology are also presented. Research and practical implications are introduced. The following chapters present a more detailed discussion of these elements.

## 2 LITERATURE REVIEW

### 2.1 Introduction

This chapter provides an overview of the literature most relevant to this study. As the present study adopts an inductive approach for data collection and analysis, the literature covers those areas that helped to increase the researcher's theoretical sensitivity<sup>2</sup> to the topic of interest. Literature and studies in the areas of reference interactions, computer-mediated communications and information-seeking behavior in medical settings were considered.

This literature review is focused on:

- Studies that model various aspects of face-to-face intermediation in library settings, especially those that deal with the content of the interactions and question classification;
- Studies concerning the use of various electronic media for user-intermediary interactions;
- The computer-mediated communication literature that deals with the use of electronic media for person-to-person communication in organizations;

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<sup>2</sup> “Theoretical sensitivity refers to the [researcher’s] attribute of having insight, the ability to give meaning to data, the capacity to understand, and the capability to separate the pertinent from that what it isn’t.” (Strauss & Corbin, 1990, p. 42)

- Literature related to information-seeking behavior in medical library settings. This particular aspect of the literature review is intended to provide familiarity with the language and concepts used in the study setting.

The chapter initially presents a general model for human interaction and defines the interactions of interest in this study. The following section presents the literature in intermediation, covering face-to-face and digital intermediation. Then, a section is dedicated to the computer-mediated communication literature related to the study. The chapter ends with a review of information-seeking behavior in medical settings. Each section, other than the first, is structured so that the literature is presented first, followed by a summary of the literature, and ending with a subsection detailing the potential contributions of the literature to the present study.

## **2.2 Human interactions**

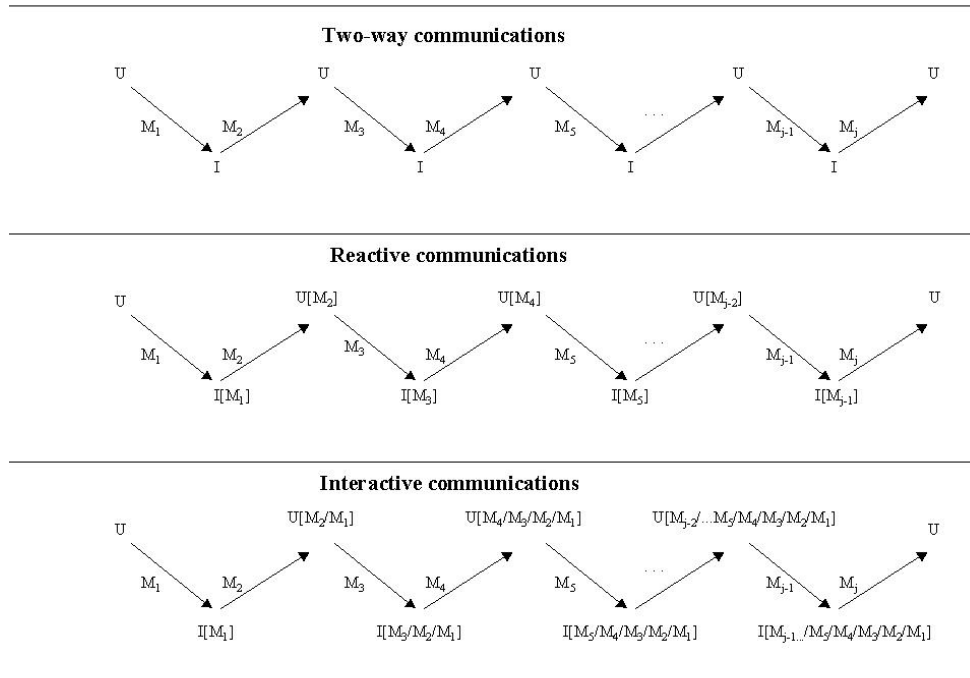
The user-intermediary interaction is a critical part of any intermediation. Before introducing the literature most relevant to this study, this section refines the definition of interaction, elaborating a specific representation of interaction as conceived in the context of this study. This representation is built on Rafaeli's model of communication (Rafaeli, 1988).

### **2.2.1 General interaction model**

Based on the communication responsiveness dimension, Rafaeli classifies a sequence of face-to-face communications between two persons as *interactive*, *quasi-interactive* (reactive) and *non-interactive* (Rafaeli, 1988, p.118). A fully interactive

communication presupposes that both communicators respond to each other and the responses acknowledge previous communications. Another particular characteristic of this type of communication is in the interchangeability of communicator roles. A quasi-interactive communication happens when each response is a reaction to the previous message, but does not acknowledge the chain of messages preceding it. A non-interactive communication, in contrast, is when messages flow from one communicator to another but lack coherence; i. e., they are isolated and do not refer to previous messages.

Schematically, Rafaeli represents these three types of communication as shown in Figure 2-1, where the identifications of the two communicators were adapted to the terminology used in this research: **I** for intermediary and **U** for user.



**Figure 2-1: Rafaeli's communication model**

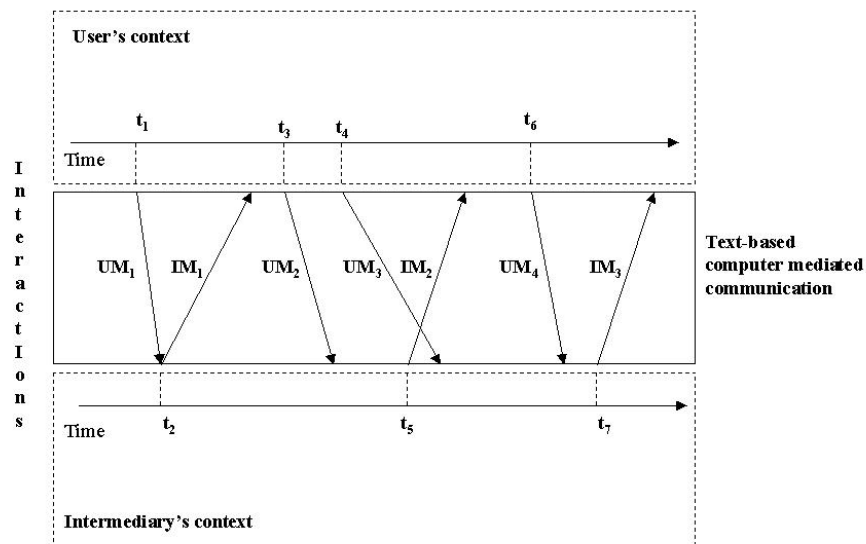
The representation  $I[M_1]$ , in Figure 2-1, means that the intermediary is creating  $M_2$  based on  $M_1$ . The notation  $U[M_1/M_2/M_3/M_4]$  means that the user is creating  $M_5$  based on previous messages. As shown in Figure 2-1, in a two-way communication (non-interactive), the messages are not necessarily related. In a reactive communication (quasi-interactive), a message is always related to the previous message, and in a fully interactive communication a message refers to (or acknowledges) the chain of preceding messages.

This study focused on interactions that, in terms of Rafaeli's classification, are considered as quasi or fully interactive because users and intermediaries should be aware

of previous messages in order to provide coherence to the interaction. Although helpful, Rafaeli's communication model presupposes a face-to-face communication and does not include characteristics of communications occurring through a computer-mediated medium. The next section presents an adaptation of Rafaeli's model that was used in this study.

### 2.2.2 Interactions of interest in this study

Interactions of interest are asynchronous, text-based and computer-mediated. Two salient characteristics distinguish this mode of communication from face-to-face: it is asynchronous and turn-takings are unregulated. In order to reflect such features, Rafaeli's communication model was extended through the inclusion of a second dimension, time, and messages were represented in a way that show the unregulated turn-taking behavior of communicators. Furthermore, since users' and intermediaries' contexts may influence their communications, the representation of these contexts was also included in the model. Figure 2-2 below shows the extended representation of the conceptual model. These extensions were included since they help to understand interactions in the context of this study. The researcher is not advocating that such a representation is more comprehensive than Rafaeli's model; it is solely serving the purpose of conveniently representing interactions in the context of this study and helping to set a common terminology.



**Figure 2-2: Representation of a text-based and computer-mediated interaction occurring as part of an intermediation**

For the sake of simplicity, the messages do not show their relationships with previous messages (quasi or fully interactive communication characteristics). In addition to the characteristics mentioned so far, interactions may occur through diverse media, but the focus of this study was on interactions that occurred, at least partially, through a text-based computer-mediated medium.

In summary, interactions considered in this study were:

- Part of an intermediation;
- Asynchronous;



- Dyadic - Even if more than one person (intermediary or user) participated in the interaction, it was between two communicators at a given time. This research did not focus on interactions where various persons participate at the same time, as in a group discussion list, for example;
- Computer-mediated;
- Text-based; and
- Quasi or fully interactive.

This section characterized the interactions of interest in this research. The following section identifies the general context in which these interactions occur - i. e., services that provide intermediated assistance to users for their information problem.

### **2.3 Intermediation**

As mentioned in the previous section, this research was focused on digital intermediation where interactions between users and intermediaries were dyadic. Intermediaries receive requests from users, interpret them and identify relevant information sources or use their own expertise to respond to users' requests. Intermediaries may also instruct users in how to search for information in printed or electronic resources. Thus, three elements comprise the reference process (Katz, 1997): (1) Users, (2) Intermediaries, and (3) Information. Belkin's model for information systems shares the same three elements identified by Katz, and augments their conceptualization. Belkin's definition of an information system is "*the dynamic interaction among the following components: (1) User, (2) Intermediary mechanism, and (3) Knowledge resource.*" (Belkin, 1984, p.112). Users are those who have an

information problem. Intermediary mechanisms, which can be human or some formal system, have the role of mediator between users and knowledge resources in order to transfer information from the knowledge resource to the users in response to their information requests.

Although the present study deals with human intermediation in digital environments, the parallel between system-oriented (Belkin) and library-oriented (Katz) views is helpful in understanding how human-intermediation studies can inform information systems research. Gaining knowledge of how intermediaries and users behave during an intermediation provides insights into designing systems capable of simulating (at least partially) the intermediary's behavior. Through extending our knowledge of digital intermediation, this study made contributions toward system design.

The process of assisting users with their information problems can increase in complexity depending on, among other factors, how clear users are about their own information needs. Taylor emphasizes the complexity of the reference interview by pointing out that,

...the negotiation of a reference question is one of the most complex acts of human communication. In this act one person tries to describe for another person not something that he knows, but rather something that he does not know. (Taylor, 1968, p.180)

A general categorization of users' requests clusters them into two groups: those requests in which users ask for known items (like a specific book or article) and those in which users ask for information without knowledge of specific sources (Katz, 1997). The second group of requests is more likely to trigger more complex user-intermediary interactions, in which the intermediaries have the purpose of acquiring knowledge about the users' information problems in order to better assist them in finding relevant

information. This knowledge acquisition occurs through a series of communication events between users and intermediaries.

A more traditional way for intermediaries to help users is through a face-to-face interview. In library science this has been the traditional form for the reference interview. This study investigated intermediary assistance to users through an electronic network, using an asynchronous text-based computer-mediated medium. The following sections present studies investigating these two modes of intermediation – i. e., face-to-face and computer-mediated – indicating the potential contributions of these studies to the present research.

### 2.3.1 Face-to-face intermediation

Face-to-face intermediation has received much attention in the library science literature. The main research stream aims to develop models for reference interviews. While some researchers try to gain a deeper understanding of the process itself, others aim to develop intelligent systems capable of simulating user-intermediary interactions during intermediation processes.

Most of these models are based on actual intermediation and typically reflect the intermediary's perspective. Various aspects of the reference interviews have been modeled. The following sections present these models and are organized as follows:

- (a) Task models – models that focus on the tasks performed by intermediaries in the process of helping users with their information problems;
- (b) Question classifications – models that classify questions asked by users or intermediaries;

- (c) Reference interview models – models that view reference interviews as a process;

#### 2.3.1.1 Task Models

The term, *task models*, is used in this context to group studies that have investigated what kinds of information intermediaries gather from users in order to understand their information problems. Researchers have not adopted a common terminology in developing these models. For example, to indicate classes of information exchanged between users and intermediaries, Taylor (1968) uses the term, filters; Belkin, Brooks and Daniels (1987) use *functions* and *tasks*; Cochrane (1981), *tasks*; Lynch (1978), *information sought by librarians*. Although these researchers may have subtle differences in defining what reference dimension they were looking at, for a broad understanding of what has been done in this area it seems helpful to group these studies together as a singular dimension.

A main assumption underlying these studies follows the previous information-seeking behavior literature: acknowledging that information seekers may be incapable of expressing their information needs (Belkin, Oddy, & Brooks, 1982a; Belkin, Oddy, & Brooks, 1982b; Dervin, 1983; Taylor, 1968).

The first and perhaps most well-known empirical study of the reference interview was conducted by Taylor (1968). He interviewed special librarians and information specialist with the purpose of understanding the intermediation process. From these interviews he derived a model featuring five filters which identify the kinds of information gathered from a user in order to aid intermediaries in searching for relevant information. These filters (Taylor, 1968, p.41) are shown in the table below.

determination of the subject
objective and motivation
personal characteristics of inquirer
relationship of inquiry description to file organization
anticipated or acceptable answers

**Table 2-1: Taylor's filters**

Since Taylor's research, many other empirical studies have been conducted that focused on various aspects of reference. Lynch (1978), however, was the first one to directly observe users and intermediaries during reference interviews. In an exploratory study, she observed actual reference interviews in public libraries. The reference interview was defined as any transaction between a user and an intermediary where the intermediary needed to ask at least one question of the user before responding to the request. Lynch found that reference interviews were needed in 49 percent of the transactions. Inspired by Taylor's research, Lynch wanted to find out what kinds of information were sought by librarians during interviews. From a total of 309 interviews observed and recorded she built two models: a *holding transaction model* (requests about specific bibliographic items) and a *substantive transaction model* (requests for factual information, helping finding materials, interpreting information, etc.). Each model included a list of five gross categories of information acquired by intermediaries during a reference interview as shown in the Table 2-2 below.

Holding model	Substantive model
Bibliographic description	Subject definition
Function	Fact gathering
Action taken	Answer specification
Location requirement	Action taken
Other	Other

**Table 2-2: Reference transaction's model** (Lynch, 1978, p. 131)

In her discussion of findings, Lynch pointed out that her models differed from Taylor's model, and that a closer comparison of the study's findings was inappropriate because settings, methodologies and reporting were different. Lynch's and Taylor's models dealt with a high level of categorization of information acquired by intermediaries in reference interviews. A major distinction between these two models is that Lynch differentiated her models by type of query.

In a comprehensive study of face-to-face intermediation, Cochrane and colleagues (Cochrane, 1981; Crouch, 1981) conducted a study of pre-search reference interviews<sup>3</sup>. The researchers aimed to "*identify tasks that are accomplished by the librarians to optimize information exchange*" (p. 5). The researchers content analyzed 80 pre-search interviews that were conducted in seven medical libraries. They also interviewed users and intermediaries. Their task categorization is shown in Table 2-3 below.

Tasks
Descriptive and tutorial tasks
Request clarification tasks
Request negotiation tasks
Vocabulary construction
Search strategy tasks
Administrative activities

**Table 2-3: Task categorization scheme** (Cochrane, 1981; Crouch, 1981)

The task categorization produced in this study has a high level of abstraction and exhibits a general incompatibility of terminology with previous studies. For example, while Taylor considers the whole process of the reference interview as a question negotiation, Cochrane's study has considered it as a task category.

Belkin and colleagues went further in identifying these classes of information (Belkin, 1984; Belkin, Borgman et al., 1987; Belkin, Brooks et al., 1987; Belkin & Windel, 1983). They approached the categorization task with a different purpose: to identify functions performed by users and intermediaries in interactions occurring in pre-search interviews.

The long-term goal of Belkin and his colleagues' research was the design and implementation of an intelligent interface for information retrieval systems. Their primary strategy was to specify the functions needed in intelligent interfaces in order to conduct a functional discourse analysis of user-intermediary interactions. The researchers used the MONSTRAT (**M**odular functions based on **n**atural information processes **s**trategic) model (Wersig & Hennings, 1984) as an initial guide for identifying such functions (Belkin, Borgman et al., 1987). This model was intended to be a general model for information systems. It was further refined for information retrieval environments.

Ten main functions were identified. These are presented in Table 2-4 below:

Name of the function	Description
Problem state	Determine position of user in problem treatment process, e.g. formulating problem, problem well specified, etc.
Problem mode	Determine appropriate mechanism capability, e.g. document retrieval
User model	Generate description of user type, goals, beliefs, knowledge etc., e.g. graduate student, thesis.
Problem description	Generate description of problem type, topic structure, environment, etc.
Dialogue mode	Determine appropriate dialogue type and level for situation, e.g., menu, natural language.
Retrieval strategy	Choose and apply appropriate strategies to knowledge resource.
Response generator	Determine structure of response to the user, appropriate to the situation.
Explanation	Describe mechanisms operation, restrictions etc. to users as appropriate.
Input analyst	Convert input from user into structures usable by functional experts.
Output generator	Convert response to the form appropriate to user, situation, and dialogue mode.

**Table 2-4: Functions of an intelligent interface** (Brooks & Daniels, 1986, p. 39)

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<sup>3</sup> Pre-search interview is conducted before the search itself. The reference interview, on the other hand, includes the search process.

Although Belkin's categorization for tasks seems well developed, it was based on an analysis of only 7 reference interviews. Working with a larger sample, Saracevic and colleagues (Saracevic, 1989; Saracevic & Kantor, 1988a, 1988b; Saracevic, Kantor, Chamis, & Trivison, 1988) developed a long-term research project where they also investigated user-intermediary interactions during reference interviews and conducted experiments in order to better understand the elements (variables) involved in information seeking and retrieval. They observed 40 reference interviews in academic libraries. Among other dimensions of reference interviews, they investigated the focus of attention in the linguistic expressions. In a manner similar to Belkin's work, they conducted a discourse analysis of these interactions and identified the following foci:

Focus of utterance
Context
Terminology and explanation
Search tactics
Review and relevance
Action
Prompt, pauses
Extraneous

**Table 2-5: Focus of utterance scheme** (Saracevic et al., 1988)

Although the *focus-of-utterance* categorization produced in this study was based on the content of the interaction, the categories generated seem to be of a broader level of abstraction than in the studies of prior researchers. The essential nature of the observed phenomenon is another aspect that differentiates this study from previous work in this area. The aforementioned studies of Belkin, Cochrane and Lynch analyzed pre-search interviews. Saracevic and colleagues analyzed the entire intermediation process including the reference interview and the search process. Consequently, there are specific categories of the search, such as *review and relevance*, not included in the other studies.



A more recent study conducted by Robins (1998) analyzed the same set of 40 reference interview data used by Saracevic and colleagues. Robins looked at the focus of attention of utterances and used discourse analysis in analyzing the data derived from his investigation. His focus-of-attention categorization scheme (Table 2-6) differs qualitatively from Saracevic's despite the fact that both studies used the same set of data.

Focus of attention
Documents to be retrieved
Evaluation of search results
Search strategies
IR systems
Topic of the search
Information about the user

**Table 2-6: Focus of attention scheme** (Robins, 1998)

#### 2.3.1.2 Question classification models

Various studies have attempted to classify questions asked by users or intermediaries during intermediation. One of the early studies to classify questions in this environment was conducted by Derr (1982, 1984). Through an analysis of 300 written questions posed to information specialists and reference librarians, the researcher classified questions based on the particular concept which the questions presuppose (Table 2-7). The author's question categorization is:

I.	Categorical question (presuppose very basic concepts)	
A.	Existence	(Does X exist?)
B.	Identity	(What/Who is X?)
C.	Qualities	(What are the properties of X?)
D.	Relation	(How is X related to Y?)
E.	Number	(How many X are there?)
F.	Location	(Where is X?)
G.	Time	(When is X?)
II.	Document questions	
A.	Information	(Is there information in X?)
B.	Verification	(Is there evidences in X?)
III.	User-service questions	
A.	Permission	(May I have X?)
B.	Direction	(Where can I find X?)

**Table 2-7: Question classification based on presupposition** (Derr, 1982, p. 70)

Derr asserted that intermediaries would benefit from instruments for classifying questions because these would provide ways to organize questions, promote a more comprehensive understanding and, ultimately, improve the effectiveness of information retrieval. This research was part of a larger study conducted by Saracevic (1980).

In Saracevic's long-term study previously mentioned, the researchers investigated questions posted by users (Saracevic & Kantor, 1988a, 1988b; Saracevic et al., 1988). Their analysis of the questions aimed at the development of a scheme for question classification and identification of the questions' structure.

The classification was based on five pre-defined dimensions (*domain, clarity, specificity, complexity* and *presupposition*). They reported a high level of agreement among 21 judges in all dimensions but specificity. The identification of question structure, however, was not successful and they seemed to abandon further efforts in this endeavor. Their approach to the investigation of question structure was to test a pre-defined structure comprising three elements: *lead-in, query* and *subject*. The judges could not reach agreement about what parts of the questions belonged to what parts of the structure.

While Saracevic and his colleagues analyzed questions posted by users for information retrieval (not actually in the context of reference interviews), White (1998) studied questions in pre-search interviews investigating both user and intermediary perspectives. She applied a question taxonomy developed by Graesser in order to determine the types of questions asked in reference interviews by both users and intermediaries (Graesser, Person, & Huber, 1992). She observed 12 pre-search interviews and identified 596 questions asked. Of these, a range of 63-86% was questions asked by intermediaries. She found that in Graesser's taxonomy the majority of the questions were for verification (48%) followed by questions pertaining to judgments about the query (12%). White also analyzed the content of questions and classified them concerning their objectives, as shown in the Table 2-8 below.

**Comment [RS1]:** Silvia, note the change here. The term "judgmental" usually refers to a personal attribute. If I say that "Silvia is judgmental", I mean that you like to pass judgments about people.

Question objective
Problem 5%
Subject 47%
External constraints 1.5%
Internal constraints 0.4%
Output 11.5%
Search strategy 3.2%
Logistic/closure 1.9%

**Table 2-8: Question classification based on objective** (White, 1998)

Although based on only a part of the pre-search reference interview (questions as opposed to the whole text of the interview), White's findings present some similarities with Belkin's scheme for functions/tasks in terms of the scheme.

Another study that applied the Graesser taxonomy for classifying questions was developed in healthcare environments (Stavri, 1996). The findings of that study suggest that quantification questions are more likely to be asked during conditions of urgency and verification when the least amount of information is present. Stavri's study is further

analyzed in Section 2.5. An important aspect in comparing the studies mentioned so far with Stavri's study is that the latter suggests the effect of the external situation on the kind of question asked; an aspect not considered in previous studies. Miwa (2000) and Wildemuth (1994) have also considered situational factors affecting users' information requests.

Another source of question classification comes from the interviewing literature. Questions are classified as open and closed. Investigating actual user-intermediary interactions in public libraries, Lynch (1978), for example, looked at the frequency with which intermediaries used open questions in 309 pre-search interviews in public libraries. She found that only 8% of the questions were open. Based on the sense-making model, Dervin and Dewdney (1986) proposed neutral questioning as a strategy for increasing efficiency in reference interviews. Bryce (1988), on the other hand, studied the use of structural questions, which are based on a text-linguistic structure of literature. Like neutral questions, these provide more structure for responses than open questions do and less structure than closed questions.

#### 2.3.1.3 Reference interview models

While the studies mentioned in previous sections augment our knowledge about the content of the reference-interview dialogues, White (1989) draws a picture of the reference interview based on the intermediary's behaviors when presented with users' requests. She has formulated two models: the *needs-oriented model* and the *question-oriented model*. The former emphasizes the fact that users are unsure about their information needs and, therefore, the intermediary is likely to conduct an in-depth interview in order to understand the users' information problem. The *question-oriented*

*model*, on the other hand, assumes that users are aware of their information need, prompting intermediaries to respond by providing pertinent information.

Although White has found that in face-to-face reference interviews intermediaries adopt both models, the same may not always be true for reference services offered through the Internet. Most Internet-based services operate solely on the *question-oriented model*, as they explicitly do not accept complex questions that would eventually lead to negotiation (Bushallow-Wilbur, De Vinney, & Whitcom, 1996; Gray, 2000; Ryan, 1996; White, 1999). This is corroborated by Lankes' research findings, which indicated that some digital reference services conceptualize users as questions rather than as contextually embedded persons (Lankes, 1998a).

#### 2.3.1.4 Summary of the models

Table 2-9, Table 2-10, and Table 2-11 present a summary of the models mentioned in the previous sections, showing the schemes produced for tasks and questions asked during pre-search or reference interviews.

	Taylor (1968)	Lynch (1978)	Cochrane (1981)	Belkin et al. (1987)
Phenomenon	Pre-search interview	Pre-search interview	Pre-search interview	Pre-search interview
Data gathering methods	Interview (librarians)	Observations	<i>Interviews (user and librarians)</i> Observations Recall sessions	Interviews (intermediaries) Questionnaires
Analysis	Content analysis	Content analysis Statistical analysis	Content analysis Statistical analysis	Discourse analysis
Sample	21 special librarians	309 reference interviews videotaped 18 librarians	80 pre-search interviews + recall sessions (videotaped)	7 pre-search interviews 2 interviews with intermediaries
Settings	special libraries	4 public libraries	7 medical libraries	2 academic libraries
Variables	Tasks (filters)	Tasks (Information sought by librarians)	Tasks / Verbal Nonverbal Behavior / Satisfaction	Functions and tasks (sub-functions)
Schemes	Determination of the subject Objective and motivation Personal characteristic of the inquirer Relationship of inquiry description to file organization Anticipated or acceptable answers	<u><i>Substantive Model</i></u> Subject definition Fact gathering Answer specification Action taken Other <u><i>Holding Model</i></u> Bibliographic description Action taken Location requirement Other <u><i>Directional Transaction</i></u> (not considered as reference transactions) Moving Transaction (13% of 309)	<u><i>Tasks</i></u> Descriptive and tutorial tasks Request clarification tasks Request negotiation tasks Vocabulary construction Search strategy tasks Administrative activities Verbal Behavior (It is a scheme containing 60 categories. Follows some examples of these categories) Person speaking Silence Greeting or polite expression Number of occurrences of "I don't know" Verbal reinforcer Reciprocated nervous laughter <u><i>Nonverbal behavior</i></u> I don't have examples	<u><i>Problem Mode (PM)</i></u> Explain capabilities of system to user <u><i>User Model (UM)</i></u> Determine user's goal Determine status of the user Determine user's knowledge of the field Determine user's familiarity with the system Determine relevant aspects of the user's background <u><i>Problem State (PS)</i></u> Determine user's previous reference activities Determine user's previous non reference activities in connection with the problem Determine the problem's dimensions <u><i>Problem description (PD)</i></u> Determine the subject area or background to the search Specify the content of user's research Specify the topic of the search Determine the content or description of the documents the user would like to retrieve

	Taylor (1968)	Lynch (1978)	Cochrane (1981)	Belkin et al. (1987)
			<p><u>Satisfaction</u> Two instruments were developed to measure the user's and intermediary's satisfaction with the interview – applied right after the interview and before the search</p>	<p>Determine the formal characteristics of the subject literature Retrieval Strategies (RS) Select terms for searching Formulate the query Evolve the search strategy Select the database <u>Response Generator (RG)</u> Select the output requirements <u>Explain (EX)</u> Bring user's knowledge of IR systems to the minimal level necessary for the user to be able to co-operate effectively Explain the intermediary's intention to the user Literal display of some aspects of the system <u>Meta-goals (MG)</u> Compare models that participants hold Specify the plan of the interview, structure the activity, what should be done next</p>

**Table 2-9: Task models: Taylor, Lynch, Cochrane and Belkin et al.**

	Saracevic et al. (1988-1990)	Robins (1998)
Phenomenon	Reference interview	Reference interview
Data gathering methods	Interviews (users and librarians) Questionnaires Observation	Observations (subset of the data used by Saracevic)
Analysis	Discourse analysis	Discourse analysis
Sample	40 reference interviews (videotaped)	20 reference interviews
Settings	Academic libraries (Rutgers)	Academic libraries (Rutgers)
Variables	Focus of utterances / Stages in interaction and Styles in interactions	Focus of attention
Schemes	<u>Focus of utterance</u> Context Terminology and explanation Search tactics Review and relevance Action Prompt, pauses Extraneous <u>Stages and styles in interaction</u> Opening Gambit stage User predominant Intermediary authoritative Intermediary educational Tactical Maneuvering stage Terminological preference Combinational exploration Closing Downdrift stage User enlivening Intermediary helpfulness Fill-in banter	<u>Focus of attention</u> Documents to be retrieved Evaluation of search results Search strategies IR systems Topic of the search Information about the user

**Table 2-10:Task models: Saracevic et al. and Robins**



	Lynch (1978)	Derr (1982)	Saracevic et al.(1985-87)	White (1998)
Focus	Librarians' questions in reference interviews	Written users' questions posed for search purposes	User's questions in reference interviews	Users' and librarians' questions in pre-search interviews
Data gathering methods	Observations		Judgment of user's written questions	Observations
Analysis	Content analysis Statistic analysis	Content analysis	Statistical analysis	Content analysis
Sample	309 reference interviews (videotaped) 18 librarians	300 questions	40 questions / 10 judges	596 questions (asked by users and intermediaries) in 12 reference interviews
Settings	4 public libraries	Academic library	Academic libraries	Academic libraries
Variables	Number of questions Questions' mode Nature of probe	Question classes	Question classes Question structure	Dominance Questions' types Content objectives
Schemes and Findings	<u># of questions</u> 70% interviews has max. 2 questions <u>Question's mode</u> 99% primary questions were closed <u>Nature of probe</u> <u>More frequent:</u> Echo/confirmation Clarification Extensions <u>Less frequent:</u> Summarizing Confrontation Repetition	<u>Categorical question</u> (presuppose very basic concepts) Existence Identity Qualities Relation Number Location Time <u>Document questions</u> Information Verification <u>User-service questions</u> Permission Direction	<u>Question classes</u> Domain Clarity Specificity Complexity Presupposition <u>Questions structure</u> (questions have three parts - not supported) Lead-in Query Subject	<u>Dominance</u> Intermediaries dominate the interviews <u>Questions' types</u> Verification Judgment, Request, Disjunctive, Concept completion, Feature specification, Assertion, Quantification, Definition, Comparison, Goal orientation, Instrumental, Procedural, Enablement, Expectational, Directive. <u>Questions' Content objectives</u> Problem, Subject, External constraints, Internal constraints, Output, Search strategy Logistic/closure.

**Table 2-11: Question classification models**

An analysis of the empirical studies that have investigated the content of face-to-face user-intermediary interactions, reviewed in this section, suggests that:

- The findings overall are not conclusive.
- The studies are often not comparable.
- There is not always agreement concerning terminology, even for studies that analyzed the same data set.
- It is not always clear why these studies produced diverse findings and how much the setting or other contextual variables have affected findings.
- The level of abstraction of task categorization differed in all studies.
- In most of the cases, interactions were analyzed outside of their unique contexts.
- Often the transferability of findings is unclear.

#### 2.3.1.5 The contribution of the face-to-face intermediation literature to this study

The face-to-face user-intermediary interaction literature is important to this study as it:

- emphasizes the need for intermediation;
- helps to characterize the complexity of the intermediation process; and
- draws an initial picture of what may be expected in digital intermediation.

#### 2.3.2 Intermediation through electronic media

The various studies in face-to-face intermediation emphasize the potential level of complexity of user-intermediary interactions during an intermediation. One may expect that a similar process would take place in intermediation offered through an electronic network. For reasons yet to be understood, however, most information-provision services offered through the Internet do not offer the opportunity for question negotiation using a text-based computer-mediated medium (Bushallow-Wilbur et al., 1996; Gray, 2000; Ryan, 1996; White, 1999). Question-negotiation in the digital environment has started to

be discussed in the literature (e.g., Abels, 1996; Gray, 2000; Straw, 2000), but relatively few studies have directly addressed the matter as yet.

While the literature on electronic communication is abundant, the literature on *intermediation* through electronic media is still scarce. Despite the growing number of information-provision services offering services through an electronic network, there remains a lack of knowledge concerning the effectiveness of this medium. Information-provision services' success, measured by the number of users using their services, range from an extremely low reported use (e.g., academic libraries' digital reference services) (Fishman, 1998; Mon, 2000; Schilling-Eccles & Harzbecker, 1998; Still & Campbell, 1993) to increasing trends of growth as in the case of AskA services (Lankes, 1998a, 2000) and e-government service providers (Mon, 2000). Such a discrepancy of experiences calls for a better understanding of intermediation in digital environments. At this point in time, researchers have only begun to direct attention toward this problem.

Intermediation can occur through diverse types of electronic media. It is logical to assume that users and intermediaries will tend to communicate electronically when they are remotely located. Davenport (Davenport, 1997) identified combinations of time and location that reflect possible situations in which consultants (intermediaries) may assist users. For each of these combinations, the author identified possible media (or genres) through which such assistance can occur (see Figure 2-3).

		Time	
		Same	Different
P l a c e	Same	Face-to-face (1)	FAQ lists (2)
	Different	Conferencing: Text, audio, video (4)	E-mail Web (3)

**Figure 2-3: “The consultation space”** (Davenport, 1997, p.272)

Quadrant 1: same place & same time

This situation reflects a more traditional situation for user-intermediary interactions, already explored in the previous section.

Quadrant 2 & 3: different times & (same place / different places)

Davenport has indicated FAQ lists (frequent-asked-question lists) as an example of a genre used in quadrant 2 (different times / same place), suggesting that such a situation does not involve direct interaction between users and intermediaries. As this research was focused on intermediation, this situation (different times / same place) may, in fact, involve asynchronous interactions. For example, interactions can occur through e-mail. So, it does not seem necessary to differentiate situations where the place is the same and the time is different from situations where the places are different and the time is also different. For the purpose of this research, these two situations were considered similar.

Quadrant 4: same time / different places

Text, audio and video conferencing systems were the media (genres) identified for this quadrant. Research in intermediation through conferencing systems is scarce. The

application of the technology to intermediation in library settings is still being tested and the results are inconclusive.

A brief review of studies conducted using these various electronic media follows where studies are grouped into those using synchronous (same time) and asynchronous (different times) electronic communication media.

#### 2.3.2.1 Synchronous electronic media

There is very little literature about the use of a synchronous electronic medium for intermediation in library settings and results of the adoption of this technology are at preliminary stages. Two technologies have been tested in synchronous intermediation: desktop videoconferencing (e.g., CuseeMe) and synchronous text-based communication, such as Internet relay chat (IRC), and Multi-User Object Oriented (MOO) technologies. The main characteristic of the literature on synchronous intermediation through an electronic network is that it is not research oriented and is restricted to the testing of the technology. Little theoretical research has investigated the collaborative electronic environment, integrating various media for intermediation, including desktop conferencing technology (see Section 2.3.2.3 below).

A few projects have tested videoconferencing technology for intermediation. In these studies, more attention has been dedicated to the testing of the technology for providing services directly to users. The technology was also examined as a potential tool for promoting collaboration among intermediaries. Results seem to be in very preliminary stages and are inconclusive.

Three projects reported in the library-science literature tested desktop videoconferencing technology as an implementation of reference services. They were conducted at the Shapiro Undergraduate Library of the University of Michigan (Folger, 1997), the Science Library at the University of California, Irvine (Lessick, Kjaer, & Clancy, 1997), and the Center for Business Information at Emory University (Pagell, 1996).

The three projects adopted similar procedures: they acquired the technology, installed it at the reference desk and at places where users could have access, divulged their project and started operating it. A common theme in all the project reports is that users and intermediaries were self-conscious while on camera. Pagell, for example, commented that “*Some people would never speak or look into the camera. Some found it an invasion of privacy.*” (Pagell, 1996, p. 25). Another issue raised in these experiments was that video by itself is not sufficient to promote effective user-intermediary interactions. For example, Folger (1997) found that one of the inconveniences of the technology is that students and librarians could not see each other’s screen. Along the same lines, Lessick et al. (1997) emphasized the importance of providing the capability for displaying text and graphical images, since their project allowed the use of whiteboards and chat-rooms simultaneously with video images.

In terms of technical aspects of using the technology, poor quality of audio and video seemed to be a common problem among these reference-service projects. The low use of the service caused frustration for intermediaries. In summary, these experiences show that there remain doubts about the adequacy of the technology for intermediation and users seem reluctant in adopting it as implemented.

Looking at the potential of using desktop videoconferencing technology for promoting collaboration among intermediaries, a project called “See you See a Librarian” was conducted at North Carolina State University (Morgan, 1996). The results were limited, as other libraries were not able to participate in the project because of the lack of availability of the technology.

If little has been written about intermediation using videoconferencing technology, the use of synchronous text-based communication for intermediation has been even less documented. According to Gray (2000), prior experiences with this technology were unsuccessful due to difficult interfaces. Users were perplexed by unfamiliarity with the technology. In recent years, although this technology has become more popular, there are still few applications of it in library services.

The Internet Public Library (IPL) had run a five-week pilot reference service using Multi-User Object Oriented technology (MOO) during November-December 1995 (Shaw, 1996). The IPL MOO was a real-time text-based environment that simulated a physical library. Thirty-six librarians participated in the project. Both users and librarians who had experience with the service evaluated it. Results of this pilot, among others, pointed to difficulty with user interfaces, low frequency of use and the amount of time required to use the system. The IPL MOO continued to operate until February 2000, when it was shut down due to decreasing use. A project conducted at the University of Maryland to investigate digital intermediation has also dropped the synchronous text-based communication option as it was considered to be “*extremely tedious to schedule electronic meetings and successfully connect*” (Abels, 1996, p. 346).

The University of Arkansas worked on a project in which graduate students served as virtual tutors to undergraduate students. This project created a MOO environment (ArkMOO) in which a virtual library was implemented, offering real-time text-based reference service (D'Angelo & Maid, 2000). Preliminary results of the project point to the potential of the technology for providing library services to remote students. However, the project has faced some operational problems and ceased before its full implementation. Various other libraries are trying to use Internet relay chat or MOO technologies for reference as reflected in postings on Internet discussion lists (such as DIG\_REF). However, to date, there do not seem to exist concrete indications of the adequacy of the technology for digital intermediation as presently conceptualized.

#### 2.3.2.2 Asynchronous electronic media

Although attention has been devoted to studying face-to-face interactions in library settings, studies of asynchronous text-based computer-mediated interactions (hereafter digital interactions) are scarce. Libraries began experimenting with email reference services in the mid-eighties, mainly in health science and engineering libraries (Still & Campbell, 1993), but very little research on them has been done to date. Initial use of email reference was for photocopy requests (Weise & Borgendale, 1986). Most of the literature in email reference services is anecdotal (Carter & Janes, 2000; Howard & Jankowski, 1986; Philip, 1997; Sloan, 1998; Still & Campbell, 1993; Whitaker, 1989). These descriptions are based on non-systematic observations of email reference practice and are not guided by theoretical models. A few empirical studies have actually focused on digital reference services. These studies are reviewed in the following sections.



### *2.3.2.2.1 Use and management of digital reference services*

In the studies conducted in this area the researchers have looked at digital reference services from various perspectives. From an administrative perspective, Lankes (1998a) conducted a qualitative study on K-12<sup>4</sup> digital reference services. The purpose of his study was to understand the process of building and maintaining digital reference services on the Internet. One of his findings relevant to the present study is that the information-provision services studied treated users as questions, without looking deeper at their actual information problem.

Other researchers have conducted user studies to investigate who the users of digital reference services are and what kinds of questions they ask. For example, Bristow and colleagues analyzed the Indiana University digital reference services' clientele. They conducted two surveys: 1991 and 1994 (Bristow, 1992; Bristow & Buechley, 1995). In both surveys the researchers found that the service was mostly used by faculty, staff or graduate students who use computers on a daily basis. The use of the service increased significantly from 1991 to 1994. The greatest increase detected was in the number of graduate student users; from 14 in 1991 to 111 in 1994.

Bushallow-Wilbur et al. (1996) also conducted a user study at the University of New York at Buffalo, covering eighteen months of the digital reference service operation. The purpose of the study was to determine who uses email reference, what types of questions are asked, when they are transmitted, and whether those who use email prefer it to more traditional means of asking reference questions. Among the findings, respondents

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<sup>4</sup> K-12 is short for Kindergarten through 12<sup>th</sup> grade.

emphasized the ease and convenience of using reference services via email; they mentioned immediacy and accuracy as motivations for using the service. Most of the questions were reference questions (70%). Of these, 74% were responded to using standard reference tools (known as “ready reference”). The use of the service increased during the course of the study from 13 to 20 per month. This study also found that 58% of the respondents preferred email reference versus 37% that indicated a preference for face-to-face; 5% selected the telephone.

Of course these studies describe the situation almost a decade ago, and findings may well be different if these studies were repeated today.

A more recent user study conducted by Schilling-Eccles and Harzbecker (1998) continues to show a low-level of use of reference services. Researchers first analyzed the email reference service at the Alumni Medical Library at Boston Medical Center. After verifying the low use of the service, researchers investigated why email reference services were not heavily used, and when it is used, to what extent it impacts the user-intermediary communication. Beyond studying the content of the interactions of their local library, the authors selected forty librarians from academic and health-science libraries in the United States to be interviewed in order to elicit their perceptions about their email reference services. Results confirmed the low-level use of email reference services in other libraries. Librarians identified potential barriers to the use of this modality of service, such as, *limited access to computers*, *inconvenience* (users want immediate responses) and *lack of personal contact*. The low level of use seems to give corroboration to the findings of other authors who have raised this issue (Bristow, 1992; Bristow & Buechley, 1995; Bushallow-Wilbur et al., 1996; Gray, 2000).

While most library-based reference services are experiencing under-use, the so-called AskA services – email or web-based reference services aimed at the K-12 community – seem to be sustaining a growing acceptance (Lankes, 1998c). The digital reference service AskEric, for example, on average responds to more than 1,000 questions per week (Lankes, 2000). Government-service providers are also experiencing an increasing number of users in the electronic medium (Mon, 2000). These apparently disparate measures of use between academic library digital reference services and AskA services and government sites suggest a need for a broader understanding of digital reference services.

Another example of highly used service is the Internet Public Library (IPL). Focusing on analyzing the interaction logs between users and intermediaries, Carter and Janes (2000) conducted an exploratory study of requests sent electronically to the IPL. The authors analyzed 3,022 questions submitted to IPL during the January-March 1999 period. The authors characterized the IPL's clients, classified requests as *factual* and *source*, identified the subjects of the requests, computed the time spent on answering the questions and discussed some operational procedures of the service. The authors acknowledged that this was a beginning stage, with the results of this study serving as a starting point to more comprehensive research in which content analysis of questions and user's satisfaction might be included.

#### *2.3.2.2.2 Impacts of the information technology on digital reference services*

Looking at the phenomenon from a different angle than the previous user studies, a study conducted by Tenopir and Ennis (1998) surveyed reference librarians from academic research libraries across the United States. The purpose of the study was to

evaluate the impact of digital resources on users and librarians. Results from respondents (68 academic libraries) indicated that the new information technologies have promoted a change in users' attitudes (users expect to solve their information problems with electronic resources), a growing need for instruction for users and an increase in librarians' workload as more and different resources are continuously added. The authors suggest that the demand for remote assistance to users will continue to rise.

Additionally, the literature points to various unique characteristics of the use of an asynchronous text-based computer-mediated medium for reference services:

- It “*can allow for a more thoughtful process of question negotiation*” (Straw, 2000), as there is no need for immediate response. Intermediaries can take more time to think or look for a more adequate way to respond to users' requests (Bristow & Buechley, 1995; Bushallow-Wilbur et al., 1996; Gray, 2000; Roysdon & Elliot, 1988; Straw, 2000).
- It facilitates follow-up contacts with users and enables sending them search results (Abels & Liebsher, 1994);
- It reduces barriers for non-native English speakers who may have more facility in writing than speaking in English (Bristow, 1992; Fishman, 1998);
- It facilitates referral of a question to someone else (Fishman, 1998);
- It facilitates the development of question and answer databases (Fishman, 1998).
- It allows for more equality in user-intermediary interactions (Wilson, 2000).

How these features affect the actual interaction between users and intermediaries is yet to be investigated.

### 2.3.2.2.3 *Digital reference service as a process*

Most of the studies presented so far give an overview of the use of digital reference services and the impacts of the information technology on digital reference. They do not, however, significantly augment our understanding of intermediation, as a process, in this new environment. The following studies address the issue of intermediation more directly.

Abels studied digital reference service in a three-phased project at the College of Library and Information Services at the University of Maryland (Abels, 1996; Abels & Liebsher, 1994). Adopting an exploratory approach for three semesters, the researchers conducted the study with graduate students acting as intermediaries. One of the researchers' objectives was to verify the feasibility of question negotiation using email. Data analysis was conducted on the texts of the transcripts of the reference interviews, subject's motivation, user's reported preferred medium and students' critiques of the experience of acting as intermediaries. Initial results indicate that questions can be negotiated successfully via email. Researchers, however, acknowledged the need to extend the study using real-settings and experienced intermediaries. The research identified various models for conducting a reference interview through email and made recommendations for designing a form for entering users' initial requests. Furthermore, results indicated that reference interviews are composed of three messages: the problem statement by the client, a summarization of the information need by the intermediary and a confirmation by the client.

Although the research goals were comprehensive, the research findings did not produce a deep understanding of remote intermediation because:

- the study was not conducted in a naturalistic setting (intermediaries were students with low reference-interview experience),
- there was no control for users' or intermediaries' differences (no users' demographic data was collected and the research does not account for intermediary variability – 65 students participated as intermediaries),
- interactions were analyzed out of their context and the researchers referred to this analysis as “informal” (Abels & Liebsher, 1994, p. 3).

Hahn (1997, 1998) conducted an exploratory study on a help service that answered questions related to network use and the use of telecommunications software. Unlike Abel's research, Hahn conducted her study on naturally occurring user-intermediary interactions. She analyzed one month of logs of outgoing messages generated by the service (265 help service responses). Additionally, five users and six intermediaries were interviewed. Findings suggest that users and intermediaries have different models for ideal email communications: intermediaries expect an extended dialogue similar to face-to-face conversation, and users expect a more limited match of question statement with appropriate response. Question negotiation occurred, but in rare cases. The researcher stated, however, that the analysis of interaction logs by themselves did not indicate reasons why, and in which situations, the negotiations had occurred.

In analyzing Hahn's research, two major issues emerge. First, the interactions between users and intermediaries were analyzed outside of their environmental context. So, the identification of factors affecting the interaction (e.g., problems, limitations and benefits) - a primary goal of the research - could not be investigated. As the researcher

recognized, the texts of interactions did not reveal “how” and “why” interactions had occurred in the way they did. Second, the interview sample was too small and, therefore, the study results leave open questions.

Garnsey and Powell's (2000) study, although using a different methodology and investigating a different type of setting, shares a similar research question with the present study. The authors investigated electronic reference in public libraries. One of their goals was to identify factors that influence users in deciding to ask a reference question via email. They used survey instruments to collect data from users and librarians. Twenty-two librarians from public libraries in the United States and thirty-eight patrons responded. The researchers also analyzed the questions posted. The study's findings point to *ease* and *convenience* as factors influencing a user's decision in using email to ask reference questions. The present study showed that these two terms are vague and further probing indicated various reasons associated with *ease* and *convenience*. Garnsey and Powell's study also did not consider context as a source of factors. Their methodology did not allow exploring a wider range of factors.

Miwa (2000) investigated intermediation from the user's perspective. Her goal was to identify tasks requested of intermediaries by users, situational factors that are salient when users make these requests and patterns of association between situational factors and tasks. She investigated users of a particular digital reference service, AskEric, which is a question and answer service in Education that targets the K-12 community.

Although Miwa's interest was not in examining factors associated with digital intermediation, some of her findings inform the present research. For example, in her data analysis she verified a discrepancy between the question asked by a user (based on the

analysis of the question transcript) and the data collected in interviews, reflecting what users reported asking. Such findings reinforce the design of the present research.

Interaction logs were analyzed; interviews with both customers and intermediaries were conducted, and field observations were made in order to provide contextual information related to the intermediations. Another relevant finding of Miwa's study was that external situational factors are related to what users asked of intermediaries. This finding corroborates Stavri's (1996) study results in the medical context in which questions vary across situations.

### 2.3.2.3 Integration of various media

New technologies are emerging in the business market that allow the use of various media to promote interactions between vendors and customers. These may provide promising advances that could be adapted for user-intermediary interactions. Following this direction, McGlamery and Coffman (2000) report on an ongoing project in which they evaluate the use of Web Contact Center Software for reference services. This software, beyond the basic functions of call centers (queuing and routing users' requests), takes advantage of the multimedia features of the web in a way that gives users the opportunity to email requests, talk to intermediaries, use a chat-room or even use video to communicate with intermediaries. Applications of this software are already operational in some companies for handling product sales and service. The McGlamery project installed the Web Contact Center Software in a central server and public and academic libraries in Los Angeles and Orange Counties have performed preliminary tests. This initial phase was anticipated to continue through the summer of 2000 and to date there have been no new reports in the research literature.



The use of integrated media for offering digital intermediation has also been the object of research conducted by Davenport and colleagues (Davenport, 1997; Davenport, Procter, & Goldenberg, 1997). They investigated circumstances under which different genres and media (videoconferencing, email, synchronous text-based communications, etc.) would be most appropriate for remote reference consultation. This research project is part of a larger project that has the objective of developing a collaborative environment for digital libraries (Procter, Goldenberg, Davenport, & McKinlay, 1998; Procter et al., 1997).

#### 2.3.2.4 Summary of the literature on intermediation through electronic media

Studies of synchronous intermediation using an electronic network are in their preliminary stages. The technology is still being tested and results are inconclusive. The major issues raised involve technical aspects of the technology, such as poor quality of image and sound. Self-consciousness of users and intermediaries on camera and low use of the service during the test phase were also raised.

Similarly, text-based synchronous intermediation does not seem to have performed better. Reports of experiences of using the technology for intermediation are rare. Two well-known projects, Internet Public Library (Janes, 1996; Ryan, 1996) and the University of Maryland digital reference service (Abels, 1996), have stopped offering the option for synchronous text-based intermediation in their digital reference services. Two reasons seemed to motivate these decisions: low use and the fact that it is time consuming.

Although research studies in asynchronous digital intermediation are also in the preliminary stages, researchers and information professionals have paid more attention to

this medium of communication than the synchronous forms. The major issues raised in the literature are:

- User studies have demonstrated a low-level of library-based digital reference service usage (Bristow, 1992; Bristow & Buechley, 1995; Bushallow-Wilbur et al., 1996; Howard & Jankowski, 1986). This finding contrasts with the experience of other information-provision services, so called AskA-services (usually virtual and non-library based) (Lankes, 1998a, 2000) and government information-provision services (Mon, 2000) that are experiencing increasing success and growth.
- Librarians have suggested that potential barriers to digital reference services use are related to the impersonality of the medium, while at the same time, users have identified advantages such as convenience, accuracy, immediacy, etc. of using email reference services (Bushallow-Wilbur et al., 1996). Ease and convenience were also found in Garnsey and Powell study (2000) as factors that influenced users to request information via email.
- Users' question-negotiation is feasible through email in experimental settings (Abels, 1996; Abels & Liebsher, 1994). Despite this finding, most libraries offering digital reference services are limiting their operation to requests that do not require negotiation.

It is important to note here that rapid changes in information technology make tenuous the findings of even the most recent studies.

In summary, research in this area is in its preliminary stages and it reveals a lack of understanding of the interactions occurring through an asynchronous text-based

computer-mediated medium. Such knowledge is necessary in order to provide human-intermediated information services using this medium that better match users' needs.

#### 2.3.2.5 The contribution of the literature on intermediation through electronic media to the present study

The literature on intermediation through electronic media helped the researcher in (1) identifying the major issues being discussed and researched in the area, and (2) pinpointing a specific topic in which there appeared a need for further research. Since the research in digital intermediation is in its initial stage and theoretical frameworks are under continuous revision and development, this study adopted an exploratory approach. The literature, however, revealed important issues that have yet to be fully understood.

Two major issues found in this literature have triggered the present research:

- the contrast between highly used digital information-provision services and low use of others;
- the restrictions imposed by many such services of not dealing with users' requests following extended question negotiation.

The present research, then, tried to address some of these issues with the goal of gaining a deeper understanding of digital intermediation using an asynchronous text-based computer-mediated medium.

## 2.4 Computer-mediated communications

Since this research focused on digital intermediation, where communications were, at least partially, text-based and computer mediated, the body of literature in computer mediated communications (CMC) related to email use in organizations was considered relevant. Although this literature is extensive, the theories and models emerging from these studies are neither conclusively supported nor refuted (Carlson & Zmud, 1999; Carlson & Davis, 1998; D'Ambra et al., 1998; El-Shinnawy & Markus, 1998; Fulk & Boyd, 1991; Fulk et al., 1990; Garton & Wellman, 1995; Markus, 1994; Rice et al., 1994; Rudy, 1996; Steinfield, 1992; Walther, 1992)

Two major streams of research are prevalent in computer-mediated communications research: (1) those that study how individuals choose a medium to convey a message – i.e., media choice theories and models – and (2) those that study the impacts that an elected medium has on communication. Both research streams are informative for the present study. The former stream provided background for understanding factors related to the medium that may affect its usage for a particular task. Since impacts of using a communication medium may also influence an individual's usage of a medium, the second stream of research was also considered.

The following sections present a review of the computer-mediated communication literature considered relevant to the present study.

### 2.4.1 Media choice models

Media choice theories can be grouped according to what class of factors are emphasized in the explanation of media choice (Steinfield, 1992; Webster, 1995). These are:

- Rational explanations of media choice
- Social explanations of media choice.

While rational media choice theories are based on the individual-level aspect of media choice (individual's perception), the social theories emphasize the collective aspect of media choice (social construction) (Markus, 1994). *Information richness* (Daft & Lengel, 1986) and *social presence* (Short, Williams, & Christie, 1976) are the most influential rational choice theories in the CMC literature. The *social influence model* (Fulk et al., 1990) and *critical mass theory* (Markus, 1990), the most acknowledged social media choice/use theories, were proposed as an attempt to account for study's findings that were not explained by rational media choice approaches.

#### 2.4.1.1 Rational media choice models

The rational media choice theories are based on a common premise that individuals choose a medium motivated by efficiency, that is, by evaluating the capability of the medium to adequately convey the information they intend to communicate.

The theory of *social presence*, proposed by Short et al. (1976), hypothesizes that users will choose the communication medium based on two factors: *type of interaction* intended and the *perceived degree of social presence of the medium*. Social presence is "... a quality of a [communication] medium that permits users to become more or less aware of the other person in the interaction." (Matheson, 1991, p.137). Users would tend to avoid a lower social-presence medium for interactions requiring higher interpersonal involvement, such as negotiations or conflict resolutions (Stalker & Murfin, 1996).

A series of studies conducted by Short and others (1976) led to the identification of a list of activities that are sensitive to the medium's perceived social presence (Rice,

1993). Among these they identified the activity of *exchanging information*.

Intermediation comprises exchanging information activities and, therefore, as suggested by the social presence theory, users or intermediaries' media choices may be affected by their perception of the degree of social presence of the medium.

The *information richness theory* (Daft & Lengel, 1986), in its original version, is a prescriptive model in which the effectiveness of a communication depends on the match between the *richness of the medium* and the *degree of ambiguity of the task*. Media of low richness process fewer cues, restrict feedback, and are less appropriate for resolving equivocal issues. Media of low richness are effective for processing well-understood and standard data. Traditional media were ranked as (1) face-to face (the richest), followed by (2) telephone, (3) personal documents (e.g. letters, memos), (4) impersonal written documents, and (5) numeric documents.

A later review of the *information richness theory* identified two new factors influencing media choice: contextual determinants and symbolic meaning (Trevino, Daft, & Lengel, 1990). The contextual determinants refer to constraints that may be imposed in choosing a medium, such as geographic restrictions (e.g., distance between communicators may not allow face-to-face choice) and time pressure. Symbolic-meaning refers to the organizational meaning attributed to different media that extends beyond the specific content of the message. Trevino, Daft and Lengel included email in the media richness ranking between telephone and personal documents

User-intermediary interactions may have various degrees of equivocality, depending on the awareness and complexity of the user information problem. Contextual determinants also seem to play an important role in the intermediation process.

Additionally, individuals may perceive the richness of email communications differently. Information richness theory may be a helpful model to assist in understanding media choice in digital intermediation.

#### 2.4.1.2 Social media choice theories

Empirical evidence in the CMC research literature suggests that factors other than the ones considered in rational models may affect media choice (e.g., Carlson & Zmud, 1994, 1999; Fulk, 1993; Fulk et al., 1990; Markus, 1990, 1994; Steinfield, 1992; Webster, 1995). The *social influence model* (Fulk et al., 1990) is an alternative approach to rational media choice models. It proposes a broader set of factors that might influence media use. The social influence model posits that "*media perception is, in part, subjective and socially constructed.*" (p. 121). The quality of the medium is not a fixed attribute of the medium (as posited by rational choice models) but instead, it varies across individuals and situations.

The *social influence model* is seen by some researchers (e.g., Steinfield, 1992; Webster, 1995) as an extension of the information-richness theory because the model recognizes that rational decision-making plays a role in media choice. This model identifies the following classes of factors directly affecting media use (Fulk & Boyd, 1991):

- Media evaluations (not an objective feature of the medium but a user's perceptions and attitudes toward the capacity of the medium in communicating the message they have in mind);
- Media experience and skills;

- Social influence, that in organizational settings would be: direct statements by coworkers regarding the application; vicarious learning; group behavioral norms; and social definitions of rationality;
- Task evaluations; and
- Situational factors such as: individual's difference, facilitating factors, and constrains.

Two distinct social contexts may influence media choices in digital intermediation: the user's and the intermediary's context. Organizational context may strongly influence intermediary's actions. However, social influence on users can originate through various situations. For example, if the user is a student the influence can come from instructors or class requirements.

Markus proposed the application of the *critical mass theory* to interactive media (Markus, 1990). According to Markus, an individual realizes the benefit of using a medium only when the medium has reached a level of universal access in the community. The critical mass theory seeks to explain how universal use within a community develops (Steinfeld, 1992, p. 354).

In studying digital information-provision services, multidirectional communications, an important component of critical mass theory, do not play a significant role, since the communication is dyadic - i.e., between a user and an intermediary. However, the researcher believes that universal access may increase in importance as such services start operating cooperatively, opening reference interviews to the participation of various intermediaries or users.



In an attempt to account for inconsistencies in the CMC literature and trying to further explain how individuals perceive communication channels, Carlson and Zmud (1999, 1994) developed the *channel expansion theory*. This theory is not so broadly discussed in the CMC literature as the ones previously presented, but it introduces new variables in explaining media perceptions that might be important for digital intermediation. As in the social influence model, Carlson and Zmud presuppose that media richness is not a deterministic characteristic of a medium but instead is a perception that individuals have about it. While the social influence model indicates that such perception is socially constructed, channel expansion theory amplifies this concept, suggesting that experiential factors also contribute to the perception of media richness. Four types of experiences are identified as relevant in this theory. Experience with:

- the channel;
- the message topic;
- the organizational context; and
- the communication participants.

As individuals acquire such experiences they develop knowledge bases that may be used to code or decode richer messages in a given medium. Thus, individuals who build such knowledge bases are then able to participate in richer communications and therefore, might perceive a medium as increasingly richer. Although this theory does not predict media selection, it assumes that individuals' perception of the medium affects their attitude towards media selection.

## 2.4.2 Impacts of an electronic communication medium

In Sproull and Kiesler's (1986) perspective "*senders and receivers are situated within a social context that regulates or influences communication contact and content.*"

The researchers identified three kinds of variables that most prominently contribute to the social context: geographic (e.g., a person's physical position in time and space), organizational (e.g., person's status in the organization) and situational variables (e.g., the relationship of senders and receivers, norms and social conventions for the situations).

Different communication media, to different degrees, attenuate the social context cues that would be available in a face-to-face mode. Electronic mail, in particular, is likely to have a strong effect in attenuating social context cues. The *lack-of-social-context model* posits that the absence of such cues in computer-mediated communications leads to:

- Excited and uninhibited behavior;
- Self-absorption;
- Equalized participation.

Another important aspect raised in the *lack-of-social-context model* is the emphasis on the effects of the context on the communications. The present research is consistent with this view as it assumes that the contexts of users and intermediaries play an important role in understanding digital intermediation.

Concerning equalized participation, O'Mahony and Barley (1999) point out that there is not much evidence supporting the belief that CMC equalizes status within organizations. Studies that indicate some support to such behavior are more focused on individuals' behaviors in small groups. Wilson (2000) also looked at the specific aspect

of equalized participation but focused on user-intermediary communication. In proposing the use of *culture theory* to understand user-intermediary interactions, he analyzed the nature of user and intermediary relationships. Wilson posited that users whose orientation is hierarchical are best served by traditional reference, where they have the role of supplicants and the librarians the role of gatekeepers. According to the author (and consistent with Sproull and Kiesler's model), this situation, however, is reversed in a digital environment where the relationships are more equalized. Thus, the author suggested that users served in the new environment are those who are more individualistic and egalitarian.

#### 2.4.3 CMC and group communications

The largest body of empirical studies on impacts of digital communications is concerned to group communications (O'Mahony & Barley, 1999). In these studies various other CMC effects have been identified such as individuals' increased *participation*, *risk-taking* or group difficulty in *reaching consensus*. As the present study is focused on dyad communications, this body of literature does not seem directly related to the present study and therefore is not reviewed here.

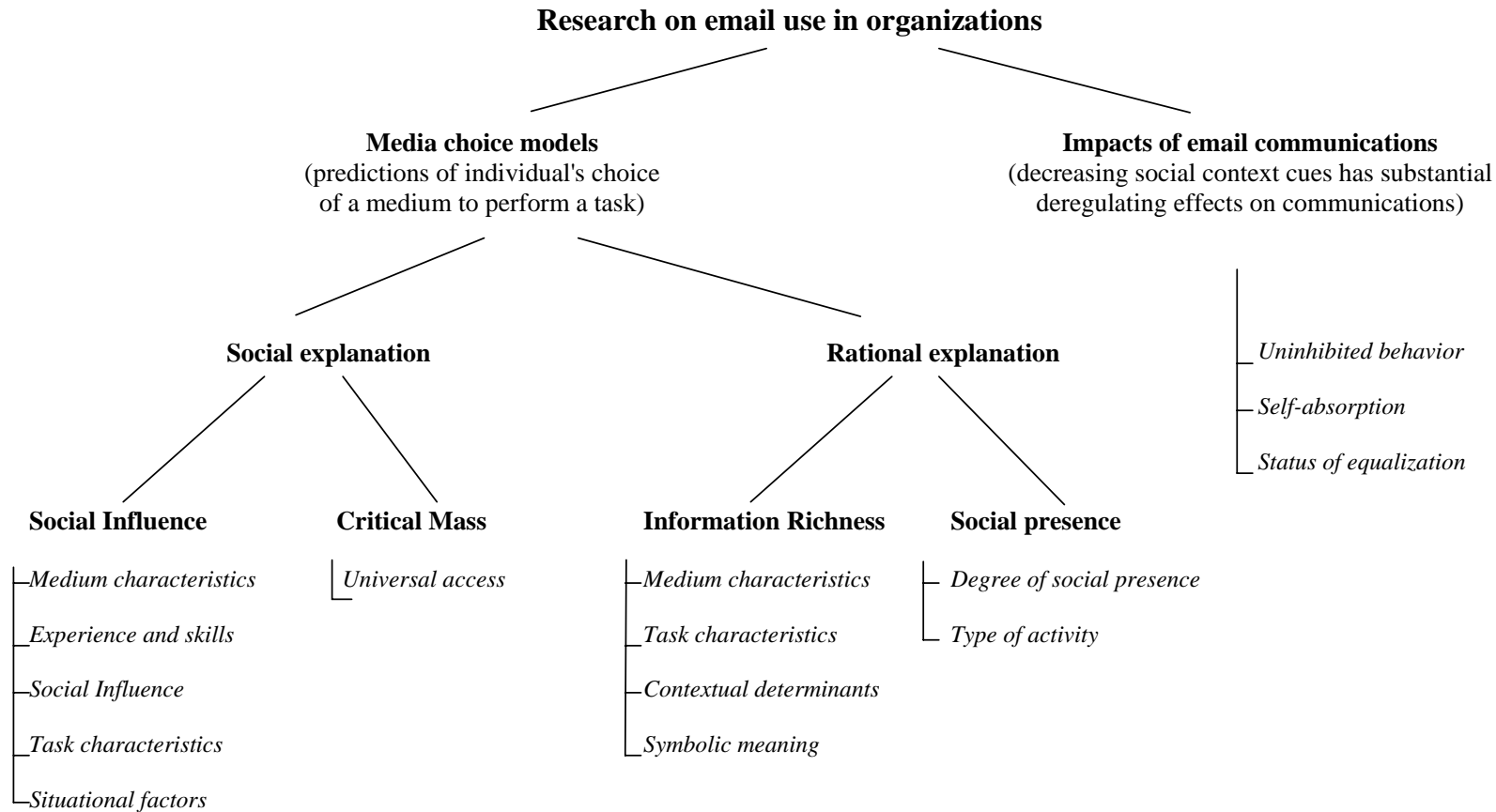
#### 2.4.4 Other factors affecting media use and choice

The inconsistencies in supporting the various CMC models seem to have motivated researchers to conduct empirical studies to test existent models or to extend the spectrum of factors potentially affecting media choice and use. Among others, researchers have identified factors such as *media experience* (King & Xia, 1997; Rice et al., 1994), *job pressure* (cited in (Carlson & Davis, 1998)), *temporal factors*, (Carlson &

Davis, 1998), *ease of use*(Adams & Todd, 1992). However, to date, there is no consistent or generally accepted theoretical framework able to predict or explain media use and choice in organizations. According to El-Shinnawy and Markus (1997) a complex set of social factors governs organizational media use that existing theories cannot fully explain (p. 242). Thus, this review focuses on those models that seemed more broadly discussed in the literature or those considered more directly related to the present study.

#### 2.4.5 Summary of the CMC literature of interest

The diagram presented in Figure 2-4 shows the various factors identified in organizational settings that may affect email communications, as identified in models reviewed in Sections 2.4.1 and 2.4.2



**Figure 2-4: Factors identified in CMC models considered relevant to the present research**

#### 2.4.6 Contribution of the computer-mediated communication literature to this study

The literature in CMC helped to identify potential factors that may affect digital intermediation. These models and theories did not formally guide the study, but some of these factors were considered in designing the initial interview guide.

Informed by the CMC literature, the following aspects were considered as possible a starting place for data collection:

- perceptions about the adequacy of the medium for the task;
- perceptions of the complexity of the task;
- circumstances under which the interactions occurred;
- possible medium switches (from or to text-based computer-mediated medium);
- previous knowledge about the person with whom respondents are interacting;
- previous experience with the information-provision service;
- previous experience in using text-based computer-mediated medium; and
- local organizational culture that affect the use of the medium for intermediation.

As explained earlier these were a starting point, sensitizing the researcher to possibly fruitful factors. Whenever any of these aspects emerged as relevant during data collection and analysis, the researcher went deeper into investigating them. On the other hand, those that did not seem relevant were abandoned.

## 2.5 Overview of information seeking behavior in medical settings

Since the selected site for this study offers services to health professionals (see Section 3.4.2.2 for details on the chosen site), the following section gives a brief overview of some of the characteristics of information-seeking behavior in medical settings.

Leckie, Pettigrew, and Sylvain (1996) state that models of information seeking that have been developed for scholars are likely to be inadequate for professionals. Among other reasons, the authors point to the fact that professionals have different constraints in their work, access to alternate sources and types of information, and may play different roles throughout a given day. These roles might include counseling, supervision, planning, and so on. Since the information-provision service selected for this study offers service to healthcare professionals, this section provides an overview of information-seeking behavior of potential users of this type of service. It is not a comprehensive literature review but it tries to cover the main aspects that are particular to healthcare environments. The existent literature on intermediation in medical settings was already reviewed in previous sections.

The main objective of reviewing this literature was to familiarize the researcher with language and topics that helped her to understand the rather specific context of health information. Three aspects of the literature were chosen:

- General characteristics of the information needs of healthcare professionals;
- The main information resources used; and
- The role of intermediation in medical environments.

As an overview of the characteristics of research of information-seeking behavior in medical environments, Detlefsen (1998) points on that:

- Surveys, interviews and focus groups are the most popular methods of studying information-seeking behavior in medical settings. A few researchers have used vignettes or critical incident techniques.
- Most of the information-seeking literature is descriptive rather than prescriptive. Few researchers have actually attempted theory building.
- Models of information seeking are not particular to medical settings. An exception is the model developed by Leckie et al. (1996), whose model was aimed at professionals, including those who deal with healthcare.
- Little research has been done in the high-technology workplace envisioned by medical informatics researchers.
- Not surprisingly, MEDLINE is the most studied information system reported in the literature.

### 2.5.1 Information needs and sources

In the site chosen for this study two types of healthcare professionals are more likely to be the predominant users of information services: physicians and nurses. Beyond offering service to these kinds of users, information service also are offered information service to patients, and recently the site has opened its information service to the public, publicizing it through the Internet. The following sections present some characteristics of the information-seeking behavior of potential users of the service.



### 2.5.1.1 Nurses

While the information needs of patients and the public external to the hospital are difficult to identify, researchers have studied the information needs of physicians and nurses. A study conducted by Buyan and Lutz (1991) indicated that nurses make very low use of libraries (cited in Leckie et al., 1996). In their study, although nurses represented 31% of the hospital staff, they represented only 6% of the library's users. While the study found that most of the nurses' questions presented to the library were not related to patient care, other studies have suggested that they do look for information related to patient care from various other sources, such as from other nurses, physicians, pharmacists or laboratory results (Leckie et al., 1996). Acknowledging that nurses may need healthcare information as much as physicians do, King (1987) points out that due to the smaller size and less adequate personal and departmental collections, and additionally, due to nurses' rigid work schedules, they face more obstacles to accessing information.

### 2.5.1.2 Physicians

The information needs of physicians are the focus of much attention in the literature. Based on various research studies (details in Leckie et al., 1996), the following list gives an overview of some these studies' findings:

- Needs and uses of information may vary widely depending on the physician's specialized practice.
- Articles in professional journals, colleagues and books are the most frequently used sources.
- Family practitioners and obstetricians use colleagues more than other sources.
- Urban professionals use colleagues more than those in other areas.

- Professionals in solo practice use medical libraries more than do those working in institutional or group practices.
- Physicians with less than 10 years' experience rely more on books as information resources.
- Consultation with colleagues decreases as physicians grow older.

Various researchers have tried to characterize healthcare professionals' information needs. The analysis of physicians' questions to Medline has produced a series of question categorizations. According to Florance (1996), the most comprehensive study was conducted by Wilson et al. (1989). Here, researchers analyzed 1,158 reports where physicians tried to locate literature in Medline. The findings showed that 43% of these requests were to support patient care. Of these requests, 51% were treatment or prognosis questions, and 41% were diagnosis or etiology questions. A central motivator concerning the use of literature by health practitioners is their permanent need to keep themselves up-to-date about diseases, processes and treatments. Despite this fact, various studies have reported the low use of the literature by practicing physicians (e.g., Ej, 1989-90; King, 1987). Researchers have pointed to *lack of time* as one of the major barriers preventing a more adequate use of the literature. For example, in studying rural physicians, Dee and Blazek (1993, p. 263) reported that physicians have many unanswered questions and that the information resources available are not sufficient. Florance (1996), studying the same population, estimated that for two typical questions in a workday requiring a search, the physician would need to dedicate approximately four hours to information-seeking activities.

Florance and Welch (1992) have looked at physicians' use of information resources from a different perspective. Assuming that the structural characteristics of the

information sought by physicians would help to explain the nature of clinically applicable medical knowledge, the authors analyzed sixty questions posed by practicing physicians. They analyzed stated and unstated needs, certainty levels, implicit and explicit assumptions, decision-making processes, and types of answers required. Their findings suggest that clinical problem-solving is based on declarative and procedural knowledge, and that procedural knowledge is scarce in biomedical journals, or is more difficult to identify.

Following the same line of research in a follow-up study, Florance (1996) has raised the question of the adequacy of the Medline record structure for physicians' information needs. She found that physicians, when searching, have a patient-care model, while the database was created using a citation model. The well-known introduction-methods-results-discussion-conclusion structure of research articles presents a problem for the physicians who come to the literature with a conceptual model of a problem that is shaped by a specific patient's case.

Healthcare professionals use diverse sources of information. According to Gruppen (1990) a number of factors affect physicians' information-source preferences, such as the physician's characteristics (age, experience, specialty, etc.), practice characteristics (community size, practice type, etc.), and availability of other physicians (colleagues, specialists, etc.) for consultation. Although information-sources preferences vary, informal consultation with colleagues or specialists pervade almost all reports of the various studies on information sources used by physicians (e.g., Cullen, 1997; Dalrymple, 1990; Dee & Blazek, 1993; Leckie et al., 1996; Thompson, 1997; Tsafirir & Grinberg, 1998; Woolf & Benson, 1989). Haug (1997) analyzed twelve published investigations of

physicians' information-seeking behavior in the United States and Canada that were reported between 1978 and 1992. The author reported facing various difficulties in conducting a meta-analysis. Nevertheless, the analysis revealed a credible pattern of information-seeking behavior practices. Physicians frequently use books and journals as their preferred sources of clinical information. Getting information from colleagues or consultants ranked next to the medical literature.

Consultation with colleagues seems to play an important role as an information resource in medical environments. Three criteria are pointed to in the literature as being prevalent in choosing a resource: immediacy, reliability and usability. Consultation with colleagues seems to satisfy these criteria. A study conducted in New Zealand showed that medical specialists are critical gatekeepers for family practitioners (Cullen, 1997). According to Cullen, *"a gatekeeper is an individual of standing who both seeks information and disseminates it to a particular cultural or occupational group."* (p. 348) As posited by Cornelly et al. (cited in Cullen, 1997, p. 349), the advantage of interacting with colleagues is the possibility of clarification and questioning, improving the chances of application of the information sought.

Emphasis on colleagues as a main information resource was also found in an investigation of rural physicians (Dee & Blazek, 1993). Lack of time due to workload was reported as a major reason preventing rural physicians from searching for formal information.

In practice, physicians seem to respond more readily to the counsel of their peers and local opinion leaders, and it is expected that the pool of available experts will increase with ever-wider availability of network consultations. (Tsafirir & Grinberg, 1998, p. 43).

Other information sources frequently used by physicians are books and journals that belong to their personal collection and not to a library. Gruppen (1990) pointed out that prior studies often have not included libraries as primary information resources, which makes it more difficult to evaluate the use of libraries by physicians.

The use of electronic resources in medical settings has been increasing, as shown in a study that compared the number of times print and digital sources were used to answer reference questions in a period of 6 months in 1996 (Li & Wu, 1998). Results showed that bibliographic databases (30%) and OPACs (25%) were the sources most used. Accordingly, database-searching assistance (46%) was the instruction most frequently given, followed by instructions for web and Internet tools (32%). Medline has been widely acknowledged as the most valuable information resource for traditional and even evidence-based medicine (Dalrymple, 1990). The use of electronic resources, however, brings new difficulties. For example, Dorsh (1997) in a study conducted with rural physicians identified the need for intermediation since rural health professionals feel that they lack the time to master search skills and keep up with changing information technologies.

In library science literature, the Internet has been reported as an important source of information (Ladner & Tillman, 1993; Li & Wu, 1998; Mardikian & Kesselman, 1995; Schilling & Wessel, 1995; Silva & Cartwright, 1994; Strong, 1996; Tenopir & Ennis, 1998; Vishik, 1999; Zulmat & Pasicznyuk, 1998). In the medical setting, a survey conducted in 1995 showed that 48% of the 103 academic health-sciences libraries participating in the study reported that the Internet's major benefit was to answer reference questions (Schilling & Wessel, 1995). Not all medical-information areas,

however, can rely on the Internet as a reliable information resource. For example, McKibbin (1998) points out that the Internet contains very little literature about clinical research for evidence-based practice. Despite this, Tsafirir and colleagues (1998) indicated that many healthcare professionals are, in fact, using the Internet to gather the information they need. The authors caution about the danger of basing clinical decisions on such resources since comprehensiveness, accuracy and reliability are not assured. Concerns about the quality of information on the Internet is shared by other authors (e.g., Vishik, 1999).

#### 2.5.1.3 Patients

As pointed to by King (1987), studies have indicated that patients do not use libraries as frequently as might be anticipated. On the other hand, the provision of information directly to patients seems to be a controversial issue. Despite this, one hospital library has created an information service focused on patients' needs (Tarby & Hogan, 1997). The service responds to information requests from staff members within 24 hours and to patients' requests within 2 hours. In eighteen months of the service operation, the patient requests rose from 3% to 30% of the total amount of the requests at the hospital library. The authors stated that information typically requested by patients was disease processes and psycho-social concerns.

A study conducted by D'Alessandro et al. (1998) investigated the user demographics of a digital health sciences library. The largest user category comprised patients and laypersons followed by students and physicians. The digital library investigated in this study does not provide intermediated service, which means there are no intermediaries available to help users with their information problems. Users have to

search the library resources by themselves. The library, however, provides an email and web-form in order to receive user feedback and, eventually, if they receive medical questions they redirect them to other information-provision services. The authors conducted the study based on information coming from email and the web-form. Concerning the medical content of these emails and web-forms, the researcher found that most of them were related to medical advice and patient care.

#### 2.5.1.4 Students

A comprehensive study that addresses tasks asked of intermediaries by students in medical libraries was conducted by Cochrane (1981) at Syracuse University. This study is reviewed in Section 2.3.1.1 (Task Models). While that researcher described *situations* where users go to a library (a formal channel) to look for information, Wildemuth (1994) conducted a study that investigated the *questions* asked by students in healthcare situations. Using vignettes describing situations where patients were affected by a toxin, she analyzed the types of questions and to whom they are addressed. Sixty-three first-year students participated in the study. They were given the opportunity of asking two questions to hypothetical internists and librarians. She found that students tended to ask the librarian questions about the identity of the toxin and additional references, and that they were more likely to ask the internist for explanations of the symptoms and descriptions of treatment (Wildemuth, 1994). Although in a limited way (because it is attached to specific scenarios and two kinds of experts), this study assumes the need for formal (references in the library) and informal channels (internists) of information sources and shows differentiated types of questions that are expected to be answered by them.

Using a similar methodology, vignettes under experimental conditions, Stavri (1996) investigated the types of questions that would be asked for preliminary diagnoses in the vignette situations. Vignettes varied with respect to two problems: urgency and etiology. Fifty residents in internal medicine and family practice participated in this study. Stavri used the question taxonomy developed by Graesser (1985) to classify questions. Findings suggest that quantification questions are more likely to be asked in conditions of urgency and verification questions when the least amount of information is present. The researcher emphasized the importance of contextual information to extract questions from the data and understand them.

### 2.5.2 The role of intermediation

Clinical medical librarians<sup>5</sup> seem to have an effective intermediary role in medical environments. King posits that their primary function is “*to provide highly specific, case-related information to physicians in support of patient care.*” (King, 1987, p.9). Various studies, in the past, have shown the importance of contributions by clinical medical librarians to patient care (citations in King, 1987). In recent years, however, as electronic resources are more easily accessible, the role of clinical medical librarians has begun to be questioned. Veenstra (1992) conducted a study to investigate whether clinical medical librarians were still needed. The study’s findings showed that the information provided by these librarians still affects patient care between 40% and 59% of the time.

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<sup>5</sup> A medical librarian is “*A librarian who attends rounds with a health care team and provides pertinent information to assist with patient care*” (Medical Library Association, 2000).



The study also found that, most of the time, physicians research the question themselves before consulting the librarians.

Although clinical medical librarians have proved to be of great value, they are more expensive than are services offered by standard health sciences libraries (King, 1987), and, thus, are not always available. Studies that evaluated the contribution of hospital-library information services to clinical care were not done until 1987, when King conducted a study in eight hospitals in the Chicago area. Results indicated that nearly two thirds of the respondents (out of 176 physicians, nurses and other health professionals) reported that they would handle their cases differently as a result of information gathered in the library. These results suggested that the impact of hospital libraries is comparable to that of clinical medical librarians in providing information for healthcare.

### 2.5.3 Contribution of the literature on information-seeking behavior in medical settings

The literature on the information seeking behavior of healthcare professionals, patients and medical students sensitized the researcher to the kinds of situations she would face in the course of conducting the study. It also helped in designing the initial elicitation instruments. Finally, the literature served the purpose of familiarizing the researcher with issues (and language) of interest in investigating reference service in the healthcare environment.

## 2.6 Chapter summary

This chapter supplied the background for research in intermediation. Studies in face-to-face and computer-mediated intermediation were reviewed and the contributions

of these studies to the present research were presented. In general, researchers have given much more attention to traditional intermediation (face-to-face) than to computer-mediated intermediation and various models have been developed to describe face-to-face user-intermediary interactions. These models informed this study with respect to the complexity and breadth of the user-intermediary interaction during intermediations. They also showed the various dimensions that researchers have used to analyze user-intermediary interactions.

The literature on intermediation occurring through an electronic network is more limited. This literature helped the researcher to identify a topic needing research. Research in the area is scarce and very few studies have actually studied digital intermediation.

The computer-mediated communication literature was also reviewed and it informed the present study with respect to potential factors affecting electronic communications in organizations. The literature on information-seeking behavior specifically in medical settings was reviewed with the purpose of increasing the researcher's theoretical sensitivity, without imposing an overly restrictive conceptual framework on the study.

## 3 METHODOLOGY

### 3.1 Introduction

This study investigated intermediation in natural settings. The goal of the research was to describe and gain a further understanding of intermediation that occurs through a network in which intermediaries help users to solve their information problems.

Intermediation is understood as the whole process of intermediaries helping users to find information relevant to their information problems. The present research was a case study of an information-provision service in a hospital library that offers information services via a network. The research adopted a qualitative and naturalistic approach and employed grounded theory methods in order to investigate the phenomenon.

The following sections present the research assumptions and the guiding questions, the rationale for conducting a case study, and the research design. The chapter ends with considerations about the trustworthiness of the study.

### 3.2 Assumptions underlying the research design

The literature that supports the assumptions of this study is presented in Chapter 2. In this chapter, only a brief overview of these assumptions and the guiding questions are presented, as they are important to understand the research design.

This study relied on two assumptions:

**Assumption 1:** Face-to-face and remote user-intermediary interactions differ.

This assumption is essential to justify the study. If the literature had suggested that there were no differences between face-to-face and computer-mediated human interactions, models developed for the former situation would hold for the latter. The

computer-mediated communication literature indicates the existence of such differences (see Section 2.4). Studies of user-intermediary interactions in the library science literature point to the importance of non-verbal cues in such interactions (Abels & Liebsher, 1994; Boucher, 1976; Eichman, 1978; Genova, 1981; Glogoff, 1983; Gothberg, 1976; Munoz, 1977; White, 1981). As text-based computer-mediated interactions are likely to reduce such cues (Kiesler et al., 1984), it is expected that interactions using such a medium differ from face-to face.

Furthermore, it has been largely acknowledged in the literature (e.g., Bristow, 1992; Bristow & Buechley, 1995; Ladner & Tillman, 1993; Procter et al., 1997; Schilling & Wessel, 1995; Silva & Cartwright, 1994) that electronic networks promote (or have the potential to promote) remote collaboration. Thus, such an alternative might also influence the way user-intermediary interactions develop. For example, an electronic network might facilitate access to human subject expertise to help users to solve their information problems.

***Assumption 2:*** Users' and intermediaries' contexts play an important role in understanding intermediation.

Context in this dissertation is used as a reference to social and physical components of the individuals' work environment that might be influencing their behavior in particular situations. Context is part of what Marchionini called *setting* in his information-seeking framework (Marchionini, 1995, p. 46). The physical components are constraints in the physical environment of the participants. These would include, for example, the availability of information and communication technologies, individual's work place (if it is an office or a public place). Social components are related to the social

working environment, such as rules, norms, local culture, or situational constraints involved in the situation being investigated. These would include, for example, time pressure in a particular situation, or organizational policies that regulate the use of information technologies.

In pursuing a further understanding of digital intermediation, user-intermediary interactions were analyzed considering their contexts. Interaction logs gave only a partial picture. Investigation of contexts helped to reveal *how* and *in what circumstance* intermediation occurred. Many researchers have studied information-seeking processes and have identified the important role of context in understanding the process (e.g., Dervin & Nilan, 1986; Hert, 1995; Marchionini, 1995). The CMC literature also suggests that social context may influence media use (e.g., Fulk & Boyd, 1991; Fulk, Schmitz, & Steinfield, 1990; Fulk, Steinfield, Schmitz, & Power, 1987; Ngwenyama & Lee, 1997; Schmitz & Fulk, 1991). So, context was seen as an essential element contributing to understanding intermediation.

This study was guided by two questions:

*What are the factors that are perceived as affecting digital intermediation?*

*How and under what circumstances might these factors affect digital intermediation?*

### **3.3 Methodological approach**

The present case study used a naturalistic approach to describe and gain a deep understanding of intermediation in a digital environment. The following sub-sections present the rationale behind this approach.

### 3.3.1 Naturalistic

The phenomenon investigated in this research was human behavior. As pointed out by Fidel (1993) the purpose of qualitative research is “*to describe how people behave and to understand why they behave the way they do.*” Fidel also emphasized that qualitative research seeks to understand the phenomenon as respondents see it. This research, consistently, adopted the qualitative paradigm. Furthermore, the researcher assumed that context plays an important role in understanding intermediation and context is best studied using a naturalistic approach.

Lincoln and Guba (1985) suggest that

... inquiry must be carried out in a natural setting because the phenomena of study, whatever they may be - physical, biological, social, psychological - take their meaning as much from their contexts as they do from themselves. (p. 189)

Accordingly, as this study assumed that intermediation could not be understood in isolation from the contexts of its participants, it took on a naturalistic approach, investigating intermediation within its natural settings. Additionally, as little was known about intermediation using a text-based computer-mediated medium, this study was exploratory in nature.

The study used the grounded theory approach (Glaser & Strauss, 1967; Strauss & Corbin, 1990) and naturalistic inquiry principles (Guba & Lincoln, 1982), where what was relevant to the phenomenon under investigation emerged from the data. It was not based on existent theories; rather it aimed to discover the salient characteristics of the phenomenon through inductive analysis of data gathered in the field.

Beyond the attempt to avoid prior commitment to any theoretical model, Yin (1989) indicates a second condition that is essential to qualitative research: *“the use of close-up, detailed observation of the natural world by the investigator.”* (p. 25). This study also satisfied this condition as it aimed to gain a deep understanding of the phenomenon by taking a close look in naturally occurring instances of intermediation in a digital environment.

It is worth noting that although the present study used grounded theory principles and methodological procedures, its purpose was not to generate a theory. It aimed to gain further understanding of a phenomenon in a particular setting. This study is better qualified as a naturalistic inquiry where methods for data analysis were borrowed from grounded theory.

### 3.3.2 Case study

According to Yin,

A case study is an empirical inquiry that: investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and multiple sources of evidence are used. (Yin, 1989, p.23)

This research shares the same three research characteristics stated by Yin. First, it investigated naturally occurring intermediation. The research was not based on archival data but analyzed intermediation as it occurred. Second, as previously mentioned, this study assumed that in order to achieve a deep and comprehensive understanding of such phenomena it was necessary to conduct an investigation of contextual factors that were potentially shaping the intermediation (assumption 2). Third, multiple sources of evidence, such as interaction logs, interviews with users and intermediaries and direct

observations were used. Moreover, the type of questions posed by this research implied an investigation of the phenomenon as a process (i.e., *how* questions). So, this study seemed a good fit for a case study. As such, it did not produce generalizable (or transferable) findings but, instead, it generated propositions (working hypotheses) that may serve as starting points for future research.

Case study designs can be of various types. Yin (1989) identified two dimensions for classifying case studies: single vs. multiple, and holistic vs. embedded. The rationale for choosing a single case study is based on the fact that there is not enough knowledge of digital intermediation to make meaningful comparisons between cases. Additionally, by using a single case the researcher was able to control variability due to differences in organizational policies. Concerning the second dimension suggested by Yin, this case study took the information-provision service as the case, which provided contextual information for the development of a holistic view of the phenomenon, and the research was focused on a sub-unit of analysis; namely, the digital intermediation.

A particular information-provision service, at a hospital library, was selected and it served as the research site. Section 3.4.2.2 presents the criteria used to select the research site and describes some of its characteristics.

### **3.4 Research design**

#### **3.4.1 Structure**

The research was conducted in three stages: preliminary, implementation and final stages, as shown in



Figure 3-1 below. This figure is a version adapted for this study of Lincoln and Guba's representation of the flow of the naturalistic inquiry (Lincoln & Guba, 1985, p. 188). A difference between this study and the purely naturalistic inquiry advocated by Lincoln and Guba is that while they indicate that the researcher engages in the study based solely on tacit knowledge, in this study the literature is seen as playing a more direct role, explained in Section 3.4.2.1. It does not mean, however, that theoretical models were framing the study. Findings were grounded in data through inductive data analysis techniques. The literature served as starting point for the research (Diesing, 1971).

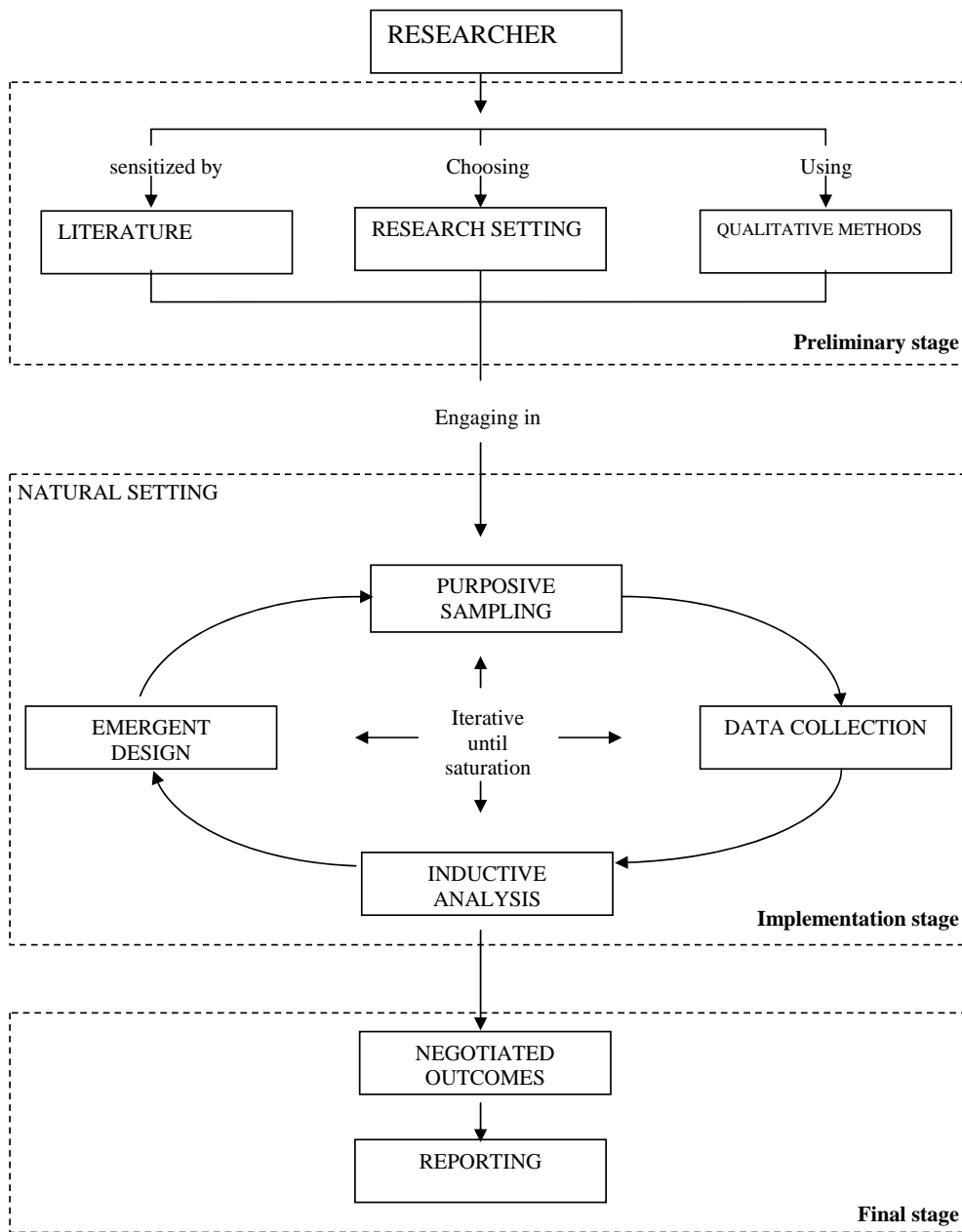


Figure 3-1: Flow of the study

Although not explicitly indicated in the figure above, there are no clear-cut boundaries between the three stages. It means that, for example, the literature can be consulted in the implementation stage or negotiation of outcomes can be done along with data collection. Dividing the study into three stages helps to identify the main activities to be performed in each one of them.

### 3.4.2 Preliminary Stage

This stage anteceded the fieldwork and it prepared the researcher to start the investigation. Three aspects seemed important to consider at this stage: a review of the literature, choice of the study setting and data collection instruments.

#### 3.4.2.1 The role of literature in designing the research

There do not seem to be any common-sense rules about the amount of knowledge that a researcher should bring to a qualitative study. Much of qualitative research lies between two extremes: pre-structured qualitative design and emergent ones (Miles & Huberman, 1994). In the former extreme the researcher can, for example, develop confirmatory studies where data is collected to confirm (or extend) a theory. In a more open design, the conceptual framework would emerge from the field during the course of the study. Concerning this matter, Fidel states that:

Because qualitative researchers recognize that all investigators, whether qualitative or quantitative, always bring some *a priori* conceptions to their inquiry, and that no observation can be purely objective, they attempt to be open to whatever emerges during their inquiries. (Fidel, 1993, p. 226)

The present study leans toward the emergent design approach. The study was not based on pre-defined frameworks; it adopted an inductive approach. The researcher,

however, made use of the literature to guide the initial steps of the study implementation.

The literature was used as suggested by Strauss and Corbin (1990) to:

- Stimulate theoretical sensitivity –without bringing a list of concepts to verify in the field, the literature alerted the researcher to probe for concepts mentioned in the literature, when and if they emerge during data collection;
- Stimulate questions to be asked of subjects or orient observations – a preliminary list of questions was derived from the literature to help in initial interviews. However, as the study developed, these questions changed according to emergent concepts that were revealed during data analysis;
- Direct purposive sampling – again the literature helped in initially selecting a sample of intermediation events and respondents; however, as the study evolved, other criteria for sampling were derived from the data.

#### 3.4.2.2 The study setting

The case study was conducted in a particular information-provision service. Before choosing a study site, the researcher developed a set of criteria in selecting it in order to increase the chances of producing a rich case study. The major concern was to choose a service that did not have rules that strongly restrict user-intermediary interactions. The researcher did not look for a *typical* (representative) site, since a typical service would be one that restricts user-intermediary interactions. Such a site would also impose restrictions on research findings, since the major factor affecting the interaction would be determined by the service itself. Rather, the researcher desired a site that was at the forefront in providing information services through an electronic network.

The criteria were as follows:

- (a) Services that offer an opportunity for multiple interactions through a text-based computer-mediated medium. This is an important criterion as the study findings should not be constrained by strong rules restricting user-intermediary interactions and therefore, not allowing them to occur naturally.
- (b) Services that allow the use of diverse media for intermediation. Although this is not an essential criterion, the possibility of using different media to interact with users allows for a better understanding of why and in which situations the text-based computer mediated medium is preferred. If the users have no media options, they would be forced to use the available medium to interact with the intermediary. This situation would hide factors that may lead users to choose (or not to choose) a digital medium for interacting with the library.
- (c) Services that are in advanced stages of implementing their electronic information-provision services. This criterion increases the chances of gathering data that is actually related to the phenomenon of interest as opposed to data that reflects the service's learning stages.
- (d) Services that have at least two intermediaries assisting users and are, therefore, less affected by the characteristics of a single person and allow for collaboration among intermediaries.

The information-provision service chosen for this study fulfilled all the criteria previously established. It is a hospital library (hereafter called HOL) and offers information services to internal and external users through an electronic network. The

choice of a medical setting was motivated by the fact that medical libraries have been known as early adopters of information technologies and innovative services and, thus, more promptly pass the initial stages of technology adoption. As a research setting HOL added important aspects to the information service, which the researcher anticipated would enrich the study.

Some of the site service characteristics are:

*Variety of users*

The HOL receives information requests from health professionals working in the hospital (such as physicians and nurses), nursing students, patients and from lay people (through a web site form).

*Use of diverse media to interact with users*

Intermediaries make use of different media to communicate with users, such as e-mail, web, telephone and fax. The HOL has a physical location close to the hospital (not in the same building) but its operation is mostly through the network. Some patrons may come to the library to solve their information problems but the HOL's major activities are directed to remote users.

*Maturity*

HOL has been operating as a virtual library for three years. It receives 6-10 information requests a day, from which 2-3 requests are received through e-mail and a web-form. Three intermediaries work in the HOL in diverse activities, including answering users' requests.

*Balance between accuracy, promptness and comprehensiveness*

As the information provided by HOL serve clinical purposes (patient's treatment), accuracy, promptness and comprehensiveness assume great importance. For the study's purpose, these constraints imposed on the HOL information service create a rich situation, where more extensive interactions between users and intermediaries were expected to occur in order to adequately serve users. On the other hand, such interactions were not expected to take too long because of the urgency of getting the requested information. A balance among these three constraints was anticipated.

#### Accessibility of the site and respondents

The researcher spent more than four months at the site for data-collection activities. Although users requested information from a remote location, most of them were accessible for face-to-face interviews since they worked at the hospital nearby. The researcher's face-to-face interviews with both intermediaries and users were preferable as they gave better opportunities for establishing rapport with the interviewees.

### 3.4.3 Implementation stage

An iterative process involving emergent design, purposive sampling, data collection, and inductive data analysis characterized the study's implementation phase (Fig. 3-2). Each of these activities is explained below. This section starts with a list of methodological key terms.

#### 3.4.3.1 Methodological key terms

- a) *Concepts* are “*conceptual labels placed on discrete happenings, events and other instances of the phenomena*” (Strauss & Corbin, 1990, p. 61). Concepts are the lowest level of abstraction assigned to data.

- b) *Categories* are “*classifications of concepts.*” (Strauss & Corbin, 1990, p.61). They are higher-level concepts. Categories are created based on comparisons between concepts.
- c) *Coding* is process of assigning labels (concepts and categories) to data.
- d) *Saturation* is a point in data collection and analysis in which the researcher starts to see similar instances of the same category over and over again, no new categories emerge, and the researcher feels empirically confident that the category is saturated (Glaser & Strauss, 1967, p. 61)
- e) *Purposive sampling* – the purpose of sampling in this study was to include as much information as possible related to the various ramifications of categories, usually called maximum variation sampling – a type of purposive sampling (Lincoln & Guba, 1985, p. 201).

#### 3.4.3.2 Sources of evidence

Four main sources of evidence were used:

- User-intermediary interaction logs,
- Data gathered during interviews with users and intermediaries,
- Field notes from observing intermediaries
- Organizational publications (print or electronic), such as organizational documents, service’s brochures, forms and website interfaces.

#### 3.4.3.3 Emergent Design

Emergent design is the main characteristic of grounded theory and naturalistic inquiry approaches. Design emerges as a product of an iterative process of sampling, data collection and inductive data analysis. As the researcher engages in collecting and



analyzing data (coding), the design of what information to gather and where to look for information next emerges at each step of this process. *“Rather than performing data analysis after the completion of data collection, data analysis guides data collection”* (Fidel, 1993, p.227). In collecting data, the researcher aimed to expand and fill gaps in the categories that she has discovered through the analysis of data gathered so far. Data collection was then guided by purposive sampling. As much as possible, in this study, data collection and analysis were conducted on a daily basis in order to direct the following day’s investigation activities.

The dynamism of this iterative process is well described by Shelly and Sibert (1992). The authors describe the evolving research design in the course of a study. They identify three phases in the research process. Each phase moves to a higher level of abstraction. All phases contain basically the same activities: data collection, coding and hypothesis generation. However, there is a change in emphasis and purpose of these activities in each phase.

In the first phase the researcher is mostly collecting data and concentrates her efforts in coding, providing within-category integration. No actual hypothesis is generated at this point since the researcher has just started having hunches about the phenomenon. This phase is characterized by *“broadly-based data collection, wide-range coding, and code-generating within category integration.”* (Shelly & Sibert, 1992, p15).

Moving towards the second phase, the researcher starts to establish working hypotheses. Data collection, coding and integration change in purpose at this phase. The researcher aims to collect a broader range of instances within each of the already discovered categories in order to start generating the category’s properties. At this phase

she concentrates on coding and integrating within and across categories. In the third phase, the emphasis is on adjusting coding and refining the working hypotheses.

Although the design is emergent, a starting point was needed. As posited by Diesing “*In the field the research design serves as a place to start, an initial focus of attention, and perhaps as a point of reference or departure for later explorations.*” (Diesing, 1971, p. 143). Accordingly, this study included a research design at the proposal stage. The sampling criteria were adjusted during the course of this study and it is detailed below.

#### 3.4.3.4 Purposive sampling

The purpose of sampling in this study was to include as much information as possible related to the various ramifications of categories. The interaction log initially guided sampling. As the study progressed, new criteria were created. These criteria were related to customers’<sup>6</sup> attributes and request’s characteristics and are explained below. Sampling stopped when categories relevant to describing the phenomenon achieved saturation (details in Section 3.4.3.8.3).

##### 3.4.3.4.1 *Criteria for selecting information requests*

###### Type of request

Three kinds of information requests were selected for inclusion in this study: literature searching, document delivery and consultation. While the initial focus was on selecting literature-searching requests, it was observed that the library also provided

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<sup>6</sup> *Customer* and *user* in this document are interchangeable terms. While the term *user* was more commonly used in references to the literature, the term *customer* is more used when referring to data, as this is the term used by intermediaries to refer to users in the investigated research setting.

reference for solving computer problems. As the study aimed to understand intermediation (in general – not restricted to literature searching), and the intermediary who answers most of these requests is also responsible for doing literature searching, the criteria were opened to include such requests, here called consultation. The inclusion of document-delivery requests proved to be important as some of the customers explained that they would use email only for those requests in which they *know what they want* and document delivery was a good instance of this sort of situation.

#### Medium used to request information

Also included in the sample were information requests made through a medium other than email or web-form e.g., by telephone. The inclusion of this kind of request had the objective of increasing the chances of broadening the spectrum of factors that might prevent customers from using email for requesting information. The selection of these intermediations followed additional criteria:

- The person who requested the information is a library customer who has requested information recently through a different medium other than email or web-form;
- The person who requested the information is an email user and has contacted the library for information request through email sometime in the past.

These two additional criteria increased the chances of collecting useful data, avoiding respondents who have never used email to contact the library or who were not customers of the library.

#### *3.4.3.4.2 Criteria for selecting customers*

##### *Customers were interviewed only once*

Because of their tight schedules, customers were interviewed for only one specific intermediation even when they sent more than one request to the library during the data-collection period. Customers commonly volunteered information beyond the specific intermediation being investigated. For instance, they also talked about other experiences and their expected behavior in different situations. This data was incorporated into the analysis as part of the context (see Section 4.6.1)

##### *Customers as intermediaries*

Intermediations where customers were requesting information for other people, such as secretaries and nurses who were requesting information for doctors, were rejected. The reason for adopting this criterion was because these people would not be able to answer meaningfully most of the interview questions, as they would not have been the ones who had the need for information. The alternative of interviewing the actual persons who have had the need for information did not seem helpful either because they probably would not have been the ones who made the decision of which medium to use to contact the library.

##### *Completeness of the data*

Only intermediations for which customers were interviewed were considered for the study. With one exception, the intermediaries were always available for interviews so, they did not restrict the selection of an intermediation. The one exception of not being

able to interview an intermediary occurred when no intermediary could remember having answered it (this happened less than a week after the request had been sent). In this one case, although the intermediary could not be interviewed, the intermediation was included in the study.

#### 3.4.3.5 Data collection

Data-collection activities comprised obtaining the interaction logs, interviewing users and intermediaries, taking field notes and selecting organizational publications. The fieldwork lasted for more than four months starting on June 1 and ending on October 10, 2000. During this period the researcher spent an average of 4-5 hours per day (Monday-Friday) at the site, most of this time at the library, where she concentrated on close observation of the intermediaries' work.

##### *3.4.3.5.1 Selection and recruitment processes*

Applying the selection criteria presented in the previous sections, the study recruited intermediaries and customers following a five-stage process:

- (1) A customer sent an e-mail information request or called the library with an information request.
- (2) The intermediary received the request and processed it, usually on the same day. Occasionally observations of the intermediary while answering the customer's request were made.
- (3) The intermediary asked the researcher about her interest in including the request in the study. The researcher judged the adequacy of including the request in the study

based on the criteria described in Section 3.4.3.4. If so, the intermediary invited the customer to participate in the study.

- (4) If the customer manifested interest in participating in the study, the researcher contacted the customer (usually by email) explaining the objectives of the study, the confidentiality of the interview and that the participation was voluntary. A time estimate for the duration of the interviews was given and customers were asked to set a date/time and place for the interview.
- (5) After interviewing the customer the researcher invited the intermediary, who processed the customer's information request, to also be interviewed.

#### *3.4.3.5.2 Interviews*

Face-to-face interviews were conducted with customers and intermediaries. In order to clarify some aspects of the customer's and intermediary's work activities and environment, the initial plan for interviews was extended. Two additional interviews with the intermediaries were conducted: an interview to gather information about the library's training program and another interview to acquire knowledge about the information systems department policies. The head of the library was also interviewed.

The interviews related to specific intermediations had a general structure as follows:

#### *General information*

- Background of the interviewee (professional background and experience in using electronic media for communication);
- Typical situations that prompt customers to seek the help of an intermediary (customers' viewpoint);

- Typical way of processing customer's request (intermediaries' viewpoint);
- Interviewees' general evaluation of the use of a digital medium for intermediation.

*Information about a specific intermediation*

- The situation that prompted the customer to seek the help of an intermediary for the specific intermediation;
- The process performed by the intermediary in answering the specific request;
- Evaluation by the customer and the intermediary about a specific interaction, considering the complexity of the task, the medium used and the information received or given.

Interviews commonly occurred after interactions had been completed. However, it was not always possible to determine if an interaction had been completed before interviewing users or intermediaries, since users could continue to contact intermediaries in order to extend or clarify their requests. Although it was desirable to interview after the whole process had terminated, this was not a major problem in data collection. Follow-up interviews covered the issues missed in the first interviews. The preference for the face-to-face interview was to facilitate the development of rapport with interviewees and therefore increase the chances of eliciting more reliable data.

The interviews followed semi-structured guides that were developed in the beginning of data collection. Interviews, however, were not limited to the questions included in these guides. Questions asked were reworded according to the interview

situation or new questions were added depending on what was being discussed in the interviews. The researcher, however, tried to at least discuss the same topics included in the interview guide with all interviewees and, as much as possible, word the questions as they were in the guides.

#### Interview with customers

Interviews with customers had as their main objective the elicitation of contextual information and the subject's perceptions related to the intermediation being investigated. They were focused on understanding the *situations* that had prompted customers to ask for the help of an intermediary and their *decision of using* or not using a digital medium to contact the library. Interviews with customers were based on interaction logs. They were more comprehensive than interviews with intermediaries, as less contextual information was known in advance. Interviews with customers had an average duration of 30 to 40 minutes.

For the most part, the interviews with customers were conducted at their workplace. Four of the interviews with customers were conducted at the library. It was up to the customers to choose the place he or she wanted to be interviewed. Interviews at the customer's workplace gave the researcher the opportunity to familiarize herself with the hospital environment. It was also helpful to observe some particularities of the work place, such as the availability of computers on people's desks.

Since the library files search requests, these were occasionally used to support, enrich and complement some interviews. For example, for customers who had called the library (instead of emailing the request), copies of their past email requests were shown



to them during the interviews in order to help them to recall past experiences and reasons why they had used a particular medium in those situations.

In general customers were receptive to the interviews although most of them seemed very busy. In many instances it was difficult for them to find a time to be interviewed. An extreme case was of a nurse who was willing to participate in the study but it took her a month to find the spare time to be interviewed. Customers occasionally demonstrated impatience – especially to those questions that were perceived as being repetitive for them. Not all interviews covered all issues previously planned; some interviews were richer than others.

#### Interviews with intermediaries

Each intermediary was interviewed at various times. The first interview with each intermediary was done a week after the beginning of the fieldwork. It had the objective of gathering information about the intermediaries' background and their typical way of processing customer requests. These were extensive interviews and dealt with the intermediary's everyday work. After these initial interviews, intermediaries were interviewed again whenever an information request that they had processed had been selected to be included in the study. The form used by the library for registering the searches was used for helping with recall.

Three intermediaries participated in the study and 25 intermediations were investigated so, beyond the initial interview, the intermediaries were interviewed 25 times – one for each intermeditation. The initial interview took about 30-40 minutes. The interviews about specific intermediations took on average 15 minutes each.

Beyond various aspects of the specific interactions, interviews with intermediaries also aimed at understanding the *process* of answering customers' requests using e-mail or web-form. Additionally, the interview with intermediaries complemented or probed what was being observed. As the same intermediary interacted with various customers and intermediaries' work was closely observed, interviews with intermediaries sometimes referred to various intermediations.

Although intermediaries were also busy, they were more involved in the research and therefore were more easily accessible. Because of the extended period of time spent at the site, the researcher had the opportunity to develop excellent rapport with the intermediaries and this facilitated her data-collection activities. The interviews with intermediaries always occurred at the library.

#### *3.4.3.5.3 Data-collection instruments*

Two interview guides comprise the data-collection instruments: questions asked of intermediaries and questions asked of customers. In the course of the study, questions that did not seem to elicit useful data were dropped and new questions were added to the guide, as they appeared important for the study.

The tables presented in the next sections contain a sample of questions asked of customers and intermediaries. Most of the questions aim to reconstruct the process and contexts in which the digital intermediation occurred. In these tables, texts in square brackets were defined during the interviews depending on the interviewee's answer to previous questions.

Customer-interview guide

During the course of data collection, the customer-interview-guide was improved several times. Most changes were not substantive and refer to form rather than content. For example, the initial attempt of asking questions for each message sent in the interaction was not successful. The interviewees did not seem to have any new information to add concerning each message and this procedure proved to be extremely repetitive. New questions were also added to the guide. Questions missed in some interviews or clarification of customer's answers were asked in follow-up interviews.

Table 3-1 below shows the final version of the customer-interview guide, grouping the questions by their main purpose and indicating the utility of the collected data.

	Questions asked of customers	Utility of the data / (comments)
Customer's background and use of email	<p>Can you give me a brief overview of your professional background?            What are your primary responsibilities?            How often do you use e-mail or chat or some other kind of electronic communication? How many hours [per day / week month]?            Do you use e-mail for your professional activities? For how long have you been using e-mail in your professional activities?            Beyond using e-mail for interacting with the library staff, for what other [professional] activities do you use e-mail?            Do you share a computer with others or do you have your own computer at the hospital?</p>	<p>Help to identify main differences among customers (profession, activities and use of email)</p>
Typical situations in which the customer seeks information	<p>Can you give me examples of typical work-related situations in which you would seek information?            When you look for information, how do you go about it?  <ul style="list-style-type: none"> <li>• Do you look for information by yourself? Do you search on the Internet?</li> <li>• Do you consult someone else? How?</li> </ul>           Are there typical situations in which you are more inclined to seek the help of an intermediary than seek the information by yourself? What are they?            Can you give me an idea of how often you use the library services?            What media (ex. phone, e-mail, fax etc.) have you used request information?            [If a medium other than email was reported] Can you give some examples of situations (requests) in which you chose to use the telephone (or any other medium) instead of email?            What caused you to choose the telephone (or other medium)?            Why didn't you use the e-mail?</p>	<p>This information gives to the researcher a general picture of situations that prompt the customers to request information, their need for intermediaries and the media used to contact the library.</p>

	Questions asked of customers	Utility of the data / (comments)
Specific information about the interaction being analyzed	<p>{Looking at a recent interaction}</p> <p>What were the circumstances that prompted you to send this request?</p> <p>Have you had contact with anyone in the library before sending it? Who? How?</p> <p>[If there was previous contact] What in the previous contact prompted you to send this request?</p> <p>[If the request is addressed to a particular person] Was there a reason for you to direct this request</p> <p>Have you looked at other sources before sending this request? Which ones? Why?</p> <p>Have you consulted someone else before sending this request? Why? How?</p> <p>Did you have alternative ways to contact the library? Why did you choose to contact through [this medium]? Why didn't you use other medium such as phone or fax? {This question tries to elicit reasons related to the situation}</p> <p>Between the initial request and the final response, were there other contacts with the library that are not reflected in this interaction? How (phone, in person, fax, etc.)?</p> <p>[If the request is addressed to a particular person] Was there a reason for you to direct this request to [name of the intermediary]? What was the reason?[If the request presents uncommon information] Why did you decide to include the various pieces of information in your message?</p> <p>[If there is more than one customer's message] what circumstances prompted the continuation of the interaction?</p>	<p>Gives the researcher details about the interaction being investigated, how and why it happened and the reasons that have led customers to use a particular medium to communicate their needs.</p> <p>It seemed interesting to understand why people convey some kind of information –other than topic, greetings and personal conversation. Intermediaries were asked how they use such information.</p>
Evaluation	<p>Was there something about this request that affected your decision to use [this medium] to communicate with the library? What?</p> <p>What were the advantages or disadvantages of using the e-mail for this interaction? Why?</p> <p>[If any media switch was reported] Was it helpful to change [media]? Why?</p> <p>How did the information you got help you?</p> <p>In retrospect, is there anything you would have done differently with respect to this interaction? What? Why?</p>	<p>Gives the researcher a general idea of the customer's perception of the adequacy of the medium for interacting with intermediaries, the process of getting the information, and how helpful it was.</p>

**Table 3-1: Customer interview guide**

*Intermediary interview guides*

The intermediary interview guides for the first and subsequent interviews are shown below. Table 3-2 presents the intermediary interview guide for the preliminary general interview and Table 3-3 presents the intermediary interview guide for those interviews about specific intermediations. As in the customer interview guide, changes have also occurred. Some new questions were added as issues from previous interviews or preliminary data analysis proved to be relevant.

	Questions asked of intermediaries (initial interview)	Utility of the data
<b>Intermediary background</b>	<p>Can you give me some details about your professional background?</p> <p>How often do you use e-mail/chat or some other kind of electronic communication? How many hours [per day/week/month]?</p> <p>For how long have you been using e-mail in your daily professional activities?</p> <p>Beyond using e-mail for responding to customers' requests, for what other professional activities do you use e-mail?</p>	Help to understand intermediaries' differences and their familiarity with electronic media.
<b>Typical information requests, customer profiles and way of processing information requests</b>	<p>Can you give me some typical profiles of the customers who submit information requests?</p> <p>Can you give some examples of typical requests for each of these customer types?</p> <p>Typically, how much of your time is consumed in answering an individual customers' request?</p> <p>How many questions do you usually answer in a typical day / week? How many of those would you estimate are through e-mail?</p> <p>About how many of the e-mail requests that you receive are from customers with whom you have had previous contact? Are prior contacts in person, by phone or by e-mail? Does it make any difference for you?</p> <p>What are your information resources for answering customers' requests?</p> <ul style="list-style-type: none"> <li>• Hard-copy, web, databases</li> <li>• Do you consult with other people? Who? How do you communicate with them?</li> </ul> <p>Is there a standard or typical procedure that you follow in answering an information request? What is it?</p> <p>Is it more likely, in answering information request, that:</p> <ul style="list-style-type: none"> <li>• You try to provide as complete an answer as possible, or</li> <li>• You try to clarify the request before answering it. Why? Please describe how you do so.</li> </ul>	<p>This information gives the researcher a general picture of the process of answering customers' requests. It also gives an idea of how the workload is distributed.</p> <p>This question aims to identify whether intermediaries avoid multiple-interactions.</p>
<b>General evaluation of the medium</b>	<p>In general, how well do you think the e-mail / web-form works for interacting with customers? Why?</p> <p>Is there anything you don't like about it? What? Why?</p> <p>Does it [intermediary's evaluation] depend on the kind of request? How?</p>	This gives the researcher a general idea of the intermediary's evaluation of the use of the medium for interacting with customers.

**Table 3-2: Interview guide – initial interview with intermediary**

	<b>Questions asked of intermediaries (Interviews about specific intermediations)</b>	<b>Utility of the data / (comments)</b>
<b>Information about the particular interaction</b>	<p>Tell me about this interaction</p> <ul style="list-style-type: none"> <li>• What was it about?</li> <li>• How and under what circumstances did it happen?</li> </ul> <p>How did you receive this information request? How was it assigned to you? Have you had contact with this customer before? How? Do you have any additional information about the customer or about his/her request that is not reflected in this interaction but was helpful in answering his/her request? What? How did you get it?</p>	<p>Provides a general context for the interaction, which was helpful in understanding the details to be asked in the following set of questions.</p> <p>(See comment below)</p>
<b>Specific aspects of processing the customer request</b>	<p>Did you or someone else contact this customer between the first and last messages? If so, why? How?</p> <p>Did you have alternative ways to contact customers? Why did you choose to answer the customer's message through [this medium]?</p> <p>Could you please highlight any specific information provided by the customer in this interaction that was helpful in understanding and answering his/her request? How did the highlighted information help you to answer the customer's request? Why do you think the customer said [not highlighted information]? [This question is to explore the intermediary understanding of customer's intention when she/he sends information that is directly related with the topic of the search].</p> <p>What information resources did you use in providing information to the customer?</p> <ul style="list-style-type: none"> <li>• Hard-copy, web, databases</li> <li>• Did you consult someone else? How? Why?</li> </ul> <p>What circumstances prompted the continuation of the interaction? (If it is the case) Was there something about the information-request that affected your decision to use [this medium] to communicate with the customer? What? Was there something about the customer that affected your decision to use [this medium] to communicate with the customer? What?</p>	<p>Although this section of the guide elicits contextual information from the intermediary point of view for each message, emphasis was on gathering data from the process of answering the customer request and use of the medium.</p> <p>These questions were also intended to discover what other information besides topic was helpful in filling the customer's request.</p>
<b>Evaluation</b>	<p>How well do you think you satisfied the customer's request? Why? What were the advantages or disadvantages of using the e-mail for this interaction? Why? [If any media switch was reported] Was it helpful to change [media]? Why? In retrospect, is there anything you would have done differently with respect to this interaction? What? Why?</p>	<p>These questions tried to capture the intermediary's perception of customer's satisfaction and the suitability of the medium for the specific interaction.</p>

**Table 3-3: Interview guide – interview with intermediaries about specific intermediations**



#### *3.4.3.5.4 Follow-up questions*

Follow-up questions had three main objectives:

- To clarify informants' answers;
- To complement interviews due to changes in the interview guide during data collection; and
- To ask questions that were skipped for any other reason.

#### *Follow-up interviews with customers*

As transcriptions of the interviews and data analysis took longer than expected, it was not possible to identify the essential issues to guide follow-up interviews with customers during the fieldwork period. Although all customers agreed to continue the interviews through email, they were not as available for follow-up interviews as were intermediaries. Consequently, follow-up interviews with customers started at the end of October of 2000 – approximately a month after the end of fieldwork. The option for using email to conduct the follow-up interviews, from the customer perspective, seemed to fit better with their busy time schedules. From the researcher's perspective, however, the answers to the follow-up questions through email were very succinct and sometimes did not actually answer the questions asked. Attempts to clarify the answers were not always successful.

Respondents had the option of using the most convenient medium for them for answering questions. All but two of them answered through email. Two nurses sent their answers on paper; neither had her own computer at the hospital.

Appendix A presents the dates of face-to-face interviews with customers, follow-up questions and customers' answers. Not all customers were contacted for follow-up questions – seven of the interviews were judged complete and did not need further clarification. So, follow-up questions were sent to 18 customers. Of these, 15 answered the questions giving a response rate of 83%. Of the three customers who had not answered the follow-up questions one of them left the hospital and could not be reached.

#### *Follow-up interviews with intermediaries*

Follow-up interviews with intermediaries were conducted whenever important questions in previous interviews were missed or when some new issue emerged from data analysis. These follow-up questions were done at any time during the fieldwork period.

#### *3.4.3.5.5 Transcription*

In order to preserve the confidentiality of data, the following conventions were adopted in the interview transcriptions:

- (1) Each piece of text is preceded by an identifier of who was the speaker for that portion of the interview in the following way:
  - The researcher is identified by the capital letter S;
  - Customers are identified by the capital letter C followed by a number;
  - Intermediaries are identified by the codes I1, I2 and I3.
- (2) Interaction logs are associated with the customer number. So, for example, interaction 5 is the interaction that occurred between customer number 5 (C5) and an intermediary – I1, I2 or I3.

In transcribing the interviews, for ease of reading, intermediary names were replaced by aliases (Lucy, Laura and Leo) and the customer names were replaced by one or two capital letters corresponding to customers' names. All references to the name of the hospital were removed.

Transcriptions tried to reflect the exact conversation between the researcher and the interviewee with the following exceptions:

- Small portions of the conversation that were not directly related to the interview (such as the interviewee apologizing because of a phone call were omitted from the transcriptions).
- Facial expressions and sounds made by the interviewees such as laughing were not recorded.
- Inaudible words were added and put between square brackets.
- Pauses were not registered.
- Texts were normalized for clarity. Some grammatical errors were corrected.

Most of the false starts were transcribed. Some additions were made in the transcriptions in order to increase clarity. These additions can be identified, as they were included as follows:

{ } – used for researcher's comments – comments were of various nature such as to identify the interruption of the interview to change the tape, to express researcher's perception of the interviewee reaction to a question, to identify a mistake of the interviewee (such as the interviewee mistakenly says that he used a certain medium to contact the library) and so on.

[ ] – used for the text clarity – used to resolve anaphora or include a clarification necessary to the understanding of the text.

#### *3.4.3.5.6 Interaction logs*

Interaction logs contain the texts of the actual communication events that occurred between a user and an intermediary through a text-based computer-mediated medium. These interactions included the user's requests, the eventual question negotiation and the final response. If, as part of this process, a different communication medium was also used, that portion of the interaction was not captured. Interviews with customers and intermediaries tried to gather relevant missing information in these cases.

Twenty-five interactions were analyzed, four of them initiated through telephone calls and 21 initiated through email messages or web-forms. The interactions were short; most of them included two or three contacts between the customer and the intermediary. Only one interaction had a maximum of four contacts. In this study, all contacts for clarification of information were done over the telephone.

#### *3.4.3.5.7 Observations*

Observation of intermediations occurred intensively during the fieldwork period at the intermediaries' work place. The observations were focused on understanding the process of answering users' requests: how requests are distributed among intermediaries, sources used (internal or external), contacts with other people (e.g., subject experts), the choice of the media to communicate, etc.

It would have been ideal to observe customers as well. However, observations of customers could not be done due to privacy issues. Therefore, the researcher was limited to observations of the customer environment to the time she was interviewing them and could not observe them while they were using e-mail.

In order to record the observations made, a journal was kept. Observations were extremely important for getting acquainted with the intermediary's work and to plan the next steps in the research implementation. Observations of intermediaries' work occurred mostly at the front desk of the library. On any given day, there was an intermediary responsible for answering all incoming information requests regardless of the medium in which the request was received. The researcher then, with the consent of the intermediary also sat at the front desk and observed the intermediary's work.

#### *3.4.3.5.8 Organizational publications*

As pointed out by Yin (1989), in case studies documents are used to corroborate and augment evidence from other sources. The organizational publications used in this study were policy for email use, service brochures, forms, and website interfaces. They helped in understanding the context in which intermediations occurred.

#### *3.4.3.5.9 Overview of contributions of data to the study*

Table 3-4 below summarizes the multiple sources of data used in the study, data types, data utility, and how these data contributed to the study.

Data Source	Type of Data	Utility of Data	Contributions
Interaction logs	Textual data comprising customers' information requests; request-negotiation; and intermediary responses.	Provided the content of the interactions; Served as the base for interviews; Stimulated interview questions; Helped in defining purposeful sampling.	Assisted in understanding attributes of interactions, types of customers' requests, what information customers provide to the intermediary, what are occasional negotiations, etc.
Interviews with customers	Transcripts of the interviews with customers	Provided contextual information related to the specific intermediation being investigated from the customer perspective. Corroborated data gathered in intermediary' interviews and observations.	Assisted in understanding contextual factors from the customer's perspective.
Interviews with intermediaries	Transcripts of the interviews with intermediaries	Provided contextual information related to the specific intermediation being investigated from the intermediary's perspective. Provided details of the process of answering customers' requests. Corroborated data gathered in customers' interviews and observations.	Assisted in understanding contextual factors from the intermediaries' perspective. Helped to understand what is missing in the text of the interaction that was assumed by the intermediary when responding to customer's request.
Observations	Field notes from observing intermediaries	Additional contextual information from researcher perspective. Augmented understanding of the intermediation process that might not be revealed through other sources, such as use of different media.	Assisted in understanding the process of answering the customer's requests.
Organizational publications	Service norms Organizational values, rules, norms and practice	Helped to understand characteristics of the setting being studied. Corroborated data gathered from other sources.	Helped to enrich description and better define the context of the case study for transferability evaluations.
Member checking	Discussion of preliminary results with respondents	Validated findings	Increased credibility

**Table 3-4: Overview of the contributions of the collected data**

#### 3.4.3.6 Inductive data analysis

According to Strauss and Corbin, the level of granularity of analysis depends on the type of information being analyzed and the stage of research development (Strauss &

Corbin, 1990). The researcher may choose to conduct a line-by line (at the level of phrases or even words), paragraph or entire document analysis. The most detailed analyses are more generative. The authors point out that it is important to generate categories early in the research process. By doing this, the researcher is able to more quickly define what to focus on in the next data-collection efforts and it also helps to guide sampling (purposive sampling). Lincoln and Guba are more specific concerning the choice of the unit that must be coded. In their view the unit should have two characteristics:

- (1) Heuristic – *“aimed at some understanding or some action that the inquirer needs to have or to take,”*
- (2) *“it must be the smallest piece of information that stands by itself”* (Lincoln & Guba, 1985, p. 345).

So, as a first step in the analysis process, the data (user-intermediary interaction logs, interviews and observations) were broken down into units and conceptual labels were assigned to these units (see Section 3.4.3.8.1). Beyond labeling units as concepts, the researcher discovered categories through comparing concepts and grouping them, naming categories, identifying their properties, identifying potential relationships among them, and adjusting purposive sampling criteria. Reviewing coding was also a constant activity in the analysis process. The next section explains the specific procedures performed in data analysis.

#### 3.4.3.7 Coding schemes

As explained in previous sections, this study was based on various sources of data. This section presents the procedures used to analyze the following sets of data

#### Customer data

- Interview with customer
- Follow-up questions

#### Intermediary data

- Interview with intermediaries
- Follow-up questions
- Observations

#### Interaction logs

- Messages exchanged between a customer and an intermediary

For each one of these three data types a specific code scheme was developed. For customer and intermediary data, two schemes were created to reflect their distinctive perspectives. A third scheme was created for interaction data. Additionally, the researcher created another scheme to reflect her own perspective. These perspectives are explained in more detail in Chapter 4 (Section 4.6). Here only the analysis process is described.

#### 3.4.3.8 Coding scheme structures

Coding schemes were developed concomitant with the coding process. Although the different schemes share concepts, they are kept logically separated in order to be able to analyze them separately and afterwards compare them. The generated coding schemes present a three-level polyhierarchical structure. The number of levels associated with each topic/issue depended on the specificity of the data. So, there are some topics that are



coded only at the broadest level while others go down to the full three levels of the hierarchy.

*First level (the broadest)*

As theoretical frameworks did not formally guide the study, the interview guide was adopted as a starting point. So, at the first level, the main issues addressed in the interviews were segmented and coded accordingly. Codes at this level are called *code families*. They evolved along with the development of lower levels – new codes were created, others modified, and others were merged.

For instance, the researcher created four code families related to the use of a digital medium:

*Reasons to use a digital medium*  
*Reasons to not use a digital medium*  
*Advantages of using a digital medium*  
*Disadvantages of using a digital medium*

Additional code families were created for other issues dealt with in the interviews such as:

*Customer's professional background*  
*Circumstances related to the information request*  
*Question negotiation*  
*Personal communication preference*

*Second level*

Once this initial coding was completed, the researcher was able to apply the constant comparative method in each of these segments of data and to start developing finer grained coding – the second and third levels of coding. The generation of the more

specific levels of coding was not only inductive but also deductive. As a first step in applying the constant comparative method, highly specific codes were created. Some of them got names that were the transcription of the interviewees' words. As the set of codes started to increase, they were grouped into categories. Categories were compared with each other and in some cases they were split into two or more categories and in other cases categories were merged.

The second-level codes group specific codes (described below) that have characteristics in common. Codes at this level are called *categories*. For example, in the customer perspective the categories found for the *Reasons to use a digital medium* code family are:

*Technology*  
*Work practice*  
*Customer's model of the library*  
*Customer cognitive/affective state*  
*Request*  
*Physical environment*

#### Third level (specific)

The third level comprised most specific codes. As much as possible their names were created to be close to the respondents' words. They are the leaves of the polyhierarchical structure and these codes point directly to texts in the data. They are referenced in this context as *specific codes*. For example, specific codes belonging to the *Technology* category which pertain to the *Reasons to use a digital medium* code family are:

*enables quick request communication*  
*manipulates digital texts*  
*overcomes spatial distances*

*allows more fully articulated messages*

Detailed descriptions of code families, categories and specific codes are presented in Chapter 4.

Interaction logs were analyzed using a different approach, as there was no guide to use as a starting point. As interactions were short, and there were only on average two or three contacts between customers and intermediaries, there was not much data to be analyzed. The approach was to identify the different issues dealt with in the messages. This analysis yielded a relatively small coding scheme with fewer hierarchical levels.

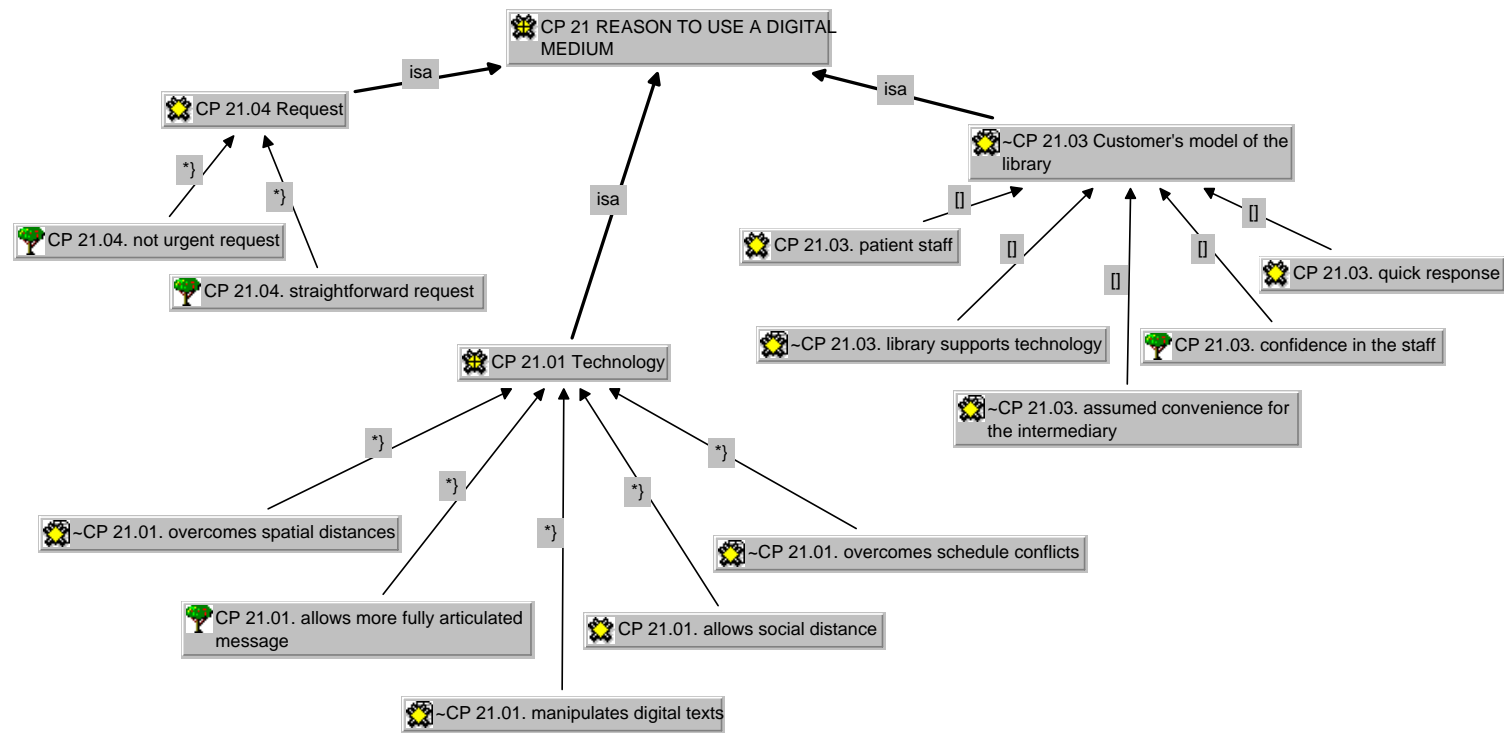
#### *3.4.3.8.1 Coding process*

Substantive statements in response to questions asked in interviews with informants were coded. There were no specific rules to define which segments of the texts would be coded. These segments were chosen based on the existence of clues for the presence of coding categories. There was no restriction concerning the number of codes assigned to a segment of text. Most of the interview texts were considered useful data. Only a very small portion of the data was judged irrelevant and therefore was not coded as already explained (see Section 3.4.3.5.5).

#### *3.4.3.8.2 Code-naming*

In order to facilitate the management of codes and their structures, a way to name codes was created so that code names were preceded by a notation that reflects the hierarchical relationships among them. Further explanation of code-naming can be found in Appendix B. The example of a code structure presented below shows the complete name of each code, but in the remainder of this document only a shortened version is

used in order to simplify explication. Figure 3-2 below presents part of the code structure created for the *Reason to use email* code family.



**Figure 3-2: Example of part of the structure of the “REASON TO USE A DIGITAL MEDIUM” code family**

Relationships showed in the figure: [] - is part of \* } is a property of

#### 3.4.3.8.3 Saturation

The constant comparative method is iterative. Each change made in the coding schemes – creating a new category for example – required a complete review of the data to check for presence of the new category. In order to reach a final version of the code scheme, several passes through the entire corpus were necessary. Upon completion of the analysis of 19 intermediations, which included interaction logs and interviews with customers and intermediaries, the checking for category saturation began. The 6 remaining intermediations were then analyzed and they fitted in with the set of existent categories. New specific codes were identified but not new categories.

#### 3.4.3.8.4 Coding consistency check

Neither the naturalistic paradigm nor grounded theory methods indicate mechanisms for checking code reliability. The coding process is a reflection of the researcher's evolving understanding of the environment under investigation. Such understanding comes from a prolonged involvement with the research site environment. Coding schemes were created concomitant with both data collection and analysis. Thus, it would not have been feasible to have code checkers replicating the same process that the researcher used in order to check code reliability.

The second axiom of the naturalist paradigm states that "*The inquirer and the object of inquiry interact to influence one another; knower and known are inseparable.*" (Lincoln & Guba, 1985, p. 37). In this approach there is a direct relationship between the researcher and the phenomenon. Lincoln and Guba go even further:

...the design is emergent and its form depends ultimately on the particular interaction that the investigator has

with the phenomena, then one could not expect corroboration of one investigator by another. (p.307)

Additionally, in comparing naturalistic data processing with conventional content analysis, Lincoln and Guba state that rules in naturalistic data analysis need not be finally formulated until the end of the inquiry (p. 337).

Based on this rationale, but at the same time striving to provide additional elements for judging the study's credibility, the following procedures were followed to check for intercoder *consistency* (rather than intercoder reliability).

When data coding was completed, the researcher asked her peers (other Ph.D. students) to check the consistency of her coding. Checking consistency is somewhat different than performing an intercoder reliability check. In checking for consistency all that is required is that the checkers do identify codes inconsistently applied, not the reliability of the codes themselves. Each code checker received a coding book containing the coding schemes and a brief explanation of categories and specific codes. They also received a sample of segments of text from the interviews and were asked to check the coding for consistency.

This procedure resulted in fine adjustments to the coding. A few instances of coding were not understood by checkers or were due to coding mistakes. The few disagreements referred to the lack of context of the data segments analyzed. Supplying these contexts solved virtually all of these disagreements. In particular, codes belonging to the researcher's perspective were double-checked. More than one person checked those codes to guarantee that other people understood (or agreed upon) the researcher's

interpretation. After completing this procedure the researcher felt confident about the consistency of her coding.

#### *3.4.3.8.5 Data analysis support tool*

This research used the Atlas.ti software for data recording and analysis purposes. Atlas.ti is a package developed for qualitative data analysis. Among other features it allows:

- Coding data considering various units such as phrases, paragraphs or any portion of the text judged to represent a unit;
- Different levels of coding;
- Writing memos associated with codes (such as categories), a portion of the data or memos that stand by themselves;
- Visually representing relationships among categories (networks);
- Searching for patterns in the data.

#### **3.4.4 Final Stage**

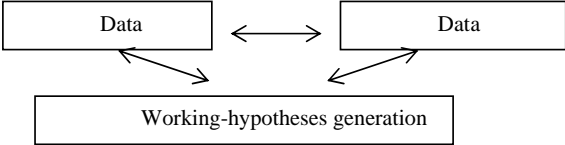
A check of results with informants was done during the advanced stages of the investigation, when the researcher started integrating the collected data and producing preliminary results. Outcomes were negotiated at individual and group levels. At the individual level, a more immediate checking of results was continuously conducted with intermediaries, since they were directly accessible at the site. Customers, on the other hand, were re-contacted for follow-up interviews where, in addition to better understanding their previous interviews, the researcher also checked some of her interpretations.



In an effort to further increase the study's credibility, a draft of preliminary results was submitted to intermediaries for review (Stake, 2000). The intermediaries reacted positively to the results and seemed to agree that the description reflected their reality. Unfortunately it was unfeasible to check results with customers because of their busy schedules and their inaccessibility.

Although summative reporting was reserved for the final stage of the study, formative analysis occurred continuously in parallel with the study's development. The collected data was stored in a database managed by Atlas.ti software.

### 3.4.5 Summary of the research design

Stage	Activities
Preliminary	Literature review Site selection Develop elicitation instruments
Implementation	<p>Three inter-related activities characterize this stage:</p>  <pre> graph TD     D1[Data] &lt;--&gt; D2[Data]     D1 --&gt; WHG[Working-hypotheses generation]     D2 --&gt; WHG           </pre> <p>Analysis of interaction logs            Purposive sampling of respondents Interview with users and intermediaries            Content analysis of interviews            Observation of user-intermediary interactions            Analysis of field notes            Analysis of organizational publication</p>
Final	Negotiate outcomes Report writing

**Table 3-5: Summary of the research design**

### 3.5 Methodological challenges

During the course of the study, a series of decisions that affected the quality of the study results were made. Some of these decisions were seen as methodological challenges. Three such critical decisions were anticipated:

#### Drawing the boundaries

The holistic approach of a case study brings up the question of what evidence should be included. Observations and interview boundaries were defined as the research developed. In choosing such boundaries, inevitably some comprehensiveness and completeness of details were lost (Diesing, 1971).

#### Sampling

Sampling stopped as categories reached saturation. It is not possible to saturate all categories. In this respect Miles and Huberman (1994, p. 62) say:

Fieldwork understanding comes in layers, the longer we are in the environment the more layers appear to surface, and the choice when to close down, when to go with a definitive coding scheme or a definitive analysis, can be painful. That choice may be dictated as often by budget constraints as on scientific grounds.

So, the researcher had to decide on those that she judged the most relevant for describing the phenomenon, the *core categories* (Strauss & Corbin, 1990). There is a degree of uncertainty in this decision.

### Informants' responses

Another methodological challenge was the ability of the researcher to stimulate respondents to reconstruct the context in which the intermediation occurred and the ability of respondents, themselves, to recall the situations being investigated. The interaction logs and field notes helped in this process but were not sufficient. Some respondents demonstrated difficulties in fully and richly recalling the situations being investigated. The study, therefore, relies on the discovery of overall and strongly prevalent patterns of behavior, but it is acknowledged that the findings may not be exhaustive and comprehensive.

## **3.6 Research quality (Trustworthiness)**

To the extent possible, means to ensure the quality of the study were included in the design of the study. Lincoln and Guba (1985) identified four criteria to be used in evaluating the quality of a naturalistic inquiry: credibility, transferability, dependability, and confirmability. These criteria are analogous to those used in more traditional approaches: validity, external validity, reliability, and objectivity. The present study addressed the issue of quality of the study adopting the terminology and perspectives suggested by these authors.

### **3.6.1 Credibility**

"Credibility" is the term used in naturalistic inquiry that is analogous to "internal validity." Credibility addresses the issue of truth-value and can be expressed by the question "*Do the data sources (most often humans) find the inquirer's analysis, formulation, and interpretation to be credible (believable)?*" (Guba & Lincoln, 1982, p.

246). According to the authors, the implementation of the study's credibility is related to methodological strategies that enhance and demonstrate credibility (Lincoln & Guba, 1985). In the present study, credibility was strengthened by using the following strategies.

To enhance credibility:

(1) Prolonged engagement

Since one of the data-collection methods was observation, the researcher tried to spend enough time at the site to learn the local culture in depth. The prolonged engagement also provided an opportunity to establish good rapport with respondents and to mitigate against eventual misunderstanding (or misinformation) during the research process.

(2) Triangulation

A variety of methods to study the same phenomenon is needed in order to overcome deficiencies in any one method. Consequently, this study's findings were based on various sources of information and methods of gathering data: observations, interaction logs, interviews with both participants of the interactions and analysis of organizational publications.

(3) Elicitation

To increase credibility (data validity), face-to-face interviews and observations were used. These data-collection methods gave the researcher the opportunity to develop a rapport with respondents and more easily probe the data being gathered.

Interviews based on recent experience allowed respondents to more easily reconstruct the contexts in which they had interacted. As the interviews were grounded in specific interactions and some of these interactions contained information about the situations that led users to seek information, this increased the chance that customers would recall in detail the context in which intermediations occurred.

(4) Hawthorne effect (Cook & Campbell, 1979)

The researcher tried to attenuate the Hawthorne effect by recruiting interviewees after interactions had occurred and by conducting observations as unobtrusively as possible. Also the prolonged involvement of many weeks' duration seemed to reduce the perception of the researcher as an outsider.

(5) Anonymity

Respondents were assured of their anonymity. The researcher also positioned herself as not belonging to the institution to which the respondents were linked.

To demonstrate credibility:

(1) Negotiated outcomes

The researcher probed her understanding of data with intermediaries through the duration of the study and discussed preliminary results with them.

(2) Peer debriefing

As much as possible the researcher discussed the fieldwork with her colleagues (other Ph.D. students) in order to check on the inquiry process.

### 3.6.2 Transferability

"Transferability" is the term used in naturalistic inquiry that is analogous to "external validity." It addresses the issue of applicability. Lincoln and Guba suggest that the degree of transferability is an empirical matter and directly related to the similarity of the two contexts: the context where the study was originally developed and the context to which findings may apply.

Naturalists can provide only the thick description necessary to enable someone interested in making a transfer to reach a conclusion about whether transfer can be contemplated as a possibility. (Lincoln & Guba, 1985 p. 316).

Yin suggests that, in terms of generalizability, the researchers should look at case studies in similar ways as they look at experiments where findings rely on analytical generalizations. *"In analytical generalizations, the investigator is striving to generalize a particular set of results to some broader theory."* (Yin, 1989, p. 44)

Accordingly, this study produced a thick description of the phenomenon and propositions. Maximum variation sampling, which promotes the inclusion of as much information as possible in the various ramifications of the categories being investigated, was adopted. In adopting this strategy for sampling, the research results hopefully provided sufficient descriptive data to make transferability judgments possible. It will be up to the researcher who seeks to transfer findings to judge the adequacy of the application of the study's findings to the new setting.

### 3.6.3 Dependability

"Dependability" is the term used in naturalistic inquiry that is analogous to "reliability" (usually demonstrated by replications) and it addresses the issue of consistency. Three measures were adopted to assure dependability:

- Systematic application of constant comparative method for data analysis;
- Meticulous and explicit documentation of the whole research process; and
- Code consistency check by peers.

### 3.6.4 Confirmability

"Confirmability" is the term used in naturalistic inquiry that is analogous to "objectivity" and it addresses the issue of neutrality, e.g., the extent to which the findings are determined by data and not by researcher bias. While it is acknowledged that the researcher brings her "person" to the study, this study adopted the following strategies to enhance confirmability:

- Findings were reported under three perspectives: customers', intermediaries' and the researcher's. While customer and intermediary perspectives reflected, as closely as possible, their perceptions about the phenomenon, the researcher perspective introduced and distinguished the researcher's interpretation of the data. The explicit inclusion of the researcher perspective provided a more comprehensive view of the phenomenon. At the same time this distinction clearly identified the specific interpretations brought to the study by the researcher herself. In other words, the "bias" was construed as a separate stream of contribution.

- Interviews, to the extent possible, contained open-ended and value-free questions that allowed for gathering a more comprehensive view of the contexts.

### **3.7 Chapter summary**

This chapter has outlined the methodology adopted in implementing the study. Two assumptions underlie the research: (1) Face-to-face and remote user-intermediary interactions differ; and (2) Users' and intermediaries' contexts play an important role in understanding intermediation. This research was an exploratory case study guided by the questions:

*What are the factors that are perceived as affecting digital intermediation?*

*How and under what circumstances might these factors affect digital intermediation?*

The research adopted a naturalistic approach and employed grounded theory methods in order to investigate the phenomenon. The research was implemented in three stages. The first stage comprised the preliminary activities, such as a literature review and the choice of a research site. The second stage comprised activities related to the implementation of the study. The main characteristic of this stage was that data collection, data analysis, and purposive sampling were intertwined. Data-gathering methods involved observations and interviews with customers and intermediaries. Interaction logs and organizational publications were also analyzed. The final stage referred to integration and negotiation of results, and report writing. Strategies to enhance the study quality were implemented along with the study development.



## 4 RESULTS

### 4.1 Introduction

This case study was guided by two questions:

*What are the factors that are perceived as affecting digital intermediation?*

*How and under what circumstances might these factors affect digital intermediation?*

This chapter provides an overview of the study findings. It comprises contextual information about the investigated setting followed by a detailed presentation of the findings. The chapter starts with a description of the research site, presenting characteristics of the hospital and detailing the library's environment and services. This is followed by a summary of the characteristics of the study participants and gives an overview of the investigated customer-intermediary interactions. Before reporting the actual findings, the researcher introduces a framework for reporting them. Based on the framework structure, findings are presented organized by category of factors affecting digital intermediation. This chapter also provides a comparison between customer and intermediary perspectives. A detailed discussion of the findings, how they answer the questions, and the implications of these findings are presented in Chapter 5.

### 4.2 The research site

This section provides the characteristics of the research site and basic contextual information in order to help readers to understand the findings. Some of the information

presented here is based on organizational publications. Because of confidentiality concerns, specific citations (e.g., websites) are not supplied in this document.

#### 4.2.1 The hospital

The library chosen for this case study is part of a not-for-profit teaching hospital that has been serving the local community for more than a century. The hospital offers a full range of general and specialty health care, inpatient and outpatient services, community health education, and outreach programs. It is a health facility with approximately 600 beds, serves more than 22,000 inpatients and more than 51,000 outpatients per year from a 15-county area in upstate New York. Their 2000 annual report indicates that the hospital at that time had 2,540 employees, 850 physicians, 600 volunteers, 800 auxiliary members and 167 students.

Of all the departments in the hospital, the library was the pioneer in implementing the first client-server computer network in 1990. The rest of the hospital, however, has relied on a mainframe system for its administrative applications, with terminals distributed throughout its departments. Among other systems, the mainframe provided an email system to the hospital's employees. Although this email system presented limitations with respect to the availability of functions such as file attachments, it has been used for communications within the organization.

A transition to a client-based system began during the 1990s. Personal computers operating on a local area network (LAN) were gradually introduced into the hospital. The new system offered a much more flexible and user-friendly email system, but it was not available to everyone in the hospital. The initial implementation strategy provided access for directors, managers, administrative staff and some of the ancillary departments.

People who were already intensive email users and needed features such as file attachments were able to use the new system. The two e-mail systems ran in parallel until recently (December 2000).

At the time of the inception of this study, the hospital's network had approximately 700 personal computers. According to the library's system administrator, the hospital at that time still had a computer shortage. Most of the people who were able to get into the new system, such as managers and administrators, had their own computer at their office in the hospital. Other employees, such as nurses, had to share equipment in the nursing station. These nursing stations are usually equipped with three PCs which are shared among receptionists and the nurses working on the floor. Most of the physicians are also among those people who do not have their own computers in the hospital and have to share computers in the physicians' lounges.

With two email systems available in the hospital network, the library's customers and intermediaries were restricted in using some of the electronic communication features depending on the system that was available to them or available to the person with whom they intended to communicate. Towards the end of the fieldwork period there were significant changes in the network infrastructure. By the time the researcher was conducting follow-up interviews with customers (November and December 2000) the hospital network infrastructure was being modernized and integrated into one common email system.

The hospital administrative policy concerning the use of electronic mail turned out to be relevant to this research. Some of the informants raised the question of privacy in using email. The policy states that messages transmitted through the hospital's email

system are the property of the hospital and confidentiality of any message should not be assumed. Participants in the study reported that the lack of privacy was a factor affecting their use of email for communicating with the library (see Section 4.7.2). So, for sensitive matters some customers would not use email to communicate with the library. They would prefer to do it through phone or in-person.

#### 4.2.2 The library

In 1948 the library began operations. It was housed within the hospital and was dedicated exclusively to hospital information requests. In 1980 it moved to a separate building across the street from the hospital, merging with the school of nursing library. In 1991, the current director re-established it as a hospital library, keeping it in the same location. It is currently a fully integrated health sciences library.

During the fieldwork period, the library staff consisted of three library professionals (one of them as the library's director), one system administrator and one library assistant. Two library professionals and the system administrator were responsible for answering customer information requests in addition to their other responsibilities.

As information resources, the library possesses digital and printed materials. It holds 150 journals and 2000 books covering the fields of patient education, nursing, medical and healthcare management. The library also provides access to electronic databases such as Medline, Cinahl and Infotrac, HSTAR (healthcare administration database). It provides access to full-text documents, including 45 reference books, the hospital policies and procedures, and drug and disease information for patients. The library staff has increasingly used authoritative websites on the Internet to provide information to customers.

Interactions among customers and intermediaries for information-gathering purposes are part of a broader organizational network existing within the hospital. Customers seem to deal with the library for information matters as they would with any other department in the hospital. The library is the major source of information for the hospital administration and staff and according to the majority of the customers interviewed its standing is as a high-quality information service. Customers have volunteered their impressions of the library with statements such as:

They provide services in a timely manner and with a spirit of cooperation and enthusiasm that encourages utilization (24:21)

I feel that the services here are second to none... I mean it is a real adjunct to the job that I do, I mean, I could not be as productive as I am without the services available. (2: 39),

... they have always produced anything I wanted. They are very timely in nature. If I tell them it is for a patient within a few minutes I have the report. (53:14)

The library's 2000 annual report indicates that the library conducted a monthly average of 51 literature searching for customers. This number does not include information requests that do not require a search in the literature, such as document delivery or some other type of service.

From interviews with the library staff and observations of their daily work, three characteristics seem to best represent their work patterns:

- Focus on customers;
- Service orientation; and
- Proactive responsiveness.

### Focus on customers

The library is guided by high operational standards. A set of values guides the library staff's work. In particular, two of these values were the most salient in observed intermediary behaviors: the library motto is "100% customer satisfaction" and the "uniqueness of the individual" is recognized. The customer characteristics and the details of the situations that they are experiencing seemed essential considerations for intermediary actions in processing customer's requests. Reinforcing this perspective, the library's director stated,

...our tactic is that they are the only customers. We don't make them queue up. We make them feel that they are the only person important in a given time, whether they are physicians, students or staff members.

Customers seem to respond to this personalized service by reporting high levels of satisfaction, trust and confidence in the library's performance.

### Service orientation

Because the library is in a location relatively remote from the hospital and also because of the characteristics of the population it serves, the library is highly service oriented. The library staff is very attentive to the virtual aspect of the library. It is not expected that physicians, nurses, administrators or other hospital employees will interrupt their work in order to walk to the library to consult reference books or read journal articles. Even if the library were located inside the hospital building, the library staff would not expect a change in customer behavior. Indeed, the library strengthens its virtual aspect, offering services through various media such as the phone, email, web-form, and fax, so that customers do not need to leave their workplace to obtain

information. The information service is under the library's policy of 24 hour turnaround. The library also maintains digital resources available online and provides training for its customers in the use of these resources.

*Proactive responsiveness*

The director of the library has a proactive role in promoting library services in the hospital and finding out new niches and opportunities to strengthen the library's presence. The history of the library reflects a willingness to take risks in implementing new services or new ways of offering services.

For example, among other actions, the library:

- was a pioneer in implementing the first computer network infrastructure in the hospital;
- has been operating as a virtual library for more than three years by offering online services to its customers through various media and training them in accessing digital resources;
- built expertise in the use of new information technologies and because of that is responsible for computer training for the whole hospital;
- actively participates in a program for patient education;
- participates on the orientation program for new employees, where all new employees are introduced to library services; and
- participates in many of the hospital's committees.

As opposed to traditional images of library professionals as reactive (i.e., waiting for customers to come to them), the library staff in this study has a more proactive attitude as expressed by its director:

... if you don't want a lot of business, don't promote yourself. But on the other hand, if your mission is to be an intricate part of the organization, you have to be there... You have to be integrated with all different areas and levels and all the operations in the hospital. So, that was what I chose ten years ago and I think it kept us pretty much flourishing, not shrinking.

### 4.2.3 Library services

The library's primary customers are from the hospital community, which includes educators, students, physicians, nursing and hospital staff, volunteers, health-care professionals affiliated with the hospital, patients and their families. The library also offers limited information services to individuals employed elsewhere.

The main focus of this study is the library's information request service, which is described in detail in Section 4.4. There are other services as well, and these comprise a comprehensive information-provision environment.

For example, the library also plays an instructional role in disseminating information technology, offering instructions to customers in the use of email, word processors, and spreadsheets. This program also stresses the use of searching tools and techniques so that customers can acquire the knowledge to solve their own information needs by searching through the hospital digital library, or elsewhere on the Internet. Many of the customers have established a strong bond with the library through this initial contact and have continued using library services to satisfy their information needs. This bond is evident in many cases where customers will consistently communicate directly



with the intermediary from whom they have had initial instruction on the use of information technologies.

Beyond accomplishing its goals of developing, encouraging and ensuring the computer literacy skills of clinicians and staff, the training program brings additional benefits to the library. Through this program the library professionals have been able to continuously disseminate library services, train users in accessing digital information resources and establish contact with potential customers. Not only do customers report their awareness of the library through the training program, but the intermediaries themselves also have benefited from these classes since they get to know their customers and use that knowledge to serve them better.

### **4.3 Informants**

The informants for this study were intermediaries and library customers who interacted with each other for the purpose of information gathering. Whereas the initial research design was to select only informants who have used a digital medium, this criterion was broadened in order to consider four cases where the initial information request was done over the phone (see Chapter 3 for details). Beyond these informants, the director of the hospital library was also interviewed.

The following two subsections present a description of the customer and intermediary profiles. While customers are characterized by their professional background and their ability to use computer communication tools, intermediaries are described by their specific roles in the library.

### 4.3.1 Customers

Twenty-five customers were interviewed in this study. The Table 4-1 below presents their professional backgrounds. The numbers shown inside the parentheses indicate the number of participants in this study who have the corresponding profession.

<b>Health care professionals (7)</b>	Nurses (6) Pathologist (1)
<b>Health care professionals &amp; managers (8)</b>	Nurse manager (5) Physician (1) Physical therapist (1) Respiratory therapist (1)
<b>Administrative (8)</b>	Managers (6) Support (2)
<b>Others (2)</b>	Spiritual care (1) Child/parents support (1)

**Table 4-1: Professional backgrounds of informants**

More than half of the interviewed customers were managers (health-professionals or administrative managers) and all of them had a computer in their offices. Only six of the customers (five nurses and one spiritual care person) did not have their own computers at the hospital. Of these six, two of them had some degree of difficulty in gaining access to computers in their work area.

Concerning customer's readiness to use an electronic medium to communicate, two customers reported that they use it at least weekly. All others reported daily use. Of those, only one customer has been using email for two years; all others reported being email users for 3 to 8 years. The table below shows an estimation of the amount of time that customers spent daily with email. So, most of the interviewed library customers had good experience in the use of a digital medium to communicate.

RANGE OF DAILY USE OF EMAIL	# OF CUSTOMERS
Less than half an hour	8
Half an hour to less than one hour	2
From 1 hour to less than 2 hours	9
Two hours or more	4

**Table 4-2: Customer's daily use of email**

#### 4.3.2 Intermediaries

The library staff includes three intermediaries. All three participated in this study. Two of them are experienced librarians specializing in health information and have been working in the hospital library for 3.5 and 10 years, respectively. The other intermediary is the library system administrator who also acts as an intermediary by helping customers solve their computer problems and by responding to regular information requests. The system administrator has been working for the hospital for almost 12 years, the last three years of which he has been working at the library.

While the three intermediaries conduct literature searching for the customers, they have, in addition, specific roles. The system administrator helps with customer information problems related to software and hardware. Information requests of this kind mostly come from a slightly different population than the regular customers; usually they are not clinicians and work in ancillary departments. The system administrator is also an instructor in the training program.

One of the library professionals is responsible for the training program and her major role at the library is to train customers. The other library professional is responsible for the hospital archives and has a major role in the information request service. All intermediaries have their own computers in their offices and use them daily.

## **4.4 Information request service**

This section provides information about the request service. It is divided into two sub-sections: the customer use of the information request service and the intermediary's processing of the information request.

### **4.4.1 Use of the information request service**

This section gives an overview of events that precede the act of sending an information request to the library. Some of the issues raised here are further explored when the actual findings are presented (Sections 4.8, 4.9 and 4.10) or discussed (Chapter 5).

#### **4.4.1.1 Circumstances**

Various circumstances prompt customers to seek information in the hospital environment. Among these, the ones found in this study are related to improving health care, developing hospital policies, preparing meetings and lectures, keeping updated in the literature and having computer problems.

#### **4.4.1.2 Consulting other sources**

Approximately half of the interviewed customers reported that, although they may or may not consider the library as their primary resource, they have, at times, tried to find the targeted information on their own by asking colleagues, searching on the Internet or, less frequently, consulting books, listservs, databases, and professional associations. They often reported failure (total or partial) in finding what they wanted and eventually have sought the help of the library. Frustration is a common feeling among customers who have failed in their attempt to find information by themselves.

The remaining portion of the sample of customers considered the library as their primary information resource and they have previously requested information directly from the library without attempting to find the information elsewhere.

#### 4.4.1.3 Seeking the help of an intermediary

Reasons that have led customers to seek the help of an intermediary fall into three categories: customer situational or personal attributes, customer goals and the customer's model of the library. Lack of search expertise and lack of time, belonging to the first category, are the most frequently reported reasons. Not surprisingly, customers who lack search expertise were more likely to request the targeted information from the library. However, customers who have already acquired such knowledge often still requested information from the library not only because lack of time is a major constraint in their everyday work routine, but also because they may want to obtain full texts of known documents. The library has mechanisms in place to provide copies of these documents, even if the library does not hold them locally.

Lack of time is occasionally associated with unsuccessful experiences of customers in attempting to do their own searches. A customer reports this situation by saying,

Well, the reason that I sought out the library with this case is because I have tried to find things on my own. Time is very precious to me and I ended up with frustration in not being able to do that kind of search and come up with what I needed.

The customer's model of the library is also a contributor to decisions to seek the help of an intermediary. This includes the staff competence, willingness to help and the quality of services. A statement made by a customer exemplifies this situation,

Usually if I feel like if it is something that I want to make sure that I'm getting the best resources, I usually ask for help [of the library]. If it is something that I'm doing on a more of a casual basis, where I like to know more about that but if I get the best resources it doesn't really matter, I'm more like to try that on my own (71:15).

#### 4.4.1.4 Addressing the request

The communication of the information request to the library involves a choice of to whom to address it. Although the library has a specific e-mail account to which customers are supposed to send their requests, half of the customers participating in this study who have sent digital requests to the library sent them to an intermediary's personal email account. Apparently, customers try to bypass the impersonal nature of the technology by communicating with someone they already know. Most of the customers are aware of the existence of the library account and that the person to whom they send the request might not be the one to process their requests. Nevertheless, they continue to consistently send requests to the same intermediary, indicating a strong desire for human interaction as a component of the process. This issue is further discussed in Section 4.10.

#### 4.4.2 Processing information requests

The following sub-sections present the intermediary's activities, experience, and perceptions concerning the information request service and its customers.

##### 4.4.2.1 Front desk

Each day a specific intermediary is assigned to the task of answering information requests. The assigned intermediary moves from his or her office to the library front desk for that day. This intermediary is also responsible for responding to all phone calls to the library, checking the library's email account, helping customers that come into the

library, and conducting the searches requested on that particular day, regardless of the medium used for the request. Usually the requests are answered on the same day that they arrive but some requests may be answered on the following day, depending on the intermediary's workload. Even when answered on the following day, intermediaries follow the 24-hour turnaround policy.

#### 4.4.2.2 E-mail accounts

The intermediaries have personal e-mail accounts. The library has a generic account. In principle, information requests should be sent to the library account. The intermediary in charge of answering requests is then responsible for checking the library account and answering the requests sent to that account.

There is no pre-established rule for how frequently the library e-mail account should be checked for e-mailed information requests. The frequency for checking this account appears to depend on the intermediary's personal email habits and on workload. When customers send their requests directly to an intermediary's personal account the rule is to forward these requests to the library account. In practice, in most of the observed cases the intermediary who received the request in a personal account simply answered it.

On rare occasions requests are left for the following day when a different intermediary is in charge of the front desk. When this occurs, requests are passed on to the other intermediary using the information request form. In case of email requests, the email history is forwarded. If necessary, the intermediaries talk to each other in order to gather more details about the request.

#### 4.4.2.3 Types of request

Requests vary according to the specific customer's situation and profession. Intermediaries reported that it is typical for physicians to ask for good review articles when they need to prepare for a presentation at a conference or for "grand-round" presentations for residents and interns. They also request information about the latest treatment for specific diseases. Anesthesiologists might ask for treatment protocols that are in the literature for a patient with a particular condition. Nursing staff might ask for information for patient education, or perhaps to help them to better understand a disease process and how to develop a plan of care. Managers ask about existing models for different kinds of programs and how other hospitals have done things. They might also need information on best practices, what lessons were learned, staffing issues and other hospital administrative topics.

#### 4.4.2.4 Processing requests

There is no typical way of processing a request. It seems to depend on who is the customer, their situation and the intermediary's workload. However, a few recurrent patterns were observed. When a customer calls to request information, the intermediary has the opportunity to go through a question negotiation with the customer. Intermediaries, however, are consistent in saying that this negotiation needs to be done quickly or, in many cases, the intermediary would not do it at all. Time pressure and customer's impatience seem to be the major reported reasons that preclude intermediaries from conducting a more complete reference interview on the phone. In this respect an intermediary said,

... in the majority of cases, there is a limit of the number of questions you can ask for clarification and you



have to do it very quickly... They think it is annoying. 'Just get me something...' I hear that a lot, 'Whatever you have, or anything, something'. Lots of times I'll just ask them simple questions that don't have anything to do with clarifying their thought process... but I need to know in order for me to deliver anything in a competent way... I need to know how they want that.

The director of the library adds *"You can't ask too much because they cannot reveal why they are looking for, sometimes, and you get to anticipate that."*

Whereas phone requests provide some opportunity for question clarification, e-mail requests usually are very short, carrying little space for information or negotiation. A common approach for answering requests, regardless of the medium, is to bypass negotiation as much as possible. In these cases a broad search is provided to customers, leaving them to self-select the relevant information. Intermediaries generally anticipate that if customers are not satisfied with the search, they will tell them. However, no such situation was actually observed.

Intermediaries rarely consult anyone else beyond their colleagues at the library in order to answer a request. They reported that a few times they sent a question to a discussion list or contacted an expert in the specific area of the sought information. However, the intermediaries' general opinion was that, most of the time, the information resources that they have access to through the library are sufficient for answering customer information requests.

#### 4.4.2.5 Priorities

There is no explicit rule of how to manage request priorities. Clearly, phone calls that are related to patient care seem to have the greatest priority. Many of the customers who call the library requesting information express a sense of urgency for receiving the

target information. Those cases receive high priority and answers may be delivered within minutes by fax, email or in person. Sometimes the customer does not explicitly state the request urgency but intermediaries may assume it based on various clues. For example, an intermediary assumed that a request was urgent based on previous requests in a similar topic made by the customer's co-worker.

#### **4.5 Investigated interactions occurring as part of an intermediation**

The researcher analyzed 25 intermediations, four of them were initiated by telephone calls and 21 initiated through a digital medium. The interactions were short; most of them included two or three contacts between the customer and the intermediary. Only one interaction had the maximum four contacts. Data also shows that all communications to clarify information were done through telephone.

The table below summarizes analysis of patterns found in interactions. The table presents the type of request, the contacts that have occurred between customer and intermediary, the medium used for each contact, and the purpose of these contacts.

REQUEST TYPE	INCOMING MEDIUM	CONTACT I → C	CONTACT C → I	RESULTS I → C	CONTACT C → I
Literature searching (14)	Digital (11)	Phone (clarification + new request)	--	Paper (articles)	--
		Phone (clarification)	--	Paper (citations*)	--
		--	--	Paper (citations*)	--
		--	--	Paper (citations*)	--
		--	--	Paper (citations*)	--
		--	--	Paper (citations*)	--
		Digital (acknowledgment)	--	Paper (citations*)	--
		--	--	Paper (information)	--
		Phone (clarification)	--	Paper (information)	--
		Digital (acknowledgment)	--	Paper (information)	Digital (thanks)
		--	--	Paper (information)	--
	Phone (3)	In person	--	Digital (citations*)	--
		--	--	Fax (information)	--
		--	--	Paper (citations*)	Digital (thanks)
Consultation (5)	Digital (5)	--	--	Digital (information)	--
		Phone (clarification)	--	Digital (instructions)	--
		Digital (automatic- message)	Digital (consultation)	Digital (instructions)	--
		Digital (instructions)	--	Digital (instructions)	--
		--	Phone	Paper (information)	--
Document delivery (4)	Digital (4)	Digital (request status)	--	Paper (article)	Digital (thanks)
		--	--	Paper (article)	--
		--	--	Paper (articles)	--
		Digital (request status)	--	Paper (articles)	--
Document delivery + Literature searching (1)	Phone (1)	--	--	Paper (article + citations*)	Digital (thanks)
Document delivery + Consultation (1)	Digital (1)	Digital (request status + information)	--	Digital (request status)	--

**Table 4-3: Behaviors in the interactions occurring during intermediations**

The notation  $C \rightarrow I$  and  $I \rightarrow C$  indicates the direction of the communications between a customer (C) and an intermediary (I).

Three types of request were identified:

1. Literature searching - where customers supply topical information to be searched;
2. Document delivery - where customers supply citations for documents;
3. Consultation - where customers direct a question to the intermediary. In this kind of request customers do not want a reference to a document where they could find an answer to their questions, they want the actual answers. This type of request commonly does not require a search in the literature. Intermediaries answer customer requests in these cases based on their own knowledge or experience. In this kind of request, intermediaries play the role of subject experts.

Four of the six consultations analyzed were about software or hardware problems. These were sent directly to the system administrator and subsequently answered by him.

Customers who request a literature searching usually receive a list of citations. They habitually analyze the list of citations, mark the ones that they want and then send a request to the library to get the full-text of the selected articles. Interaction logs considered in this study did not include this last part of the interaction – they are up to the point in which customers receive the citation list. The exclusion of this part of the interaction in the analysis is based on the following rationale:

- such transactions are usually made through the mail (on paper) and therefore more difficult to track; and

- it does not add new information to the investigation. Only if this part of the interaction were made through email would it be considered. No such case was observed in this study.

After receiving the information requests, intermediaries contact customers to send the results, to acknowledge that the request is being processed, to clarify the request, to inform the status of the request when a requested document was not available, or to give instructions to the customer. All clarification contacts were made over the phone. In two situations where the intermediary contacted the customer before sending the results, customers expanded their requests asking for additional information.

#### 4.5.1 Patterns of media use

Table 4-4, derived from Table 4-3, presents the interaction patterns of the use of the communication media in the interactions analyzed.

Request C → I	Contact I → C	Contact C → I	Results I → C	Contact C → I	Pattern freq.	# of contacts	# media switch
Email/web form	--	--	Paper	--	8	2	1
Email/web-form	Phone	--	Paper	--	3	3	3
Email	Email	--	Paper	Email	2	4	2
Email	Email	--	Paper	--	2	3	2
Email	--	--	Email	--	2	2	0
Phone	--	--	Paper	Email	2	3	2
Email	Email	--	Email	--	1	3	0
E-mail	Phone	--	Email	--	1	3	2
Email	Email	Email	Email	--	1	4	0
Web-form	--	Phone	Paper	--	1	3	2
Phone	--	--	Fax	--	1	2	1
Phone	In person	--	Email	--	1	3	2

**Table 4-4: Patterns of media use in intermediations**

The most common pattern (11 interactions) is the one-shot answer interaction, where a customer requests information and an intermediary sends back the requested information. Of those, 8 information requests used a digital medium and the corresponding answers were sent on paper; two requests were sent by email and answered by email; one request was made over the phone and answered by fax.

#### 4.5.2 Media switching

Only four interaction logs did not present a media switch. In these interactions the medium chosen by the customer was retained throughout the entire interaction. All four of these interactions were consultations. So, 21 (out of 25) interactions presented at least one change in medium. For example, all customers who had used email to request a literature searching received the results (citations) in a different medium (on paper). It is important to note that in most of the cases customers could have received the citations through email but it was the intermediary's choice to send them on paper. Reasons that led the intermediary to do so are addressed in Section 4.8.

### 4.6 Informant's reported behaviors

This section presents the types of behaviors reported by informants (customers and intermediaries) in their interviews. The purpose of this section is to describe the data used as evidence in this study.

#### 4.6.1 Customer's recalled and anticipated behaviors

In interviews with customers they made statements involving:

##### *Recalled behaviors that occurred in a recent interaction with the library*

The interviews were mainly focused on gathering information about a recent interaction that had occurred during the fieldwork. Twenty-one interviews (approximately 80%) occurred within ten days from the beginning of the interaction, four interviews (16%) between eleven and eighteen days and only one interview occurred thirty days after the beginning of the interaction (see Appendix A for details on interview dates). The researcher used the interaction log of the recent interaction to help customers to recall the situation.

##### *Recalled behaviors that had occurred in past interactions*

Customers also talked about recalled behaviors occurring in past interactions with the library. For those interactions occasionally the researcher also had the corresponding interaction logs collected from the library files.

##### *Anticipated behavior*

Customers commonly volunteered information about behaviors in which they might engage in situations different from the one being investigated. For example, a customer who had sent a non-urgent request to the library offered the following hypothetical situation: “... *whereas if it is a drug [that] I don't know and can't find anything but I need the answer right now, I would call them.*” (2:34)

All three kinds of reported evidence were used in this study, following the reason that using only recalled recent behaviors might increase data validity, but the study would lose much of its richness.

Sources of evidence other than the interviews were also taken into account in this study. This has helped the researcher to check for many of the issues dealt with in the interviews. The researcher conducted daily fieldwork for four consecutive months and during that time she had the opportunity to deepen her understanding of customer and intermediary behaviors in various situations other than the ones directly investigated through the interviews. These observations contributed greatly to the ability of the researcher to interpret ambiguous information and reported behaviors in the interviews.

It is important to note that the researcher did not have the opportunity to directly observe customers. Observing intermediaries receiving and processing customer requests, however, gave valuable insights in this regard. Such occasions allowed the researcher to expand her understanding of customer behaviors and guidance in collecting more evidence to validate interpretations of observed behaviors. For example, most of the customers anticipated that they would use the telephone for urgent requests. Two kinds of evidence helped to support these statements: (1) none of the investigated email requests was considered urgent by the customers; (2) all urgent requests made during the fieldwork were communicated over the phone or by fax. The researcher felt comfortable in using all the evidence collected during the interviews, as she did not find any notable discrepancies between reported and observed behaviors.



#### 4.6.2 Intermediary's recalled recent behaviors

This study design called for an initial interview with each intermediary to be followed by subsequent interviews for each of the intermediations selected for investigation. In the initial interviews, intermediaries talked about various aspects of their everyday work. These interviews had the purpose of helping the researcher to become acquainted with the site and the library's services. The data used to identify the factors potentially affecting digital intermediation were not gathered in these first intermediary interviews, but rather in subsequent interviews that dealt specifically with the intermediation being investigated. So, unlike interviews with customers, factors found in the analysis of intermediary interviews reflect only their behavior in a recent intermediation.

The following section presents a framework for reporting this study findings.

### **4.7 Framework for reporting findings**

Findings are reported separately for customers, intermediaries and the researcher's perspectives so that the reader can understand these perspectives as distinct.

The following structure was used to report the study findings:

First level: Class of findings

Second level: Perspectives

Third level: Categories of factors

Explanation of each of these levels follows.

#### 4.7.1 Class of findings

This study produced findings related to the following aspects of digital intermediation:

- Media use;
- Question negotiation; and
- Personal communication preference.

These are referred to in this dissertation as *classes of findings*. While the study more deeply investigated factors that are perceived as leading customers and intermediaries to communicate through a digital medium, it was open to exploring other aspects affecting digital intermediation as well. Two additional aspects of digital intermediation proved to be relevant in this study: question negotiation and personal communication preference.

Question negotiation is the portion of the intermediation process that refers to the clarification of the customer's information request. Personal communication preference, on the other hand, refers to the customer's decision to communicate with a known person as opposed to the service's general email account. Whereas media-use factors emerged from the three perspectives (customer, intermediary and researcher), question negotiation and personal communication preference emerged from the researcher's perspective.

Findings are then reported in three main sections corresponding to these classes of findings.

#### 4.7.2 Perspectives

The researcher used two main complementary strategies for identifying the phenomena:

- strategies based on what the informants explicitly say in the interviews; and
- based on what the researcher infers from interviews and observations.

Taking the informants' expressed behaviors as a starting point, the researcher inferred an extended interpretation of the phenomenon based on the researcher's more holistic contextual understanding. Three perspectives are considered in reporting findings: the customer's, the intermediary's and the researcher's. Findings under the customer's and intermediary's perspectives are based on the interviews with them and reflect, as closely as possible, their perceptions. The researcher's perspective, on the other hand, takes into account all data sources gathered in this study, including interviews, organizational publications, and site observations and reflects her interpretative understanding of the data. Although the researcher's perspective is spread throughout this document, there are specific sections (4.8.2 and 4.8.6) where the researcher explicitly identifies her perspective with respect to interpreting customer and intermediary interviews. The explicit identification of the researcher perspective has the purpose of distinguishing between those factors that are directly stated by informants from those that are inferred from the informant interviews, from the situation that they are experiencing, or from site observations. It means that the researcher is introducing a more global level of interpretation. Although it goes without question that the researcher's interpretation is pervasive even when she tries to reflect the informant's perspectives, the identification of points where she has introduced her own interpretation seems to increase the study's ability to present a more comprehensive view.

In the attempt to distinguish between informant and researcher perspectives the researcher faced two main difficulties:

- There is not always a clear distinction between these two perspectives and it is up to the researcher to decide under which perspective to classify a factor; and
- Contributions in identifying a factor can sometimes come from both the researcher's interpretation and from the informants' perceptions. For instance, some informants may make clear statements about an issue while other informants may make less clear statements about the same issue. This leaves the researcher to interpret their statements based on other information gathered. So, when the researcher's interpretation is a major contributor to the evidence for a factor, such a factor is considered as pertaining to the researcher perspective. Otherwise, it belongs to the informant's perspective.

In Chapter 5 a discussion of findings gives a broader and more complete view of the researcher's perspective.

All three perspectives (customer, intermediary and researcher) are reported for media use. Question negotiation and personal communication preference findings emerged solely in the researcher perspective.

#### 4.7.3 Categories of factors perceived as affecting digital intermediation

The analysis of customer and intermediary interviews produced a descriptive framework containing a set of nine categories of factors perceived as affecting digital intermediation (Table 4-5). These categories were generated through inductive data analysis using the constant comparative method (see Chapter 3 for details). Although the researcher has taken into account all *reported* factors, this does not guarantee that the list of factors identified in this study is exhaustive. New factors might appear as new

situations, customers or intermediaries are considered, even within the same setting. The categories of factors, however, seem to be more stable. In this respect Glaser and Strauss point that,

In discovering theory, one generates conceptual categories or their properties from evidence; then the evidence for each category is used to illustrate the concept. The evidence may not necessarily be accurate (nor is it even in studies concerned only with accuracy), but the concept is undoubtedly a relevant theoretical abstraction. (p. 23)

An inductive data analysis was conducted and it has reached category saturation after analyzing 19 intermediations (66% of the data). On the other hand, by saying that these categories were saturated, the researcher is not implying that it holds for any other instance of digital intermediation not represented in the set of investigated intermediations or even that such findings are transferable to other sites. There is, however, a considerable chance that analysis of other intermediations in this setting will generate factors that fall into these same categories when considering customer and intermediary perspectives. Transferability of findings is further discussed in Chapter 5 (Section 5.5).

The three columns on the right of Table 4-5 below indicate which category appears in each of one of the three perspectives (customer, intermediary or researcher perspectives). A brief description of all categories follows.

CATEGORY OF FACTORS	CUSTOMER PERSPECTIVE	INTERMEDIARY PERSPECTIVE	RESEARCHER PERSPECTIVE
Work practice	√	√	√
Physical environment	√		√
Customer's cognitive/affective state	√		√
Customer's model of the library	√		
Intermediary's cognitive/affective state		√	√
Intermediary's model of the customer		√	
Request	√	√	
Response		√	
Information and communication technology (ICT)	√	√	

**Table 4-5: Descriptive framework: Categories of factors perceived as affecting digital intermediation by perspective**

#### Work practices

The work practices category comprises factors that are related to aspects of the informant's everyday work practices in the organizational environment. This category includes factors related to, for example, customer's time at work, organizational culture of communicating, and the organizational social environment. Factors belonging to this category are not easily identifiable by customers. For instance, the fact that the use of email fits well with the customer's other work activities does not seem to come to mind as a possible reason for using email. So, in this category the researcher has identified factors not explicitly reported by informants.

#### Physical environment

The physical environment category refers to artifacts that are (or are not) physically available to informants in their work environment and have an effect on the

use of a digital medium in communicating with the library. An example of a factor in this category is the availability of a computer that would enable digital communication.

*The customer's and The intermediary's cognitive / affective state*

Although in the analysis these two categories are logically separated, they carry similar meaning. Factors belonging to these categories refer to the individuals' cognitive or affective state that are perceived as affecting digital intermediation: for example, the knowledge of the another person's email address or the existence of a personal relationship with the target person.

*The customer's model of the library and The intermediary's model of the customer*

The intermediary's model of the customer and the customer's model of the library refer to the image that customers and intermediaries have about each other and the library. Factors in these categories might be actual knowledge or assumptions that one makes about the other. For example, an intermediary may not send the search results to a particular customer through a digital medium based on an assumption that the customer is not an experienced email user.

*The attributes of the request and The attributes of the response*

These two categories refer to the characteristics of the information to be communicated. Customers send requests to intermediaries and intermediaries give responses back to their customers. These responses could be anything from merely an acknowledgment that the customer's request was received to the actual information

requested. Factors belonging to these two categories may be related to the content or attributes of the request or the response. Examples of such factors are the complexity of the request, its urgency, or the fact that the information to be sent to the customer is on paper (not in a digital format).

#### *Information and communication technology (ICT)*

This category refers to aspects of the information and communication technology (hereafter ICT) that potentially influence an individual's decision to use or not to use a digital communication medium. Factors belonging to this category are, for example, the technology features that allow manipulating digital texts or the ability of the ICT to overcome spatial restrictions (distance).

Factors that are perceived as affecting digital intermediation are reported grouped by categories. As four code families (see Section 3.4.3.8 for details on the coding scheme structure) emerged for media-use findings, factors belonging to media use are further grouped by code families. Only one code family emerged for Question negotiation and for Personal communication preference findings. So, factors in these classes of findings are reported grouped solely by categories.

The following sections present the study findings following the structure of the framework for reporting findings introduced in this section.

### **4.8 Media use in intermediation**

With respect to media use, a set of factors perceived as affecting intermediation emerged from all three perspectives. The identified factors fall into six of the nine categories shown in Table 4-5 above.



These factors were further classified into four code families:

- Reasons to use a digital medium
- Advantages of using a digital medium
- Reasons to not use a digital medium
- Disadvantages of using a digital medium

These code families distinguish those factors that are positively influencing the use of a digital medium from those that are negatively influencing such use. While *reasons to use a digital medium* and *advantages of using a digital medium* code-families point to potential facilitators, the other two code families point to potential inhibitors of the use of a digital medium in communications between customers and the library.

Although the two code families *reasons to use a digital medium* and *advantages of using a digital medium* may contain various factors in common, these categories are separated because the advantage of using a digital medium might not be strong enough to make an individual actually use it. Factors belonging to the advantage code-family, however, are likely to contribute to the use of a digital medium. Customers who have called the library to request information pointed to various advantages of using email, but there were other reasons that prompted them to call the library instead of sending them a digital request. For example, a customer who had called the library had also indicated, among other things, that two of the advantages of using a digital medium to send requests were the facility to manipulate a digital medium and timesaving. When asked why he had called the library he said, "*because it was urgent, it was for a patient.*" So, urgency outweighed functional advantages in his decision of what medium to use.

Similar reasons led the researcher to keep the other two code families *reasons to not use a digital medium* and *disadvantages of using digital medium* code families separated.

Findings related to media use are presented under the three perspectives: customer, intermediary and researcher. The researcher perspective is divided in two subsections. The first of these presents the researcher's perspective on customer interviews. The second presents the researcher's perspective on intermediary interviews.

#### 4.8.1 The customer's perspective

At this research site, customers may choose among using the phone, sending an e-mail, web-form or fax, or visiting the library to communicate their requests. The decision of what medium to use in a given circumstance does not always appear to be a strictly deliberative act. Until questioned, customers frequently stated that they had not thought about what had led them to make such decision. In other words, the evidence suggests that they do not always process it rationally, weighing the options and then making a choice based on evidence. When asked why a customer has used email in a particular situation she answered, "*I don't know, I just did*" (8:33). Afterwards, she identified the reasons why she actually did it the way she did. In a similar way, customers have frequently reported that they have used email because it was *easier* or, more *convenient*. Additional probing revealed other reasons not initially thought of by the respondents. The present study identified a complex combination of factors potentially affecting medium decision that would either positively or negatively influence the use of email or web-form in communicating with the library for the purpose of intermediation.

These factors fall into six categories:

- Work practices
- ICT
- The customer's model of the library
- The attributes of the request
- Physical environment
- The customer's cognitive and affective states

The Table 4-6 below shows the frequency of these categories as they emerged from interviews with customers. Categories in this table include only factors belonging to the customer perspective. The categories of reasons to use a digital medium code family are shown in decreasing order of their frequencies.

Frequencies by category of factors	Reason to use a digital medium	Advantage of using a digital medium	Reason to not use a digital medium	Disadvantage of using a digital medium
<b>ICT</b>	17	16	7	12
<b>Customer's model of the library</b>	17	4	--	1
<b>Request</b>	13	--	20	--
<b>Customer's cognitive and affective state</b>	6	1	11	3
<b>Work practices</b>	5	--	1	2
<b>Physical environment</b>	5	--	7	--
Total of customers by code family	23	16	24	17

**Table 4-6: Frequencies of categories of factors perceived as affecting digital intermediation by code family (customer perspective)**

It is worth noting that almost all customers have pointed to reasons to use, as well as to not use, a digital medium. ICT and the customer's model of the library are the two categories that most positively influence the use of a digital medium. The attributes or content of the request are most frequently reported as negatively influencing the use of a digital medium. The factors within each category are detailed in the next sections.

#### 4.8.1.1 Information and communication technology (ICT)

The Table 4-7 below shows the factors affecting digital intermediation belonging to the ICT category.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• overcomes schedule conflicts</li> <li>• manipulates digital texts</li> <li>• overcomes spatial differences</li> <li>• allows more fully articulated messages</li> <li>• reliability</li> <li>• efficiency</li> <li>• ease of use</li> <li>• allows social distance</li> <li>• democratizes communication</li> <li>• enables multi-tasking</li> </ul>	<ul style="list-style-type: none"> <li>• manipulates digital texts</li> <li>• overcomes schedule conflicts</li> <li>• enables quick response</li> <li>• efficiency</li> <li>• enables direct communication</li> <li>• leads to finding more information</li> <li>• reliability</li> <li>• allows more fully articulated message</li> <li>• allows social distance</li> <li>• reaches larger number of people</li> <li>• warns incoming messages</li> </ul>
REASON TO NOT USE A DIGITAL MEDIUM	DISADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• time delay</li> <li>• system limitation</li> <li>• inhibits immediate clarification</li> </ul>	<ul style="list-style-type: none"> <li>• promotes social distance</li> <li>• inhibits immediate clarification</li> <li>• time delay</li> <li>• lack of privacy</li> <li>• lack of verbal/body cues</li> </ul>

**Table 4-7: Factors perceived as affecting digital intermediation belonging to the “ICT” category (customer perspective)**

Customers reported four main classes of attributes potentially affecting their use of a digital medium. These aspects are:

- Networking facilities
- Existence of particular system features to manipulate messages (for example, the possibility of editing a message)
- Characteristics of the ICT implementation (for example, ease of use, its reliability or its efficiency).
- Particular ways that a person deals with ICT (for example, the possibility of writing a message while the person is on the phone).

Asynchronous digital communication enables users to overcome conflicts in scheduling of work. Customers can communicate with the library regardless of the library staff 's or customers' working schedules (or their location). The ability to overcome schedule conflicts and spatial differences were the technological factors among the most frequently reported as reasons to use a digital medium in this category. Customers, when asked why they have used email, made statements such as, *“Ah... because I can do it at any time of the day or night, when I'm reading or thinking of something and I know it will get there and they will respond”* (45:21).

Of local system features, the capacity to manipulate digital texts – i.e., editing, copying and pasting, producing hard copy etc. – is identified as another facilitator in using email for communications with the library. In particular, some customers pointed out that ICT allows them to fully articulate their requests. Two of the statements made by customers exemplify this situation,

I think email is a little quicker and it allows for the... it is more accurate presentation for me. If I take the time to write it down, I take a little more time to think of what it is that I need (78:30)

... I tend to be clear in my writing... sometimes I ramble in my speaking. So, if I can write it, I can read it and I can make sure that it is what I want to say (100:41).

Less frequently, customers indicated features such as the technology's reliability, efficiency and ease of use as the reasons that have led them to communicate electronically. The technology also makes people feel socially distant from the person with whom they are communicating. This factors is reported both as a reason to use a digital medium as well as a disadvantage. People may react differently to social distance as exemplified in these two statements made by different customers. The customer in favor of using email for a more direct communication said,

When you call somebody on the telephone and they are home ... you got to have the pleasantries. I can skip the pleasantries; I can say 'how is it going? I wish you were here' but then ask the question about, when we get next week to talk about such and such, what do you think about this?' and quickly exchange information without the telephone tag stuff that we tend to play (43:9).

The other customer, who indicated not enjoying the lack of personal contact in the email communication, said,

The only thing about email... I don't like about e-mail is that I like to interact with the person and when I send to the library [the library account] I don't know who to thank, I don't know who I'm really asking... it doesn't matter, but I like interacting with people more than answering machines and things. So, if there is any negative, it would be that (2:24).

There is no indication in the data which one of these two positions is most prevalent among the customers, since a similar number of customers argued in both directions.

Consistent with the hospital's busy environment two customers reported that they used email because it allowed them to perform two tasks at the same time: talking on the phone while writing a message. Reasons to use mail are also related to the opportunity that the technology provides for communicating directly with the target person, bypassing secretaries, answering machines or even overcoming social-status differences. Two customers reported such reasons, labeled here as *democratizes communications*.

A major reason for not using a digital medium is time delay. Although the ICT enables quick communication, there is no guarantee from the customer's perspective that intermediaries will get their requests, understand them and quickly respond back to the customers, as exemplified by the statement of a customer,

If I feel like I want to move that conversation along and get it all done I don't want the delay of waiting for the person to read their e-mail, and get back to me and then I have to wait until I'm back in the office and read my e-mail and get back to them. There is a little bit of time delay...(23:47)

The lack of opportunity for *immediate clarification*, which is also related to time delay, is pointed out not only as a reason to not use email but also as a disadvantage. While only three customers have indicated this factor as negatively influencing the use of a digital medium, it is more frequently reported among intermediaries. From the customer's point of view, they just want to check if the intermediary understood the request. For the intermediaries, it is essential that they clearly understand the request in order to respond adequately to the customer.

#### 4.8.1.2 The customer's model of the library

The customer's model of the library refers to the image that a customer has about the library services and its staff. It includes not only what customers know about the

library and its staff but also the assumptions that they make about intermediaries or library services.

The Table 4-8 below shows the factors affecting digital intermediation belonging to the customer's model of the library category.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• confidence in the staff</li> <li>• assumed convenience for the intermediary</li> <li>• quick response service</li> <li>• library supports technology</li> <li>• patient staff</li> </ul>	<ul style="list-style-type: none"> <li>• assumed convenience for the intermediary</li> </ul>

**Table 4-8: Factors perceived as affecting digital intermediation belonging to the “Customer’s model of the library” category** (customer perspective)

The customer's model of the library comprises only factors that *positively* influence the use of a digital medium. One of the major factors affecting the choice of a digital medium in communicating with the library is the confidence that customers have in the library staff. Here, the customers are assured that their requests will be handled in a competent manner. One customer's statement expresses the confidence shared by many other customers:

I knew that if I emailed them that they would take it seriously, I mean, usually they don't call or write me back, they just send the articles. So, I always can rely on them. This is not lost in some place, they take it seriously. (45:33)

In addition to viewing the library as providing highly qualified information services, customers also seek a better way to interact with the intermediaries. Customers send digital information requests to the library because they assume that this way of communicating is more convenient for the library staff.



I would have to tell, you know, to make a telephone call on my own time, or bother them while they are busy at work and they can just read [the email request] when they have a lull in their work schedule. (27:44)

Less frequently, customers reported that efficient service (quick response), a patient staff, and the fact that the library supports technology are also reasons to use a digital medium to communicate with the library.

#### 4.8.1.3 The attributes of the request

The request category comprises factors related to two aspects of the request: its urgency and its content (see Table 4-9). All such factors only refer to reasons to use or not use a digital medium. There were no reported advantages or disadvantages of using a digital medium related to the information request.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• Request is not urgent</li> <li>• straightforward request</li> </ul>	<ul style="list-style-type: none"> <li>• none stated</li> </ul>
REASON TO NOT USE A DIGITAL MEDIUM	DISADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• urgent request</li> <li>• complexity/length of the request</li> <li>• contains private information</li> <li>• contains non-routine communication</li> </ul>	<ul style="list-style-type: none"> <li>• none stated</li> </ul>

**Table 4-9: Factors perceived as affecting digital intermediation belonging to the “Request” category** (customer perspective)

Customers tend to use email for requests that are not urgent. The ability to quickly communicate their requests, however, does not guarantee that they receive the information in a timely fashion or within deadlines. Consistently, customers have reported that they would not use a digital medium for urgent requests or for those requests for which they anticipate the need for further clarification.

Most customers associate email with potential time delay, even though the library service policy does not differentiate among requests based on the incoming medium. All

requests follow the same policy – they are answered in a period not greater than 24 hours. Nevertheless, a time uncertainty is sometimes associated with email.

Customers are not aware of when the e-mail will be read. They are also unsure about when their requests will be handled by the intermediaries and the ICT does not provide ways for customer to track the intermediary's actions. Once the request is sent, customers just wait for the response to come back. Talking directly to a person in the library increases customer confidence that the intermediary will take into account the urgency of their requests and, thus, attach a higher priority to it. Therefore, phone and fax are the preferred media for communicating urgent requests. Most of the investigated intermediations refer to email information requests. These are consistent with customer's statements with respect to urgent messages in that no urgent requests were sent through a digital medium were reported. When they are reported, most of the statements about urgent requests refer to hypothetical situations, for example,

If I need it right away I might call and say what I'm looking for and then I would probably confirm that with an email to them. But if I needed it within a same day kind of thing or two three days I'll probably call to relate that level of urgency. Otherwise the email works fine. They got back to me in three or four days anyway.  
(78:36)

If a request is not urgent, customers use email for straightforward or short requests. If the request is too long or requires excessive time to write down, customers prefer to use a medium other than email. The complexity of a request to which the customer anticipates the need for clarifications, is frequently reported as a reason to not use email as illustrated in this statement,

I think because this was a kind of unusual set of circumstances which may have needed to be clarified, I

may have called and verbally explained what I was looking for... (30:21)

In these cases there is a clear tendency to avoid question negotiation through email.

Question negotiation is further discussed in Section 4.9.

Also with respect to the request content, a few customers reported that they do not use a digital medium for sensitive information or when privacy issues are a concern. The hospital email policy does not guarantee the privacy of the messages. The policy states that all messages are the hospital's property. Despite this policy, only a few customers raised this issue.

#### 4.8.1.4 The customer's cognitive and affective state

The Table 4-10 below shows the perceived factors affecting digital intermediation belonging to the customer's cognitive and affective state. All factors of this category have low frequencies (four or fewer).

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• unaware of intermediary's time schedule</li> <li>• knows what he/she wants</li> <li>• knows other's email habit</li> </ul>	<ul style="list-style-type: none"> <li>• less concern about grammar</li> </ul>
REASON TO NOT USE A DIGITAL MEDIUM	DISADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• unaware of the library service features</li> <li>• unclear about what he/she wants</li> <li>• wants personal contact</li> <li>• needs search guidance</li> <li>• lacks computer expertise</li> </ul>	<ul style="list-style-type: none"> <li>• needs to articulate meaning</li> <li>• unaware of others' email habit</li> </ul>

**Table 4-10: Factors perceived as affecting digital intermediation belonging to the "Customer's cognitive and affective state" category (customer perspective)**

Two kinds of knowledge influence customers to use a digital medium: knowledge about their information problem and knowledge about the process of gathering the information. Two complementary factors related to the customers' knowledge of their information problem were reported. When customers *know what they want*, they tend to use a digital medium. If they are *not clear about what they need or want*, they tend to prefer a different medium, such as phone or in person, as illustrated in these two statements,

If I know what it is that I need then I use the form that is on the bulletin board to request specific information. (23:15)

and,

But if it is something that I need, maybe, to have a sort of ongoing dialog about it then I'll probably go over and talk to somebody face-to-face. (23:18)

#### 4.8.1.5 Work practices

The Table 4-11 below shows the factors affecting digital intermediation belonging to the work practices category.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• lack of time to use other medium</li> <li>• more focused communication</li> <li>• assumed script for interacting</li> <li>• tension/pressure for quick response</li> </ul>	<ul style="list-style-type: none"> <li>• none stated</li> </ul>
REASON TO NOT USE A DIGITAL MEDIUM	DISADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• email can be ignored</li> </ul>	<ul style="list-style-type: none"> <li>• tension/pressure for quick response</li> <li>• library service priority rules</li> </ul>

**Table 4-11: Factors perceived as affecting digital intermediation belonging to “Work practices” category** (customer perspective)

A few customers reported factors in the work practices category. Two customers reported that they used a digital medium because it allowed them to be more direct in

their communications as opposed to phone calls, for example, where the conversation may take longer. In some cases this reason is related to timesaving as exemplified in this statement,

I find email very convenient. I can be brief and short and don't have to wait on hold. 'Am I talking to the right person or whatever?' and if they have questions they can email back to me.

Also related to the customer's work time, two customers reported that they have used email because they had no time to call.

Interestingly, the *pressure for a quick response* when using email was reported as a reason for *using* email as well as a *disadvantage*. Both customers who reported this factor seemed to feel very uncomfortable with applying such pressure but could see why it was useful. This case reinforces the researcher's decision of not merging the *reasons to not use email* and the *disadvantages of using digital medium* code-families.

#### 4.8.1.6 Physical environment

The Table 4-12 below shows the factors affecting digital intermediation belonging to the physical environment category. In this category only factors related to reasons to use or not use a digital medium were identified and all refer to the availability of a communication technology: computers, request systems or phones.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• availability of the request system</li> <li>• busy phones</li> </ul>	<ul style="list-style-type: none"> <li>• none stated</li> </ul>
REASON TO NOT USE A DIGITAL MEDIUM	DISADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• unavailability of the computer</li> </ul>	<ul style="list-style-type: none"> <li>• none stated</li> </ul>

**Table 4-12: Factors perceived as affecting digital intermediation belonging to the “Physical environment” category (customer perspective)**

Whereas customers may not mention the availability of the computer as affecting their decision of using a digital medium, all customers who have used the web-form to request information reported that the existence of such a request system was a factor that positively influenced their decision of using a digital medium. The existence of the request system does not seem to be taken for granted as are computers. On the other hand, customers who do not have easy access to computers tend to point to this factor as negatively influencing the use a digital medium to communicate with the library.

#### 4.8.2 The researcher’s perspective with respect to customer interviews

The researcher’s perspective with respect to customer interviews refers to the researcher's interpretation of statements made by customers during interviews where customers did not directly identify factors but the researcher inferred them from what was said. Factors identified in this perspective expand and complement those identified in the customer perspective, as new factors are added to the set already identified by customers. It is important to note that there is no conflict between these two perspectives. The researcher did not gather any evidence that would conflict with what was stated by

customers. To the contrary, various clues gathered through site observations tended to confirm customers' statements.

The researcher identified additional factors in three categories: work practice, ICT, and physical environment. All factors identified by the researcher positively influence the use of a digital medium. The Table 4-13 below shows the frequencies of these categories, considering only factors belonging to the researcher's perspective.

Frequencies by category of factors	Reason to use digital medium	Advantage of using a digital medium
<b>Work practices</b>	20	12
<b>ICT</b>	10	8
<b>Physical environment</b>	11	--
Total of customers by code family	23	12

**Table 4-13: Frequencies of categories of factors perceived as affecting digital intermediation by code family (researcher perspective)**

The following sections detail the factors identified in each one of these categories.

#### 4.8.2.1 Work practices

The Table 4-14 below shows the three factors identified in the researcher's perspective belonging to the work practices category.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• <i>fits existent work practices</i></li> <li>• <i>saves customer's time</i></li> <li>• <i>adoption/acceptance of the technology</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>saves customer's time</i></li> <li>• <i>fits existent work practices</i></li> </ul>

**Table 4-14: Factors perceived as affecting digital intermediation belonging to "Work practices" category (researcher perspective)**

Two related factors, at the organizational level, emerged as influencing customers' decisions to use information technology to communicate with the library: (1) email is an acceptable and institutionally promoted way to communicate within the hospital, and (2) the use of email to communicate with the library seems to fit in with existing work practices. As mentioned earlier, the history of email use in the organization dates back more than five years and the majority of the customers interviewed use email on a daily basis as a working communication tool. They reported acceptance and adoption of this technology within the organization as illustrated by a customer's statement, *"I think the hospital has, and me particularly have moved more to using e-mail than the phone."* (39:8).

When asked why a customer had used email to request information from the library, she said, *"While I was sitting here... as soon as I get the call [someone had asked a question of the customer] ... I put it right up there to start that search..."* (23:28). This statement exemplifies the seamless transition in task activities, from what the customer was previously doing to a communication with the library and then back to the prior activity. Technology enabled this kind of interaction. Customers have a generally favorable attitude towards the use of email for internal communications; they have the technological means and the organizational culture tends to favor such behavior.

Saving time is another factor contributing to the use of email for communications with the library. In the hospital environment where most customers work under time pressure, the ability to perform a task quickly is highly regarded. The email (or web-form) is perceived to be a tool that enables customers to speed up the information request.



Therefore, they are able to get the task done quickly without significant interruption of workflow. In this respect, most customers have expressed statements similar to this:

I think that I use it [email] because it is convenient. I don't have to wait on the phone or have someone to track down or wait for somebody to return my call. So, it is going to be the way to access that information that is least disruptive of my time and somebody else's time. (50:11).

#### 4.8.2.2 Information and communication technology (ICT)

In this category only one factor belongs to the researcher's perspective as can be seen in the Table 4-15.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>enables quick request communication</li> </ul>	<ul style="list-style-type: none"> <li>enables quick request communication</li> </ul>

**Table 4-15: Factor perceived as affecting digital intermediation belonging to the "ICT" category (researcher perspective)**

In the busy hospital environment the ability to quickly perform tasks is a major concern. Although customers have not explicitly stated that the information technology is the enabler for this, the researcher understands that it is implied in their statements. A customer's statement illustrates this point,

Well, because it is easy, because there is a form on there that I can pull up and just, you know, type in quick and it goes off quick, the ease, the convenience. I guess that is more about the... something about the system that influenced my using it rather something about the request...

This factor is related to the timesaving factor pertaining to the work practices category as customers associate the speed of the task of communicating their request with timesaving. This relationship is detected in statements such as,

Mostly the convenience factor, I don't necessarily have a lot of time at work and it is convenient, it is quick,

the computer is available right in the room, I don't have to go search a piece of paper and an envelope.

This statement is a response to a question about the reasons that have led the customer to send her request by email.

The two factors: *enables quick request communication* (ICT category) and *saves customer's time* (work practices category) both have high frequencies of occurrence not only as a *reason* to use a digital medium but also as an *advantage* in using a digital medium. Data suggests that they are among the most significant factors affecting digital intermediation in this setting.

#### 4.8.2.3 Physical environment

The Table 4-16 below shows the only factor belonging to the physical environment identified in the researcher perspective.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li><i>availability of the computer</i></li> </ul>	<ul style="list-style-type: none"> <li>none stated</li> </ul>

**Table 4-16: Factor perceived as affecting digital intermediation belonging to the “Physical environment” category** (researcher perspective)

Apparently, the availability of a computer is taken for granted for those who have computers in their offices. This is reflected in the customer statement:

It is easier for me. I can sit down and just type out what I want, send it and if there are questions they are very good in calling me back. They can make it by e-mail or... (12:29),

or in this statement,

...the main reason is the ease. I always know the email is ready there, waiting for me... (100:40).

The availability of a computer that enables customers to quickly request information from the library seems to be a major factor positively influencing the use a

digital medium, even though it is not explicitly offered as a reason for doing so by participants.

#### 4.8.3 Frequency analysis of customers' reported behavior

An analysis of the frequencies of factors, considering the various sources (customer's recalled and anticipated behaviors), helps to better understand the data used as evidence in this study. As a general result, factors with frequencies greater than 4 were consistently found in recalled and anticipated behaviors. A few exceptions were identified and are explained below.

##### Code family: Reasons to not use email

Since twenty-one (out of twenty-five) interviews were with customers who had recently used email, not surprisingly that in all categories most of the reported reasons to not use email refer to behaviors occurring in *past* intermediations or in *anticipated* behaviors. Only the four customers who had actually called the library (instead of using a digital medium) reported reasons for not using a digital medium in a recent intermediation. Frequencies associated with *reasons to not use email* are much larger for anticipated behaviors or recalled behaviors of past interactions than for recent interactions. Most of the disadvantages of using email consistently follow the same pattern.

##### Category: The customer's model of the library

Factors in this category originated from answers to the question *Is there anything about the library that influenced you to send this request by email?* Consequently

these factors are related to the recent intermediation being investigated. The few statements not related to the recent intermediation refer to the same factor, *assumed convenience for the intermediary*.

Category: The attributes of the request

The same reasons for using a digital medium (straightforward and not urgent requests) were indicated in all three reported behaviors in which the attributes of the request played a part in the decision. On the other hand, when talking about reasons to *not* use email or *disadvantages* of using email, the frequency of anticipated and past-interaction behaviors were four times larger than the frequency associated with behaviors in a recent interaction. This happened because the most cited reasons were *complex* and *urgent requests*. None of the investigated email-requests had these characteristics. Customers talked only about past interactions or hypothetical situations involving these request characteristics.

#### 4.8.4 Summary of findings emerging from customer interviews

The previous sections presented factors that emerged from the interviews with customers from both the customer's and the researcher's perspectives. These factors were organized by category, where each set of factors belonging to a specific category was described.

This section is intended to give a broader view of these factors, joining both perspectives and grouping them by code families regardless of the assigned categories. By showing the findings in a more integrated way, the reader can have a sense of their relative position, in terms of their frequencies compared to other factors belonging to the

same code family. Here the researcher is using frequencies as a criterion to order the factors, bearing in mind that frequencies are only one of the indicators used in judging relevance (see Section 4.8.8 for discussion in relevance of factors).

Table 4-17 through Table 4-20 present all factors perceived as affecting digital intermediation identified through the analysis of interviews with customers. Both sets of factors belonging to the researcher's as well as the customers' perspectives are shown together. The factors belonging to the researcher's perspective are presented in *Italics*. The categories to which the factors belong to are also presented in the table as they add context to the factor names.

Reasons to use a digital medium		
Categories	Factors	Freq
Work practices	<i>fits existent work practices</i>	<b>14</b>
Work practices	<i>saves customer's work time</i>	<b>12</b>
Physical environment	<i>availability of the computer</i>	<b>11</b>
ICT	<i>enables quick request communication</i>	<b>10</b>
ICT	overcomes schedule conflicts	<b>10</b>
Customer's model of the library	assumed convenience for the intermediary	<b>9</b>
Customer's model of the library	confidence in the staff	<b>9</b>
Request	not urgent request	<b>9</b>
ICT	manipulates digital texts	<b>8</b>
Work practices	<i>adoption/acceptance of the technology</i>	<b>6</b>
Request	straightforward request	<b>5</b>
ICT	overcomes spatial differences	<b>4</b>
ICT	allows more fully articulated message	<b>3</b>
ICT	efficiency	<b>3</b>
ICT	reliability	<b>3</b>
Physical environment	availability of a request system	<b>3</b>
Customer's cognitive and affective state	unaware of intermediary's time schedule	<b>3</b>
ICT	allows social distance	<b>2</b>
ICT	democratizes communication	<b>2</b>
ICT	enables multi-tasking	<b>2</b>
ICT	ease of use	<b>2</b>
Customer's model of the library	quick response service	<b>2</b>
Physical environment	busy phones	<b>2</b>
Work practices	lack of time to use other medium	<b>2</b>
Work practices	more focused communication	<b>2</b>
Customer's cognitive and affective state	knows other's email habits	<b>2</b>
Customer's cognitive and affective state	knows what he/she wants	<b>2</b>
Customer's model of the library	library supports technology	<b>1</b>
Customer's model of the library	patient staff	<b>1</b>
Work practices	assumed script for interacting	<b>1</b>
Work practices	tension/pressure for quick response	<b>1</b>
Customer's cognitive and affective state	is unaware of library service features	<b>1</b>

**Table 4-17: Frequency of factors belonging to the “Reasons to use a digital medium” code family (customer interviews)**

Advantages of using a digital medium		
Categories	Factors	Freq
Work practices	<i>saves customer's time</i>	11
ICT	<i>enables quick request communication</i>	8
ICT	manipulates digital texts	5
ICT	overcomes schedule conflicts	5
Customer's model of the library	assumed convenience for the intermediary	4
ICT	enables quick response communication	2
ICT	efficiency	2
ICT	allows more fully articulated message	1
ICT	allows social distance	1
ICT	enables direct communication	1
ICT	reliability	1
ICT	leads to find more information	1
ICT	reaches larger number of people	1
ICT	warns incoming messages	1
Work practices	<i>fits existent work practice</i>	1
Customer's cognitive and affective state	is less concerned about grammar	1

**Table 4-18: Frequency of factors belonging to the “Advantages of using a digital medium” code family (customer interviews)**

Reasons to not use a digital medium		
Categories	Factors	Freq
Request	urgent request	12
Request	complexity/length	10
Physical environment	unavailability of the computer	7
ICT	time delay	6
Customer's cognitive and affective state	unaware of the library service features	4
Customer's cognitive and affective state	unclear about what he/she wants	4
Request	contains private information	3
Customer's cognitive and affective state	wants personal contact	3
ICT	system limitations	2
Customer's cognitive and affective state	needs search guidance	2
Request	contains non-routine communication	1
ICT	inhibits immediate clarification	1
Customer's cognitive and affective state	lacks computer-use expertise	1
Work practices	email can be ignored	1

**Table 4-19: Frequency of factors belonging to the “Reasons to not use a digital medium” code family (customer interviews)**

Disadvantages of using a digital medium		
Categories	Factors	Freq
ICT	promotes social distance	5
ICT	inhibits immediate clarification	3
ICT	time delay	3
ICT	lacks privacy	2
Customer's cognitive and affective state	needs to articulate meaning	2
Work practices	library service priority rules	1
Work practices	tension/pressure for quick response	1
ICT	lack of body cues	1
Customer's cognitive and affective state	unaware of other's email habit	1

**Table 4-20: Frequency of factors belonging to the “Disadvantages of using a digital medium” code family** (customer interviews)

#### 4.8.5 The intermediary’s perspective

Similar to findings based on interviews with customers, the factors emerging from interviews with intermediaries fall into six categories:

- The intermediary’s model of the customer
- The attributes of the response
- ICT
- The attributes of the request
- The intermediary’s cognitive and affective state
- Working practices

The Table 4-21 shows the frequency of these categories in the interviews with intermediaries, considering only the intermediary’s perspective. Categories for reasons to use a digital medium are shown in decreasing order of their frequencies. Unlike customers, however, intermediaries more frequently reported factors negatively influencing the use of a digital medium. The intermediary’s model of the customer and



ICT categories are the most frequently reported contributors. A detailed explanation of factors composing each category follows.

Frequencies by category of factors	Reason to use a digital medium	Advantage of using a digital medium	Reason to not use a digital medium	Disadvantage of using a digital medium
<b>Intermediary's model of the customer</b>	6	--	9	1
<b>Response</b>	6	--	3	1
<b>ICT</b>	4	6	9	8
<b>Work practices</b>	4	4	6	--
<b>Request</b>	3	3	4	1
<b>Intermediary's cognitive and affective state</b>	2	--	2	1
Total of customers by code family	11	13	17	10

**Table 4-21: Category frequencies by code family** (intermediary perspective)

#### 4.8.5.1 The intermediary's model of the customer

The Table 4-22 below shows the factors belonging to the intermediary's model of the customer category of factors perceived as affecting intermediaries in using a digital medium to communicate with customers.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• assumed customer is regular email user</li> <li>• assumed convenience for the customer</li> <li>• assumed customer is busy</li> </ul>	<ul style="list-style-type: none"> <li>• none stated</li> </ul>
REASON TO NOT USE A DIGITAL MEDIUM	DISADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• assumed inexperienced computer user</li> <li>• assumed convenience for the customer</li> <li>• assumed customer's personal preference</li> <li>• assumed customer is not regular email user</li> </ul>	<ul style="list-style-type: none"> <li>• none stated</li> </ul>

**Table 4-22: Factors perceived as affecting digital intermediation belonging to the "Intermediary's model of the customer" category** (intermediary perspective)

Intermediaries communicated with customers *via* a digital medium if they had enough knowledge to assume that either the customers would feel comfortable or it would be convenient for the customer to communicate in that way. So, assumptions that the customer is a *regular email user*, that e-mail is *convenient for the customer*, or that the *customer is busy* (meaning that it would be difficult to reach the customer through a phone) are reasons positively influencing the use a digital medium for communication with the customer. For example, an intermediary sent a customer, by email, information about how to set up an automatic message to be sent when a person is on vacation. The intermediary explained why he did it through email,

So that she could refer back to it the next time she goes on vacation. She would have a hard copy and if it would have been verbal then chances are that she would have to call back. (55:12)

Factors negatively influencing the use of a digital medium are based on assumptions that the customer is an *inexperienced computer user*, is not a *regular email user*, or that a digital medium is not *convenient for the customer*, or it is not the *customer's preference*.

When these assumptions were contrasted with the customer's actual readiness or willingness to communicate through a digital medium, few discrepancies were identified. Even so, intermediaries demonstrated a tendency to always work in the safest way; i.e., if there was any doubt about which medium to use to communicate they would adopt a more traditional approach. For example, they would send the search results on paper. Such choices would guarantee that the customer would get the information. This behavior might explain higher frequencies of factors related to reasons to *not use* a digital medium when compared to factors positively influencing the *use* of a digital medium.

#### 4.8.5.2 The attributes of the response

The Table 4-23 shows the factors belonging to the response category that are perceived as affecting intermediaries in using a digital medium to communicate with customers.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• easy and quick response</li> <li>• large volume of material</li> </ul>	<ul style="list-style-type: none"> <li>• none stated</li> </ul>
REASON TO NOT USE A DIGITAL MEDIUM	DISADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• original information on paper</li> </ul>	<ul style="list-style-type: none"> <li>• original information on paper</li> </ul>

**Table 4-23: Factors perceived as affecting digital intermediation belonging to the “Response” category (intermediary perspective)**

In general, intermediaries tended not to use a digital medium for sending responses to customers. However, two response characteristics seem to lead them to use a digital medium: (1) when the response is *easy and quick* (a short and simple note) and (2) when the response includes a *large volume of material* that is already in a digital form. For literature searching requests, intermediaries usually send customers the retrieved citations or the requested information on paper, and often do not have further contact with the customer. In two cases, however, before sending the results, intermediaries sent an email acknowledging that they had received the request. In these two cases the requests were sent directly to an intermediary's personal account. The following situation may explain this extra communication:

I thought that her search might take me a little more time than usual and I wanted her to know that I had received it and was working on it. An e-mail note would immediately tell her that I was working on her request. Also, I know J. and thought that it would be nice to add a personal note. (106:9)

The most commonly encountered *easy and quick* responses were for the purpose of informing the customer that the requested information was not available – these were document-delivery requests. Intermediaries also sent email responses when customers asked questions to which intermediaries responded from their personal knowledge (called consultations). Out of six such consultations, five of them were responded to by email. Additionally, a single case where a large volume of material was retrieved from databases was also reported as a reason to use a digital medium and the customer had previously received other responses through email.

The fact that the original information was on paper was reported as preventing intermediaries from using a digital medium to send the results to the customer, and this was reported as a disadvantage as well.

#### 4.8.5.3 Information and communication technology (ICT)

The Table 4-24 below shows the factors belonging to the ICT category that are perceived as influencing intermediaries in using a digital medium to communicate with customers.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• manipulates digital texts</li> <li>• allows social distance</li> </ul>	<ul style="list-style-type: none"> <li>• manipulates digital texts</li> <li>• efficiency</li> <li>• gives time before responding</li> <li>• overcomes schedule conflicts</li> </ul>
REASON TO NOT USE A DIGITAL MEDIUM	DISADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• presentation / packaging</li> <li>• time delay</li> </ul>	<ul style="list-style-type: none"> <li>• inhibits immediate clarification</li> <li>• time delay</li> <li>• inhibits negotiation</li> <li>• lack of body language</li> <li>• requires training</li> </ul>

**Table 4-24: Factors perceived as affecting digital intermediation belonging to the “ICT” category** (intermediary perspective)

Factors in this category are more frequently reported as negatively influencing the use of digital media. Approximately half of these factors are the same as those identified through the analysis of the customer interviews for the ICT category (see Section 4.8.1.1). There are also some differences.

Intermediaries are cautious in the way they present the requested information to their customers. An intermediary even said that “... *packaging things for people is sometimes... as important as what you send to them*” (57:17). When intermediaries conduct literature searching they may need to do it in various databases, generating diverse sets of results. Although the systems that manage the library's databases allow intermediaries to send these results through email to their customers, this would generate as many email messages containing the search results as the number of databases consulted. So, customers would receive various packages of information referring to the same information request. Intermediaries believe that this would cause confusion for customers. Printing the results and organizing them in a package is understood as a better

presentation of results. Presentation of results is the major factor belonging to the ICT category that prevents intermediaries from using a digital medium. There are situations where results include copies of parts of books held by the library, i.e., non-digital material. Packaging in these cases is even more critical.

Intermediaries are similar to customers in associating the use of a digital medium with time delay. Intermediaries are particularly emphatic in saying that a digital medium would delay question clarification, as illustrated in this statement where the intermediary assumed that the customer's request was urgent:

To e-mail him would slow the process down and it would be easier to quickly clarify over the phone. To e-mail him I would say, 'this is what I think you are looking for, is this correct?' And then it might be a day or two before he e-mailed me back. If it were correct then that would be fine. If it wasn't correct, he would be saying 'No, I'm really looking for this' and I would e-mail him back... so I can do it in a matter minutes what might take several days... (14:7)

Disadvantages of using a digital medium, beyond factors related to question negotiation, also point to the lack of nonverbal communication (e.g., body language or tone of voice). According to intermediaries, this might prevent customers from understanding the information sent through email. Another factor reported as a disadvantage is the need that customers have for training in order to adequately use email systems.

Most of the factors positively influencing the use of a digital medium are common to factors identified in customer interviews. Intermediaries have perceptions similar to those of customers concerning the fact that the technology manipulates digital texts, allows social distance, is efficient and overcomes scheduling conflicts. These factors

were discussed in Section 4.8.1.1. In addition, an intermediary indicated that receiving an information request by email gives her time to think about the topic before responding.

#### 4.8.5.4 Work practices

The Table 4-25 below shows the factors in the work practices category that are perceived as influencing intermediaries in using a digital medium.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>assumed script for interacting</li> </ul>	<ul style="list-style-type: none"> <li>saves customer's time</li> <li>does not waste paper</li> <li>saves intermediary's time</li> </ul>
REASON TO NOT USE A DIGITAL MEDIUM	DISADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>assumed script for interacting</li> </ul>	<ul style="list-style-type: none"> <li>none stated</li> </ul>

**Table 4-25: Factors perceived as affecting digital intermediation belonging to the “Work practices” category** (intermediary perspective)

Intermediaries reported that they sent email responses to customers because customers have initiated the interaction by email. Intermediaries have assumed that to send a response in the same medium as the customer would be an expected or desired script for interacting with them within the organization. Although this was reported as positively influencing the use of a digital medium, the *assumed script for interacting* factor was more frequently reported as a reason to not use a digital medium. It was identified in situations where intermediaries have already established more traditional ways of interacting with customers and they tend to keep it in the same way; the intermediary assumed that because of the customer's work status the intermediary could not send an email; and the intermediary assumed that communication through email is more formal.

The following are examples of situations that were included as evidence for this factor. When asked why an intermediary did not send the response by email she answered, “*Ah, I don’t really know. I guess this is just my tradition with her.*” (56:12) Or, dealing with a VIP the intermediary said,

... she is a director of the... VIP, right away you try to go an extra step for them. She is close proximity; she is right down the hallway, we don't need to cross the street. So, what I did was I made it a priority because of just who she is, printed out the citations and the article and ran then down to her office.. (36:8).

Unlike customers, in only one situation did an intermediary report that the email had saved time for herself and the customer.

#### 4.8.5.5 The attributes of the request

The Table 4-26 below shows the factors in the request category that are perceived as influencing intermediaries in using a digital medium to communicate with customers.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• straightforward / clear request</li> <li>• not urgent request</li> <li>• urgent request</li> </ul>	<ul style="list-style-type: none"> <li>• straightforward/clear request</li> </ul>
REASON TO NOT USE A DIGITAL MEDIUM	DISADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>• assumed urgent request</li> <li>• request needs clarification</li> <li>• not urgent request</li> </ul>	<ul style="list-style-type: none"> <li>• none stated</li> </ul>

**Table 4-26: Factors perceived as affecting digital intermediation belonging to the “Request” category (intermediary perspective)**

While in the *response* category (Section 4.8.2.2) the reasons to use a digital medium were related to the content of the response (*easy and quick response* and *large volume of materials*), such reasons in the request category are related not only to the



request's content (*straightforward / clear request*) but also to its urgency (*not urgent request*). It is helpful to try to understand these two categories together as they seem related.

If a request is *straightforward and clear*, meaning that the intermediary does not need to clarify the request, the intermediary can then respond to the customer without any further contact. If the responses to be sent to the customer are *quick and easy* or contained a *large volume of digital material*, intermediaries might do it through a digital medium; otherwise they commonly do it on paper. However, if the request is not clear, *needed clarification*, they might conduct the clarification process over the phone.

The urgency of the request can either positively or negatively influence the use of a digital medium. This factor again cannot be analyzed alone as it seems related to what the intermediary knows or assumes about the customer's ability to manage digital files. It is also reflected in the customer's regularity of using email. For example, an intermediary expressed that he would have sent a response to a customer by email if he had known that the customer was an email user and the request was *not urgent*. In this case the intermediary actually delivered the information in person half an hour after receiving the request because he had attributed high priority to the request. He also knew that the customer had to share a computer.

By contrast, in another situation, an intermediary reported that he had not sent a response by email because the request was not urgent (implying that he would have sent it by email if the request were *urgent*). Here the intermediary emphasized that he would only do that if he knew the customer was a heavy email user. So, not urgent requests can either be a reason to *use* a digital medium or to *not use* it depending on the customer's

ability to deal with the digital response. The following intermediary's statement

illustrates this scenario:

I asked her how soon she needed it and she said it wasn't urgent. So, because of that I sent her a paper copy, as I said before, that is a ... Unless I know that the end user is a heavy email user and they need something quick, almost ninety five percent of time I'll send them a paper copy over. (70:7)

#### 4.8.5.6 The intermediary's cognitive and affective state

The Table 4-27 below shows the factors belonging to the intermediary's cognitive and affective state category that were perceived as influencing intermediaries in using a digital medium to communicate with customers.

REASON TO USE A DIGITAL MEDIUM	ADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>personal relationship with the customer</li> </ul>	<ul style="list-style-type: none"> <li>none stated</li> </ul>
REASON TO NOT USE A DIGITAL MEDIUM	DISADVANTAGE OF USING A DIGITAL MEDIUM
<ul style="list-style-type: none"> <li>unaware of customer's email address</li> <li>wants personal contact</li> </ul>	<ul style="list-style-type: none"> <li>likes personal contact</li> </ul>

**Table 4-27: Factors perceived as affecting digital intermediation belonging to the "Intermediary's cognitive and affective state" category** (intermediary perspective)

Only four intermediations (out of 25) generated factors in this category. A *personal relationship with the customer* positively influences the use of a digital medium. This subject is further explored in the Personal Communication Preference section (4.10). The other three factors negatively influence the use of a digital medium.

#### 4.8.6 The researcher's perspective with respect to intermediary interviews

The researcher's perspective on intermediary interviews refers to interpretations of statements made by intermediaries during interviews where they did not directly

identify factors in their responses but, rather, the researcher inferred them from what was said. The factors thus expand and complement those emerging from the intermediaries' perspective.

The researcher's perspective with respect to intermediary interviews actually contributed only two factors. In this sense the impact was relatively minor to the study findings. However, they are included here in order to provide a comprehensive report of findings.

#### 4.8.6.1 Information and communication technology (ICT)

Only one factor, *enables quick response*, in the ICT category came from the researcher's perspective. As in the case of the *quick request communication* factor identified in customer interviews, it refers to the rapid way that a message can be sent. It was identified only as a possible reason for using a digital medium.

#### 4.8.6.2 Work practices

Through observations of the intermediary's work, it was possible to determine that the use of email fits well with their other work practices. Most of their activities involve computer use. Moreover, their access to computers is widespread. Intermediaries can access their email account and the Internet in their offices, at the library front desk and at any of the customer workstations available in the library.

#### 4.8.7 Summary of findings emerging from intermediary interviews

The previous sections (4.8.5 and 4.8.6) presented factors perceived as affecting intermediation found in the analysis of the interviews with intermediaries. They were organized by category and each set of factors belonging to a specific category was

described. Similar to the summary for findings emerging from customer interviews, this section combines the intermediaries' and researcher's perspectives, grouping factors by code family, regardless of the categories to which they belong. The factors belonging to the researcher's perspective are presented in *Italics*. The categories to which the factors belong are also shown in the tables as they add context to the factor names (Table 4-28 through Table 4-31).

Reasons to use a digital medium		
Categories	Factors	Freq
Response	easy and quick response	5
Intermediary's model of the customer	assumed customer is regular email user	3
ICT	manipulates digital texts	3
ICT	<i>enables quick response communication</i>	3
Work practice	assumed script for interacting	3
Intermediary's cognitive/affective state	personal relationship	2
Request	Straightforward / clear request	2
Intermediary's model of the customer	assumed customer is busy	2
Intermediary's model of the customer	assumed convenience for the customer	2
Intermediary's cognitive/affective state	tired of printing	1
Request	not urgent request	1
Request	urgent request	1
ICT	allows social distance	1
Response	large volume of material	1
Work practice	<i>fits existent work practices</i>	1
Work practice	saves intermediary's time	1

**Table 4-28: Frequency of factors belonging to the “Reasons to use a digital medium” code family (intermediary interviews)**

Advantages of using a digital medium		
Categories	Factors	Freq
ICT	manipulates digital texts	3
Request	straightforward / clear request	3
Work practice	saves customer's time	3
ICT	efficiency	2
ICT	gives time before responding	1
ICT	overcomes schedule conflicts	1
Work practice	does not waste paper	1
Work practice	saves intermediary's time	1

**Table 4-29: Frequency of factors belonging to the “Advantages of using a digital medium” code family (intermediary interviews)**

Reasons to not use a digital medium		
Categories	Factors	Freq
ICT	Presentation / packaging	8
Work practice	assumed script for interacting	6
Intermediary's model of the customer	assumed inexperienced computer user	4
ICT	time delay	4
Request	assumed urgent request	3
Intermediary's model of the customer	assumed convenience for the customer	3
Response	original information on paper	3
Request	request needs clarification	2
Intermediary's model of the customer	assumed customer's personal preference	2
Intermediary's model of the customer	assumed customer is not regular email user	2
Intermediary's cognitive / affective state	unaware of customer's email address	1
Intermediary's cognitive / affective state	wants personal contact	1
Request	not urgent request	1

**Table 4-30: Frequency of factors belonging to the “Reasons to not use a digital medium” code family (intermediary interviews)**

Disadvantages of using a digital medium		
Categories	Factors	Freq
ICT	inhibits immediate clarification	4
ICT	time delay	2
Intermediary's model of the customer	assumed inexperienced email user	1
Intermediary's cognitive / affective state	likes personal contact	1
ICT	lacks body clues	1
ICT	requires training	1
Response	original information on paper	1
Request	little information	1

**Table 4-31: Frequency of factors belonging to the “Disadvantages of using a digital medium” code family (intermediary interviews)**

#### 4.8.8 The relevance of categories and factors

In an attempt to identify the study's most relevant categories or factors, the researcher faced some difficulties, as reported below. This study was designed to identify factors but not to rank them according to their relevance.

Frequencies in this study are used to help the researcher in judging the relevance of factors. Any generalized conclusions about relevance of categories and factors cannot be drawn solely based on these frequencies. The number of informants in this study is too small and they were not chosen to be representative of the target population, i.e., randomly or theoretically. If a new set of informants were to be selected it is possible that these frequencies might be altered, thereby changing their relative frequency order.

The analysis of frequencies, however, gives some insights on relevance judgment that might help to design future research. Looking at the most frequently reported categories, these seem to be perceived as having different weights when considered from the customers' and intermediary's perspectives. While *work practices* (reason to use a digital medium) and *request* (reason to not use a digital medium) are the most frequently reported categories in customer interviews, the *intermediary's model of the customer* and

*ICT* are the most frequently reported categories in intermediary interviews (both as reasons to not use a digital medium). An explanation for this difference, implied by the data, is that customers are more likely to quickly have their task done and intermediaries are more concerned about how they should appropriately serve their customers.

For customers it seems easier and faster to just write down a request to the library and send it without a major interruption. Apparently they view *ICT* as an efficient system for delivering their information requests. Intermediaries, on the other hand, need to understand the request, process it and send the information back to the customer in a timely manner. As intermediaries frequently assume that the customer is not a regular e-mail user or that to receive information through a digital medium is not convenient for the customer, they choose not to use such a medium. Intermediaries are also concerned about presenting the information to customers in an adequate format, and the technology does not offer a good alternative for such presentation.

Concerning relevance of factors, some of them were more recurrent than others, which might constitute one potential indicator of their relevance. Based on this, factors were displayed in decreasing order of their frequencies in Table 4-17 to Table 4-20 and Table 4-28 to Table 4-31. Another potential indicator of factors' relevance is their identification in both customer and intermediary interviews. Customers and intermediaries, working in different contexts with distinct goals, reported a similar subset of factors as potentially affecting digital intermediation (see 4.8.10.2 below).

Beyond these indicators, there seem to be some factors that override others, meaning that these factors when present in some situations are likely to have more weight on decisions. The data did not reveal many instances of such factors. The methodology,

however, was not adequate to investigate prevalence of factors. The *urgent request* factor belonging to the request category (customer interview) is an example of an overriding factor. Although this is the most frequently reported factor as a reason to not use a digital medium, its frequency is lower than factors belonging to work practices such as *fits existent work practices* or *saves customers' time* that were reported as a reason for using a digital medium. However, the data shows that an *urgent request* weighs more in the decision of not using a digital medium than the other two factors. Various occurrences of customers who have sent digital requests and indicated that they did so because the use of a digital medium fits existent work practices and saves their time illustrate this situation. These same customers also expressed that they would call if they had an urgent request.

If the example of urgency described above seemed intuitive, that is not true for other factors. The data did not clearly reveal the prevalence of some factors over others. In order to understand these study findings it is important to have in mind that the frequencies are merely one of the possible indicators for relevance. Indeed, if only the absolute values of frequencies are analyzed without taking into account contextual information they might be misleading.

#### 4.8.9 Cross-category dimensions

Through analysis of the interview data it was possible to identify dimensions that occurred across categories of factors. These were not anticipated findings and so there were no specific methodological strategies for gathering information about these dimensions. The researcher has merely collected some allusions to them. For this reason, they were not explored in depth in this study but their presence in the data indicates a



potential relevance to digital intermediation. They also indicate the complexity of the contextual factors affecting digital intermediation. The next sections present the cross-category dimensions identified in this study: time, trust, and assumptions that customers and intermediaries make about each other.

#### 4.8.9.1 Time

Time is the most obvious dimension across categories. It can either positively or negatively influence the use of a digital medium. Time is embedded within three elements that are pertinent to the interactions between customers and intermediaries. These elements are: the individuals who are communicating, the technology that is enabling the communication and the task that is being requested and processed, as shown in the Table 4-32 below.

Elements	Factors
Technology	enables quick request communication enables quick response communication time delay overcomes schedule conflicts inhibits immediate clarification
Individual	saves customer's time saves intermediary's time lack of time to use other medium
Task	urgent request not urgent request quick response service tension/pressure for quick response

**Table 4-32: Factors related to time**

Two aspects of the technology are directly related to time: the speed of the communication and the asynchronous character of the communication medium. The speed of the communication positively influences the use of a digital medium. The fact

that it is asynchronous can influence both aspects. The asynchronous characteristic not only allows schedule conflicts to be overcome, but also inhibits immediate clarification, potentially causing delays in the interaction.

At the individual level, time refers to individual's work time. Individuals perceive the use of a digital medium as saving time as the technology enables them to quickly communicate requests or responses. Concerning tasks to be performed by customers (request information) and intermediaries (process information requests), the urgency of the request is the most prevalent factor negatively influencing the use of a digital medium. This happens because the technology is associated with potential time delay in the interaction and there is a degree of uncertainty as to when intermediaries would handle customer requests. Consistently, customers participating in this study favor the use of a digital medium for non-urgent requests. Another factor positively influencing the use of a digital medium is the library's service. It is perceived as responding quickly to information requests. The last factor, the pressure for quick response that some customers feel when using a digital medium, may either positively or negatively influence the use of a digital medium. The discomfort – i.e., uncertainty, ambiguity, etc. – is pointed to as a disadvantage but the pressure also was reported as a reason to use a digital medium.

Taking a broader view of temporal factors, it is important to recognize the overriding influence of the busy hospital environment. Health professional customers, in general, work under time pressure and this must surely contribute to the primacy of having tasks done quickly.

#### 4.8.9.2 Trust

As already mentioned (see Section 4.8.1.2), the trust in the library's staff is a factor directly affecting the customer's choice of a digital medium. Trust, however, could also be detected in various parts of the interviews with customers in ways not specifically related to issues about customer's media use. Fifteen customers (out of 25) volunteered their feelings of trust toward the library by expressing that

- they were sure that their requests would be handled;
- intermediaries would contact them if intermediaries needed to clarify their requests, and
- the library staff is competent in finding the requested information.

The following statements exemplify customer's statements expressing trust in the library services and staff,

I know those people and like them and so, I know they will take care of my information (43:27),

I'm sure if there was clarification needed they would contact me (30:35),

... they have always produced anything I wanted. They are very timely in nature. If I tell them it is for a patient within a few minutes I have the report. (53:14)

Although trust in the library's staff is essential to the success of any service, it might be even more critical in a digital environment where customers and intermediaries are not necessarily in face-to-face or verbal contact with each other.

#### 4.8.9.3 Assumptions that intermediaries and customers make about each other

In order to request information or to answer customer information requests, customers and intermediaries make assumptions about each other or about the task they are performing. The specific circumstance involved in customer information requests is a valuable source of information for intermediaries. It helps them to make a decision on how and what information to gather for the customer. The lack of such information in most of the of digital information requests, however, gives intermediaries no alternative but to make a sequence of assumptions concerning the circumstance involved in the information request and to process the request accordingly. Only in rare situations where intermediaries are not able to find a reasonable amount of information they contact the customer in order to clarify the request.

Assumptions made by intermediaries are based mostly on their prior knowledge of the customer. These include programs that the customers work on, committees on which they are participant, and their readiness to use a digital medium. The status of the customer may also contribute to a perception of how the request should be handled. A more detailed discussion of how knowledge about customers can affect digital intermediation is addressed in the question negotiation section (4.9). Presented here are the factors affecting media use that are assumed by intermediaries and customers.

Table 4-33 below lists the factors related to intermediary assumptions, distinguishing those that are positively influence from those that negatively influence the use of a digital medium. It is interesting to note that assumed convenience for customers and assumed script for interacting can have either a positive or negative influence on media use depending on situational factors. For example, an intermediary assumed that to

deliver information in person was more appropriate in light of the fact that the customer was a director, while another intermediary assumed that it was more appropriate to send a response through email to a busy nurse manager.

Factors positively influencing the use of a digital medium	assumed convenience for the customer
	assumed customer is busy
	assumed regular email user
	assumed script for interacting
Factors negatively influencing the use of a digital medium	assumed convenience for the customer
	assumed customer's personal preference
	assumed inexperienced computer user
	assumed inexperienced email-user
	assumed not regular email user
	assumed script for interacting
	assumed urgency

**Table 4-33: Assumptions made by intermediaries**

Customers make fewer assumptions about intermediaries than intermediaries do about customers. In contrast to intermediaries who need to know about customers and the circumstances of their requests in order to answer them, customers did not report the need to know or assume much about intermediaries in order to request information. From the researcher's perspective, however, customers seem to prefer to send requests to a person they already know (details in Section 4.10).

The Table 4-34 below shows factors related to media use that are assumptions made by customers. These assumptions only positively influence the use of a digital medium. Customers assumed that the use of a digital medium is convenient for intermediaries. In only one instance did the customer go beyond that and assume that the digital medium would have the effect of the communication being taken more seriously. Consistency of assumptions is discussed in Section 4.8.10.3.2.

Factors positively influencing the use of a digital medium	assumed convenience for the intermediary
	assumed [it was an appropriate] script for interacting

**Table 4-34: Assuptions made by customers**

#### 4.8.9.4 Summary of cross-category dimensions

The cross-category dimensions point to two salient aspects in the customer's perspective: time and trust. Time is a factor for most customers in opting for digital intermediation. Trust in the library's service quality seems to be what sustains this option. From the intermediary's perspective, assumptions about customers are essential in helping them in decisions of what information to gather and how (or through which medium) to deliver the information.

#### 4.8.10 Comparing customer and intermediary perspectives

This section presents a comparison between findings: those based on customer interviews and those based on intermediary interviews. The comparison was conducted at three levels: category of factors, factors and case-by-case intermediations.

##### 4.8.10.1 Categories

Nine categories of factors affecting digital intermediation compose the framework for reporting factors (see Section 4.7.3). Table 4-35 shows a comparison of categories between the customers' and intermediaries' views.

CUSTOMER'S PERSPECTIVE	INTERMEDIARY'S PERSPECTIVE
Work practices	Work practices
ICT	ICT
Customer's model of the library	Intermediary's model of the customer
Request	Request, Response
Customer's cognitive and affective state	Intermediary's cognitive and affective state
Physical environment	--

**Table 4-35: Equivalence among categories**

The only category emerging from customer interviews that does not have corresponding one emerging from in intermediary interviews is the *physical environment* category. The intermediary's work environment seems to provide the necessary means to allow intermediaries to communicate through a digital medium with customers, when they judge it necessary. Intermediaries work for a substantial part of the day with computers. Therefore, computers are considered to be a basic working tool. When asked why they have communicated through a digital medium with a customer, intermediaries apparently take the availability of computers for granted and do not mention them. This situation helps to explain the absence of this category in the intermediary data interviews. On the other hand, customers (like nurses, doctors and managers) have other work activities not always related to the use of computers. It seems they are more conscious of the presence or absence of the specific means of communication than are intermediaries.

Most categories emerging from customer interviews (Table 4-6) are more frequently reported as positively influencing the use of a digital medium, except the *request category* and *the customer's cognitive and affective state*. The major contributors in the request category that negatively influence the use of a digital medium by customers are *urgent* and *complex/long requests*. In customer's cognitive and affective state,

however, there is not a single factor that is an extremely salient contributor. Frequencies are very low, making it hard to identify any pervasive trends.

Analysis of intermediary interviews indicates that all categories more often negatively influence the use of a digital medium, except the *response* category. This maybe because intermediaries take for granted positive factors and not always articulate them.

Looking at reported reasons to use or not use a digital medium, customers did not show a clear trend. All 25 investigated customers presented reasons to use a digital medium but 24 of them also presented reasons to not use a digital medium. If we consider only their behavior in the specific interactions, not surprisingly, they tended to favor the use of digital media since 21 of them did use a digital medium to request information.

Intermediaries, however, presented a larger difference in behaviors between the intermediations with factors either positively or negatively influencing the use of a digital medium. Of 25 intermediations, in 17 cases intermediaries reported reasons to *not use* a digital medium and 11 cases reported reasons to *use* a digital medium. It is important to say that in some intermediations intermediaries have used more than one medium, for example email and paper. This explains why the sum of the cases is greater than 25. Observations of intermediaries' work in processing information requests confirm a trend towards not using a digital medium, especially when the information request requires a literature searching.

#### 4.8.10.2 Factors

Categories are mutually exclusive, meaning that factors belonging to one category do not belong to any other. This is true when considering customer or intermediary



interviews separately. However, there exist common factors in these two sets of findings, that is, factors identified by both intermediaries and customers. The two following tables show shared factors, identifying those that positively influence the use of a digital medium (reasons to use and advantages) and those that negatively influence (reasons to not use and disadvantages) use.

Category	Factor
Intermediary's model of the customer /Customer's model of the library	assumed convenience for the intermediary/customer
Request	not urgent
ICT	allows social distance
	enables quick response communication
	manipulates digital texts
	overcomes schedule conflicts
Work practice	assumed script for interacting
	fits existent work practices
	saves intermediary's/customer's time

**Table 4-36: Common factors perceived as positively influencing the use of a digital medium**

From the 10 shared factors perceived as positively influencing the use of a digital medium, seven of them are among the top 10 more frequent factors reported by customers. As intermediaries tend to not favor the use of a digital medium (see previous section), the corresponding factors have low frequencies.

The two factors shared by intermediaries and customers negatively influencing the use of a digital medium (Table 4-37) are time-related. In particular, they refer to the asynchronous nature of the medium.

Category	Factor
ICT	time delay
ICT	inhibits immediate clarification

**Table 4-37: Common factors perceived as negatively influencing the use of a digital medium**

So, customers and intermediaries share a common subset of factors while working in different environments within the same organization and performing different tasks: customers requesting information, and intermediaries processing the requests. These factors might be potential candidates for further investigation in a class of factors less dependent on task.

#### 4.8.10.3 Case-by-case comparison of factors

This section, comparing customer and intermediary perspectives on a case-by-case (rather than a factor-by-factor) basis, adds contextual information to the study. It addresses the processes of answering information requests, consistency of assumptions made by intermediaries and customers, and informants' perceptions about the information supplied by intermediaries. This comparative analysis did not reveal significant discrepancies. Intermediaries, in general, understood what customers requested and customers reported in most cases that the information they received was helpful as detailed below.

##### *4.8.10.3.1 Understanding of requests*

Generally, intermediaries seemed to understand the information requests, including those requests that came in a digital format. Even when intermediaries complained that such requests had too little information, they were able to answer them

by filling in the gaps through their knowledge or assumptions about the customers and the circumstances involved in the request. Of the twenty-five analyzed requests, only two digital requests were considered difficult to understand by intermediaries. In both cases intermediaries called the customers to clarify their requests.

Customers have consistently reported that the intermediaries understood their requests, except in one case. This customer had requested information about a computer problem and it was not clear for the researcher if the customer did not understand the answer sent by the intermediary or if the intermediary did not understand the request.

Customers recognize the intermediary's ability to understand their requests even when they send little information. The following situation exemplifies this point. The intermediary explained the customer's information request,

I knew that she was dealing with pain because that is her specialty ... she sat on many committees for pain... controlling pediatric patients and so, these narcotics are used either for pain control before diagnostic tests or after surgery or in cancer patients, pediatric cancer patients ... If you didn't know that you wouldn't have any idea of what she asked. (77:8)

When this customer was asked about the amount of information she supplied in her request she said,

...it is enough for Lucy [the intermediary]. Usually she can figure out from what I say what I want and if she has a question she either calls me or emails me ... usually she pretty much gets from what I say, she usually understands what I want. (75:9)

Intermediaries understand customer's information requests most of the times based on the requests themselves and, in particular, because of their knowledge about the customers, along with subject knowledge.

#### 4.8.10.3.2 Consistency of assumptions

Intermediaries make more assumptions about customers than *vice-versa*. Nine customers assumed that to send a digital request to the library would be more convenient for intermediaries. Two reasons made customers believe that such way of communication would be more convenient: intermediaries would have a written request (as opposed to a verbal one) and customers would not interrupt the intermediary's work. Looking at the data, intermediaries did not perceive any of these reasons as advantages of using a digital medium, not even when probed about these specific advantages. From their perspectives, the reasons to avoid a digital medium or the disadvantages of using a digital medium seem to override possible factors positively influencing the use of a digital medium. Intermediaries tend to prefer to receive requests by phone because they can then immediately clarify the request, when necessary.

Assumptions made by intermediaries about customers, on the other hand, help them to make decisions about what information to gather and how to deliver it. These assumptions can either positively or negatively influence the use of a digital medium as seen in the Table 4-33 above. In general, intermediaries make cautious assumptions based on previous knowledge about customers or preconceived notions of what they believe would be the best way to serve their customers. Most investigated cases pointed to the consistency of assumptions. A few discrepancies between the intermediary's assumptions and customer's realities were observed. Intermediaries seemed to avoid sending digital responses to customers when these customers had participated in training and, at that point in time, were novices or exhibited difficulties in using computers.

An example of this discrepancy is illustrated by the following situation. An intermediary explained that she did not send a digital response to a customer,

I probably feel like, well, she is just building her courage up about this computer now; I don't want ... I wouldn't push her too hard. (20:10)

The intermediary in this case sent the results on paper. The customer, however, reported that she uses email for one to one-and-a-half hours daily, demonstrating a good familiarity with the medium. On the other hand, to receive the response on paper as opposed to email did not seem to bother the customer; it might even have been her preference (this possibility was not checked). When asked if this customer would do anything different about the investigated interaction she replied, "*No! I think it works fine. It is a good system.*" (18:38)

Another discrepancy was observed when intermediaries assumed urgency. Requests usually are answered as quickly as possible – within a 24 hours period. There are requests, however, that are assumed to be more urgent than others. In three observed cases of assumed urgency the requests actually were not urgent.

Beyond the assumptions mentioned so far, intermediaries assume that customers do not like question negotiation, especially if it is done through a digital medium. Such assumptions, however, when checked with customer's interview data showed a few discrepancies between intermediary assumptions and customer reports. A further analysis on this issue is presented in the question negotiation section (4.9).

#### *4.8.10.3.3 Helpfulness of the gathered information*

Nineteen customers (out of 24) reported that the information they received from the library was helpful. Of the remaining customers, four of them reported that the

information gathered was not especially helpful; one customer reported that the intermediary did not completely understand her request and the other three already had the information they received from the library. The customer who reported that the information was not helpful at all, also reported that she got all the information she requested. However, the program she was working on had changed directions and so, the information she got was useless.

The intermediaries, on the other hand, do not have formal mechanisms in place to request feedback from customers about their satisfaction or the usefulness of the information supplied to them. When asked how well intermediaries satisfied their customers in twenty-four information requests, intermediaries assumed the customer's complete satisfaction in 11 requests, partial satisfaction in 5 requests and were unsure about 8 requests. The Table 4-38 below shows the agreement and disagreement between customer's judgments of helpfulness of the gathered information and intermediary's assumptions of customer's satisfaction in 24 intermediations.

		Intermediaries assumptions		
		Complete customer's satisfaction	Partial customer's satisfaction	Unsure about customer's satisfaction
Customer's judgments	Helpful information	10	3	6
	Not so helpful information	--	2	2
	Not helpful	1	--	--

**Table 4-38: Comparisons of customer's judgment and intermediary's assumptions about the gathered information**

In conclusion, data suggests that customers receive information pertinent to their information needs. Twenty-three (out of 24) requests met requester's needs, although three customers already had the requested information and only one request, from the

customer's point of view, was not completely understood by the intermediary. In this last case, the interaction was interrupted because of the intermediary's vacation (the customer had sent the request to the intermediary's personal account) and the customer had solved part of her information problem by asking her colleagues in her department. The only case where the information was considered "not helpful" occurred due to changes in the customer's information needs.

#### *4.8.10.3.4 Evaluation of the interaction by informants*

Intermediaries and customers evaluated the interactions. Only two customers revealed that they would have done something different concerning the content or process of the interaction. One customer regretted not having asked for more information than she actually requested. The other customer regretted having asked for a copy of an article that she already possessed. In sum, customers did not mention any factor related to the service, intermediaries or even related to the diverse media used in the interactions.

Intermediaries, on the other hand, have reported that they would have done something different in six of the investigated interactions. The aspects pointed to by intermediaries revealed their desire for improving the service that they provided. Intermediaries would have liked to articulate better their answers better, sent more information, and clarified two requests.

#### *4.8.10.4 Summary of the comparison between perspectives*

The comparative analysis between customer and intermediary perspectives showed that factors affecting intermediation concerning media use fall into similar sets of categories. While most categories in the intermediary perspective more often negatively

influence the use of a digital medium, categories in the customer perspective did not present a clear trend.

Comparisons of perspectives for each intermediation did not reveal major discrepancies between the two perspectives. In general, intermediaries understand customer's requests and provide helpful information to them. Where there were discrepancies, these revealed the cautious behavior of intermediaries who do not want to risk difficulties in successfully delivering the requested information. For example, intermediaries do not send email responses to customers if they believe that the customer is not a regular email user. The evaluation of each interaction made by customers and intermediaries did not reveal any issue related to media use.

#### **4.9 Question negotiation**

In order to answer customer's information requests, sometimes intermediaries need to go through a process of question negotiation to clarify the question, understand the circumstances and purpose of the request, gather information about the urgency of the request and about how the customer wants the information to be delivered. Where requests are made in person or over the phone, the question negotiation may happen in a direct verbal communication between customers and intermediaries. Digital requests do not offer such an opportunity for personal interaction. Intermediaries at this site adopted alternative ways to avoid, as much as possible, question negotiation, as explained below. Another related issue is the customer's willingness or expectations in conducting question negotiations through a digital medium. This issue is also presented in the following sections.



#### 4.9.1 Knowledge about customers

Intermediaries reported having some degree of knowledge about their customers. One library professional estimated that she knows 90% of the customers that request information through the library. Another library professional reported 50%, and the system administrator around 95% of the customers who sent requests directly to him. Although there are differences in knowledge about customers, intermediaries consult each other when they need to know about an unknown customer. So, intermediaries have some kind of knowledge about almost all customers who request information from the library.

The knowledge about customers can vary from just knowing the customer's profession or position in the hospital to detailed information about the customer's work activities or ability to use computers. Based on this knowledge, intermediaries make assumptions about the customers in order to answer their requests. Some of these assumptions are identified as factors affecting their decision to use (or not use) a digital medium to communicate with customers and were already discussed in Section 4.8.5.1.

Knowledge of customers, however, plays a role in processing customer's information requests that goes beyond the media decision. It helps intermediaries to clarify requests and, thus, more adequately serve customers. Various instances of observed situations show the extent to which the knowledge of customers can influence the intermediary's actions in processing requests. Table 4-39 below lists some of these influences.

Intermediary's knowledge about the customer	Influence of that knowledge on intermediary's actions or responses
customer is not a clinician	searches for patient information
works on the pediatric floor	narrows the search to pediatrics
customer searches by herself	suggests to the customer to search elsewhere
is thoughtful	carefully articulates the response
is an expert in the subject	zeroes in on the literature
inexperienced computer user	doesn't send the response through email
regular email user	sends the response through email
works in a particular committee	assumes urgent request
professional interests	guides response content

**Table 4-39: Examples of the knowledge about a customer and its influence on responses**

An intermediary, for example, received a digital information request from a customer containing little information. She said that in order to answer that request she reasoned in the following way:

... I went to find for her [the customer] the basics, just the basics, thinking that...making the assumption right off the bat that she [the customer] needed this information at a consumer health level because she is not a clinician. (57:2).

So, although the customer omitted essential information in her request, the intermediary was able to fill in gaps without the need to re-contact the customer for clarifications.

For all intermediations investigated, intermediaries demonstrated some knowledge about the customer requesting information. While in traditional settings such knowledge is acquired through reference interviews with customers, in this setting knowledge is gathered by alternative means. Intermediaries know about customers through training classes offered at the library, participation in hospital committees, through interoffice memos, in previous work with the customer, or even through the customer's history as a library user. The library staff works toward broadening their

knowledge about customers in order to serve them better. This is reinforced by the library director who expressed her belief that their *"mission is to be an intricate part of the organization."* By doing so, they are able to understand and keep track of the hospital's business and, in particular, understand the needs of their customers.

By acquiring knowledge about customers, intermediaries seem to be creating a *common ground*<sup>7</sup> for interacting. Coiera (2000) identified two broad classes of common ground: pre-emptive and just-in-time grounding. According to the author a pre-emptive grounding is the knowledge shared *"prior to a conversational task, assuming that it will be needed in the future."* (p. 283). He also posited that it is a good strategy when task time is limited. This seems consistent with intermediaries' behavior in such a busy hospital environment. Of all 21 digital requests only four of them required clarification that was not resolved by the intermediary's knowledge of the customers.

Intermediaries reported that they try to bypass question negotiation, since they do not want to bother their busy customers. There are situations, however, where question negotiation is unavoidable. In such situations intermediaries have demonstrated their preference for phone use, avoiding digital negotiation. This attitude towards digital negotiation, however, was not so clear from the customer's point of view. This issue is addressed in the next section.

#### 4.9.2 Digital question negotiation

It was observed and confirmed through interviews with intermediaries that as much as possible they bypass question negotiation. A main reason for this appears to be

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<sup>7</sup> *"Common ground refers to the knowledge shared by two communicating agents."* (Coiera, 2000, p. 282)

that intermediaries attribute impatience to customer behavior, "*people are so busy they don't want to be bothered with question after question...*" (110:16). One intermediary said,

I think there is even less patience that people have in e-mail back and forth... They think it is annoying. 'Just get me something...' I hear that a lot! 'Whatever you have, or anything, something.

Again, time is a factor. As already presented in Sections 4.8.1.1 and 4.8.5.3, time delay is one of the major factors negatively influencing the use of a digital medium. This is perceived by intermediaries as well as by customers. Customers reported that they expected the library to contact them if their requests were not understood. In a contrast to intermediary's assumptions, seven customers explicitly reported their expectation that the library would (or could) contact them by email, if clarifications were needed. Examples of such statements are:

I can put my thoughts down and if they have a question then they could email me back and I can do it at my convenience (71:27)

If they cannot understand what I need from the e-mail, they will follow up with a phone call or e-mail me back to clarify. I find the service efficient. (24:5)

Voicing an alternative position, other customers expressed a desire to clarify by phone, as illustrated by this customer statement

...if I didn't feel the information was being understood from their perspective or maybe I wasn't able to convey specifically enough to them over email then I would try doing it by phone (71:33).

Although some customers stated preference for phone clarifications there was no instance revealing an explicit intent of avoiding digital negotiation. On the other hand, the only digital negotiations observed were consultations; all literature-search negotiations were conducted by phone.

### 4.9.3 Summary of question negotiation

Intermediaries bypass negotiation as much as possible. They use their own knowledge about the customer in order to fill in missing information in digital requests. As explicitly stated in interviews, intermediaries bypass digital negotiation because they assume it annoys customers and there is a potential time delay associated with it. Customers did not reveal so strong an opposition to digital question negotiation. Some of them have even expressed their expectation of being contacted by the library through email with the purpose of clarifying their information requests.

Two factors were identified as related to question negotiation: intermediary's knowledge about the customer and intermediary's attitude towards avoiding question negotiation. Both factors were classified under the intermediary's cognitive and affective state.

### **4.10 Personal communication preference**

Communication with a known person (as opposed to a general email account) seems to be an important factor mostly positively influencing digital intermediation for both intermediaries as well as customers. Even though this factor was explicitly mentioned only twice, based on the researcher's observations, communication with a known person seems to be an important factor affecting intermediation. This factor goes beyond personal relationships and it is not necessarily related to media use.

The communication of the information request to the library involves a choice of to whom it should be addressed. Of the 21 digital requests, four were through a form (no option to whom to address) and 17 were actually sent to email accounts. Of these, 11 were sent to personal accounts and 6 to the library general account. So, if only requests

sent to email accounts are considered, 65% of them were sent to personal accounts. This is actually a conservative number because in addition to this number, of the customers who sent request to the library account, one complained that it was too impersonal and another did it mistakenly (she thought she was sending it to a specific person).

It appears that customers who send digital requests tend to prefer to send them to people that they already know. Customers reported four main reasons that led them to direct the request to a specific person in the library:

- they have established a personal relationship with the specific intermediary,
- they trust the specific intermediary's work,
- they expect higher priority, or
- the subject of the request was related to the specific intermediary.

A personal relationship with the intermediary is the most frequent reason justifying sending requests to specific intermediaries. It is important to note that most of these relationships were developed through work activities such as training, participation in the same committees or a history of the intermediary answering prior requests. Trust in the intermediary was also mentioned. The researcher sees this as related to personal relationship since trust is built as the customer gets to know the intermediary and establishes a working relationship. The strategy of sending the request to a particular intermediary in order to get priority, indeed, may work in the opposite direction. The library has a policy of answering information requests within a 24-hour period. Requests that are sent to personal accounts may not conform to this policy as the account holders are occasionally unavailable to retrieve the request from their own account.

Customers are aware of the existence of the library account and that the specific person to whom they send the request might not be the one to process their requests. Nevertheless, they continue to consistently send requests to the same intermediary. This seems to reinforce the relevance of personal communications in digital intermediation.

From the intermediary's point of view, to interact with the same person allows intermediaries to keep track of the customer's requests, to deepen their knowledge about the customer's topic of interest, and therefore to help them better answer customer's requests. The following statement made by an intermediary illustrates this situation,

if somebody personally asks me for something really important and I have a lot of background with that person or somebody had expertise in a particular area you might choose for them to do that search or you might choose to take ownership of the search that was sent to you and not forward it out... (110:4).

Although keeping track of customer's requests is helpful to intermediaries, to consistently receive information requests in the intermediary's personal account is not always appreciated. The same intermediary who made the previous statement in a subsequent interview where a specific intermediation was being investigated said,

Well, she [the customer] is doing this thing that I can't stand which is emailing to a person. I think that...you know, I wonder if I was on vacations... She emails me personally because I sit on committees with her and have done searches on the past for her but I don't like when that happens, like people picking the individual and then sending the search request. (77:1).

A single factor was identified as related to personal communication: customer's preference for personal communication. This factor was classified under the customer's cognitive/affective state.

This study did not deeply explore the effect of personal communication preference in digital intermediation. Nevertheless, there are some indications that this might be an important issue for further investigation.

#### **4.11 Chapter summary**

This chapter reported the study findings, which are related to three aspects of digital intermediation: media use, question negotiation and personal communication preference. Findings are presented under customer, intermediary and the researcher perspectives. In order to report the findings, the researcher supplied a framework, which comprises factors, categories of factors and code families. This framework is considered a preliminary framework for identifying categories of factors affecting digital intermediation.

Media-use factors fall into nine categories. These factors were presented for each of the three perspectives, grouped by category. Related to media use, three cross-category dimensions: *time*, *trust* and *customer-intermediary assumptions* were discussed. These dimensions were identified in factors belonging to diverse categories. A comparison between customer and intermediary perspectives showed few discrepancies.

Findings related to question negotiation and personal communication preference belong solely to the researcher perspective. These findings were less deeply investigated but the information gathered on these issues already point to their importance in influencing digital intermediation.



## **5 Discussion and implications**

### **5.1 Introduction**

This chapter amplifies the researcher's perspective with respect to the study findings, underlining the most significant ones and discussing their implications for theoretical frameworks and practice. The chapter starts with a summary of the findings followed by the researcher's reflection on how well the study attained its goals. The chapter also points to methodological difficulties faced by the researcher in conducting this study and the benefits of design and implementation choices. This is followed by a comparison of the study findings with traditional and digital reference-interview models and media-use models. Considerations concerning the quality of the study are also presented. The chapter ends with suggestions for future research.

### **5.2 Recapitulation of findings**

A summary of the study's findings is given below. General findings and those related to media use, question negotiation and personal communication preference are presented.

The investigation took into account three perspectives: intermediary's, customer's, and researcher's. The researcher's perspective expands and complements the other two. The study generated a descriptive framework that identifies nine categories of factors affecting digital intermediation as shown in the Table 5-1 below.

Class of findings	Perspectives		
	Intermediary	Customer	Researcher
Media use	Work practices		
	Information and communication technology (ICT)		
	Customer's model of the library	Intermediary's model of the customer	--
	Request	Request, Response	--
	Customer's cognitive and affective state	Intermediary's cognitive and affective state	--
	Physical environment	--	--
Question negotiation	--	--	Intermediary's cognitive / affective state
Personal communication preference	--	--	Customer's cognitive / affective state

**Table 5-1: Category of factors perceived as affecting digital intermediation by class of findings and perspectives**

Although this study did not aim at generating a theory, the framework can be considered a model in development. As posited by Glaser and Strauss (1967), grounded theory can be presented “as a well-codified set of propositions or in a running discussion, using conceptual categories and their properties” (p.31). Because of the limitations in this study and transferability concerns, the researcher assumes a cautious position and considers the generated descriptive framework as preliminary (still incomplete). The framework stands as a high level abstraction of findings in this study.

#### General findings

Three classes of findings are reported: media use, question negotiation, and personal communication preference. Contextual information proved to be essential in understanding digital intermediation.

In addition to the nine categories of factors, the study also identified three cross-category dimensions that potentially affect digital intermediation: *time, trust* and *assumptions that intermediaries and customers make of each other*.

With respect to the nature of categories of factors perceived as affecting digital intermediation, this study found that potential sources of factors belong to different levels of aggregation: *organizational environment, individual, message* and *information and communication technology*. When viewed from this perspective the categories of factors can be organized as shown in Table 5-2.

LEVELS OF AGGREGATION	CATEGORY OF FACTORS
<b>Organizational environment</b>	Work practice
	Physical environment
<b>Individual</b>	Customer's cognitive/affective state
	Customer's model of the library
	Intermediary's cognitive/affective state
	Intermediary's model of the customer
<b>Message</b>	Request
	Response
<b>ICT features</b>	Information and communication technology (ICT)

**Table 5-2: Sources of factors perceived as affecting digital intermediation**

The following is a brief outline of the key findings.

#### Media use

This study found factors related to media use in nine categories. Factors belonging to these categories are perceived as positively or negatively affecting digital intermediation and they must be understood in their contexts:

- Some factors override others depending on context;

- While factors emerging from intermediary's perspective more often negatively affect digital intermediation, factors emerging from customer's perspective did not show a clear trend;
- The customer and intermediary perspectives were compared with respect to media use and did not reveal substantive differences.

#### Question negotiation

- Two intertwined factors related to question negotiation were identified: *knowledge about customers* and *intermediary's attitude towards avoiding question negotiation*;
- Negotiation is a continuous (rather than a one-time) process in which intermediaries acquire knowledge about customers and respond to their information request based on such knowledge;
- Customers and intermediaries seemed to have a different attitude towards question negotiation: intermediaries bypassed it anticipating customer reluctance, while customers did not reveal any opposition to it.

#### Personal communication preference

- Only one factor related to personal communication was found: *customer's personal communication preference*. Customers demonstrated preference for sending email requests to an intermediary whom they already knew as opposed to the library's general email account;

- Intermediaries reported mixed feelings about receiving information requests in their personal email accounts;
- Factors related to personal communication preference could not be fully explored due to the limitations of the study design, but this remains a promising area of future research.

### **5.3 Reflections on accomplishing research goals**

The study identified a set of factors perceived as affecting digital intermediation, described circumstances and explained how these factors might affect digital intermediation. The study also described the perspectives of three groups of individuals: customers, intermediaries and the researcher, which increased the ability of the study to present a broader view of the phenomenon. Various aspects contributed significantly to the credibility of the study findings (see Chapter 3, Section 3.6.1 for more complete discussion).

Despite this, there were some limitations. A critical analysis of findings led to the identification of possible limitations to their comprehensiveness. Important sources of evidence that could have produced additional factors or even categories of factors might have been missed. The conceptual model and methodological strategies adopted in this study might have been a contributor to these limitations. It does not mean that the research design was not appropriate to the study. However, the study design could have included additional methodological strategies that would have produced an even broader view of the phenomenon and, therefore, increased the chances of more comprehensive results. The study also faced a few difficulties in the implementation phase, which prevented a full implementation of the original study design.

These issues are further discussed in the next sections.

### 5.3.1 Resources for attaining research goals

The study findings were greatly benefited by the adoption of the case study approach, the researcher's unlimited access to the intermediary's work environment, and the characteristics of the investigated site, as explained below.

#### 5.3.1.1 Case study

Case study proved to be a good approach for exploring the phenomenon because it enabled the investigation of contexts and, consequently, allowed the discovery of important factors. Case study also assumes the use of multiple sources of evidence. In particular, considering different perspectives on the same intermediation process greatly enriched the study. The phenomenon was investigated from the perspectives of all those participating in it.

This study was designed to seek intermediary and customer perspectives on each investigated intermediation. Through a comparative analysis of these perspectives it was possible to identify commonalities and discrepancies, produce more comprehensive results, and remove potential biases derived from a single perspective. Investigating both perspectives also allowed the researcher to identify issues that could not have been raised otherwise. For example, question negotiation proved to be an important issue to be further investigated after comparing these two perspectives (see Section 4.11). In addition to these two perspectives, the study explicitly acknowledges the researcher's perspective as well.

By identifying the three perspectives the researcher has also tried to distinguish *emic* and *etic* views. While there is no consensus about the terms *emic* and *etic*

(Headland, Pike, & Harris, 1990), the researcher adopted a differentiation between these two terms suggested by Berry (1990):

External or internal view: Etic descriptions or analyses are alien, with criteria external to the system. Emic descriptions provide an internal view, with criteria chosen within the system. (p.85)

The informant's perspective would reflect an *emic* view and the researcher's perspective an *etic* view. This distinction, however, was not always clear. There was a tension between the immersion of the researcher in the social context of informants and her objectivity in investigating the phenomenon. The informants' behavior might also have been affected by the researcher's presence in their context. Nevertheless, the attempt in making this distinction allowed a more comprehensive report of findings, identifying as much as possible the specific interpretations brought by the researcher to the study.

#### 5.3.1.2 Access to the research site

The researcher's ability to identify factors was immensely enhanced by the openness of library staff in allowing the researcher to immerse herself in the library's everyday life. The library director and the intermediaries were very receptive to the presence of the researcher and generously allowed unlimited site observations and questioning at any time during the fieldwork. Site observation was an essential data-collection strategy in this study. Through observations the researcher could become acquainted with the site environment and increase her sensitivity to important issues related to the phenomenon being investigated. Observations also allowed the researcher to continuously probe findings and therefore increased her confidence that the data reflect the informant's reality pointed out by Lincoln and Guba. The researcher's prolonged

engagement in the research site and persistent observation as enhances the study credibility (Lincoln & Guba, 1985).

#### 5.3.1.3 Characteristics of the research site

Although operating for more than three years, digital intermediation in the research site does not yet seem structured. There are no rigid procedures put in place that customers would need to follow in order to request information. Therefore, reported reasons to choose a medium to communicate with the library did not reflect strict rules of the service but, instead, these reasons reflected a wider range of factors affecting the decisions.

Another characteristic of the site is the quality of its information service. Customers have reported a high level of satisfaction with the library services. As stated in the research design (Chapter 3) a criterion for selecting the research site was to choose an *exemplary* digital information-provision service. Such a choice enriched the study since findings can be viewed from a best-practice perspective. For example, the way intermediaries conduct question negotiation at this site might not have been found if different criteria had been adopted. On the other hand, that also has brought limitations to the study since, for example, factors related to a non-satisfactory service quality did not emerge.

#### 5.3.2 Limitations of the study

Two main interrelated factors restricted the researcher in producing more comprehensive findings. These were issues related to the broadness and depth of the investigation. The following sections discuss these limitations and point to some of the remaining unanswered questions.



Limitations are presented grouped by design and implementation problems. While the implementation section presents those practical problems faced in conducting the research, the design section includes a more subjective analysis, indicating possible solutions to the raised problems.

#### 5.3.2.1 Implementation

In the implementation phase, limitations were due to the study's inability to more deeply investigate the customer's environment, potential problems in the interviews, the depth of the investigation, and the existence of factors overriding others.

##### 5.3.2.1.1 *The customer's environment*

Although in the original research design the researcher had planned to conduct observations of customers and intermediaries, she, in fact, did not have much of an opportunity to observe customers. The nature of the hospital environment, where health professionals work under time pressure and deal with private issues made observations of customers unfeasible. Thus, the researcher's direct access to contextual information was restricted to the intermediary's everyday work, while contextual information about customers had to rely on analysis of interviews and on what intermediaries reported about customer's contexts.

Through interviews with customers the researcher tried to gather information about their work situation, but this yielded only a restricted view of their environment. Therefore, concerning the customer's environment, the data was limited to the customer's perceptions and to clues about their environment that the researcher gathered when observing intermediaries dealing with customers.

In sum, the study points to contextual information as an important component in understanding factors affecting digital intermediation but customers' contexts could not be fully investigated. Consequently, important sources of factors might have been missed from the customers' environments.

#### *5.3.2.1.2 Interviews*

Since intermediaries were repeatedly asked the same questions (the same set of questions for each intermediation in which they participated) such repetition might have influenced their responses, which, in turn, might have threatened internal validity (credibility) (Cook & Campbell, 1979). The researcher, however, was able to observe them more closely and therefore had an opportunity to probe the consistency of their responses and their actual behavior. Although the researcher conducted follow-up interviews with customers she did not have much opportunity to follow-up and confirm their reported behaviors.

#### *5.3.2.1.3 Depth of the investigation*

Factors affecting digital intermediation were not evenly explored. While factors related to media use and question negotiation were anticipated findings, personal communication preference was not. Thus, the researcher had a better opportunity to investigate media-use factors than the others. This emphasis does not imply the relative importance of factors. The difference in the depth of the investigation reflected the methodological strategies adopted.

As the study's purpose was to gain a further understanding of digital intermediation, the research design was centered on exploring factors related to media

use, investigating reasons that led participants to use or not use a digital medium when interacting with the library. Interviews were focused on points in the interactions where media decisions were made and, therefore, the methodology was suitable to exploring such factors from the informants' perspectives.

Factors related to question negotiation were another anticipated set of findings. The researcher planned to explore this topic in the interviews because it is a well-studied theme in traditional reference services but very little is known about it in digital environments. However, what was found in this study was not anticipated. The researcher expected that question negotiations would occur during the more traditional reference interactions, regardless of the medium used to do so. This study revealed, however, that most of the question negotiations were not limited to the actual "question" but, rather, they constituted a process through which intermediaries accumulate knowledge about customers so that when information requests come to the library, at some future time, the intermediaries could fill in missing information from "stored" customer information. So, question negotiations do not always occur as a consequence of an information request. The knowledge to help with understanding the request might already have been gathered some time before the request came in. The research design was not prepared to fully explore this facet of the phenomenon. Interviews and observations were designed to explore issues within a timeframe that, most of the time, did not include the process of knowledge acquisition beforehand.

The only factor related to personal communication preference, the last class of findings, was a non-anticipated result. Customers' preference for personal communications emerged as an important factor towards the end of the fieldwork when

the researcher had accumulated a considerable number of cases in which customers addressed their requests to specific intermediaries. By that point in time, the researcher did not have much opportunity to explore the personal communication preference topic in depth. Despite the fact that very little formal data was collected on this issue, what did emerge was sufficient to suggest its potential importance in affecting digital intermediation. From the researcher's perspective, personal communication preference is an important topic to be further investigated in future research.

#### *5.3.2.1.4 Overriding factors*

While it was important to choose an environment where information is essential to those who request it, the characteristics of the chosen site might have prevented the identification of a more comprehensive range of factors affecting digital intermediation. Health professionals fitted well in the desired profile of those in real need for information. However, these professionals work under time pressure and this fact may have inhibited the identification of a wider range of factors. For example, when there is a situation with an urgent request, this factor seems to override all other factors. Another pervasive factor is the availability of computers. Customers who do not have easy access to computers point to this factor as inhibiting the use of a digital medium. On the other hand, the presence of a computer in the person's office and the wide adoption of such communication media within the organization might be major factors affecting the use of a digital medium, regardless whether the communication is with the library or with any other department in the hospital.

Overriding factors probably exist in most situations, but their presence emphasizes, once again, the need to understand this study's findings as situated in a specific context.

#### 5.3.2.2 Design

Three aspects of the research design might have contributed to the limitations of this study: the conceptual model, the unit of analysis and the atheoretical approach.

##### 5.3.2.2.1 *Conceptual model*

The conceptual model adopted in this study restricted the interactions being studied to a time frame (see Chapter 2, Figure 2-2). What was revealed in this study is that the interaction did not in fact have such a time restriction. When considering question negotiation, for instance, as it is implemented at this site, interactions are spread over time and the interaction's time boundaries are not easily identifiable. For example, when an intermediary makes a decision on how to respond to a customer she might base her response on information gathered during classes that she taught in which the customer was a student, committees in which she has participated with the customer or even on the customer's past history with the library. Negotiations actually were a continuous process in which intermediaries acquire knowledge about customers, regardless of the "existence" of a request. So, part of question clarification is not "attached" to a particular request, it is a knowledge-acquisition process that happens over time. Thus, while interviews were focused on the specific interaction being investigated, the time frame was not actually defined properly.

#### 5.3.2.2.2 *Unit of analysis*

This study used the intermediation as the unit of analysis, interviewing individuals who have participated in it. Factors affecting digital intermediation, however, were found at other levels of analysis (organizational levels) and the researcher was not able to fully explore them. This study observed individuals' behaviors, but what constitutes the rationale for actions of individuals is not solely related to the individual but also to the social environment in which they function (Salancik & Pfeffer, 1978). It does not seem possible to clearly distinguish an individual's behavior from this larger context. For example, it seems that email use is an organizational norm at this hospital, and so when customers chose email it could have been as a result of this taken-for-granted situation. In this study the analysis of intermediations ignores a larger view since the intermediations were integrated into a larger context that was not fully studied. Library and customers' individual departments have their own "roles, norms and values" that potentially create a frame for interacting with each other. This study might have missed this larger component.

Yin suggests that the same case study can deal with more than one unit of analysis (Yin, 1989, p. 49). A design using two units of analysis might have produced more comprehensive results. Yin refers to this kind of design as an *embedded case study*. The adoption of two units of analysis in designing this study would have implied, for example, a case study at the organizational level – a holistic view of the organization, investigating how groups interact within the organization – and an embedded case study focused on investigation of intermediations, as it was done in the present study.

#### 5.3.2.2.3 *Atheoretical approach*

By adopting the grounded theory approach with no formal theoretical guidance, the researcher had the freedom to explore the phenomenon in various facets without potential limitations that a theoretical approach might have imposed. On the other hand, an atheoretical approach, without guidance for which dimensions to explore, might also leave some important aspects of the phenomenon unexplored. In this study, while the researcher was able to identify various sources of factors affecting digital intermediation, some of these sources were not explored in depth. That was the case of factors originating from the organizational culture or from question negotiation. While the grounded theory approach advocates theory building from data, it does not guide changes in the research design when preliminary findings indicate the need for exploring venues of the phenomenon to which the original research design may not be suitable.

Theoretical guidance might have helped in broadening the approach. If *social influence theory* (see Section 2.4.1.2), for example, had been taken into account in the research design it might have guided the researcher to look at the organizational social environment in more depth, in addition to focusing on the intermediation process. On the other hand, this model could have restricted this study by not pointing to sources of factors that were discovered in this study but not predicted in such a model. Glaser and Strauss (1967) reinforce this point by saying “... *A focus on testing can thus easily block the generation of a more rounded and more dense theory.*” (p.27) Social influence model and its relation to this study’s findings are further discussed in Section 5.4.2.2.

### 5.3.3 Remaining questions

The restrictions mentioned in the above sections led to questions that were not possible to be answered in this research. Some of these questions are presented below.

#### *Why library professionals did not want to conduct question negotiation?*

Even with all the good access the researcher had to the intermediary's work environment the above question remained unanswered. This question does not only refer to digital requests. Intermediaries seem to bypass question negotiation even for requests taken over the phone.

The main reported reason for not conducting more extensive question negotiation is the intermediary's cautiousness in not bothering customers. On the other hand, customers reported their confidence that the intermediaries would contact them if they had any question about their information requests, demonstrating their expectation for further contact, if needed. In the busy hospital environment, while not bothering customers seems an understandable and logical reason for not re-contacting customers in some cases, it might not be true for all cases. Intermediaries may be creating a rationale for not conducting question negotiation. There may be other reasons not explicitly mentioned in this study that cause intermediaries to have such an attitude. Is such behavior related to the library's image within the organization? Is it part of the library script for interacting within the organization? These questions call for a further investigation at the organizational level. How do groups in the organization relate? In particular, how do groups relate with the library? What is the library's image in the organization and how does the library staff create and preserve such an image? All these



questions may lead to a better understanding of the social culture within the organization that might affect intermediations, and in particular, affect question negotiation (regardless of the medium used).

Digital negotiation raises even more specific questions. Given that digital media tend to promote social distance, how does social distance influence digital negotiation? By using a digital medium, does it make it more difficult to overcome differences in social influence between the two parties?

The library professionals at this site seem not to have yet developed a comfortable way to conduct digital intermediation. While the framework for question negotiation is already set up for traditional library settings, it is not for the digital environment. The adoption of the technology by the library professionals, in fact, seems to be still in process. Customers perceive ICT in its present format as an efficient request-delivery system. Perhaps intermediaries also feel that it is efficient but without feeling a commitment all phases of digital intermediations? For instance, if question negotiation is needed, they do it over the phone. Responses to requests, most of the time, except for very brief ones, are delivered by a more traditional medium (paper). Is it because the technology is not suitable to digital intermediation or is it some kind of resistance to the technology? An analogy with two systems running in parallel illustrates this point. Because the old system is well known by its users they feel more comfortable in using it. The new system is only used for those aspects where there are lesser risks of being unsuccessful.

*Do customers make different decision for communication with the library than they do for organizational communication in general?*

Until explicitly questioned, some customers demonstrated that they had not reflected on the reasons that have led them to choose a particular medium for communication with the library. For most customers, the use of ICT is already incorporated into their everyday work. Customers seem to use a digital medium to communicate with the library, as they would do to communicate with any other department within the hospital. A consequence of this rationale is to question what portion of the findings is unique to the communication with the library and what portion is a common behavior shaped by the organizational culture? This study was not able to make such a distinction since it only investigated communications with the library, without having the knowledge of how other communications happen within the organization. Part of the findings may be particular to the investigated phenomenon, but there might exist parts belonging to a broader phenomenon, i.e., digital communications within the organization.

All the questions posed in the preceding section can be summarized in a more general question and that is *how does organizational culture influence digital intermediation?* While the study indicated some factors at the organizational level, such as those belonging to the work-practices category, the researcher does not feel confident that organizational factors were fully explored.

#### 5.3.4 Implications for research design

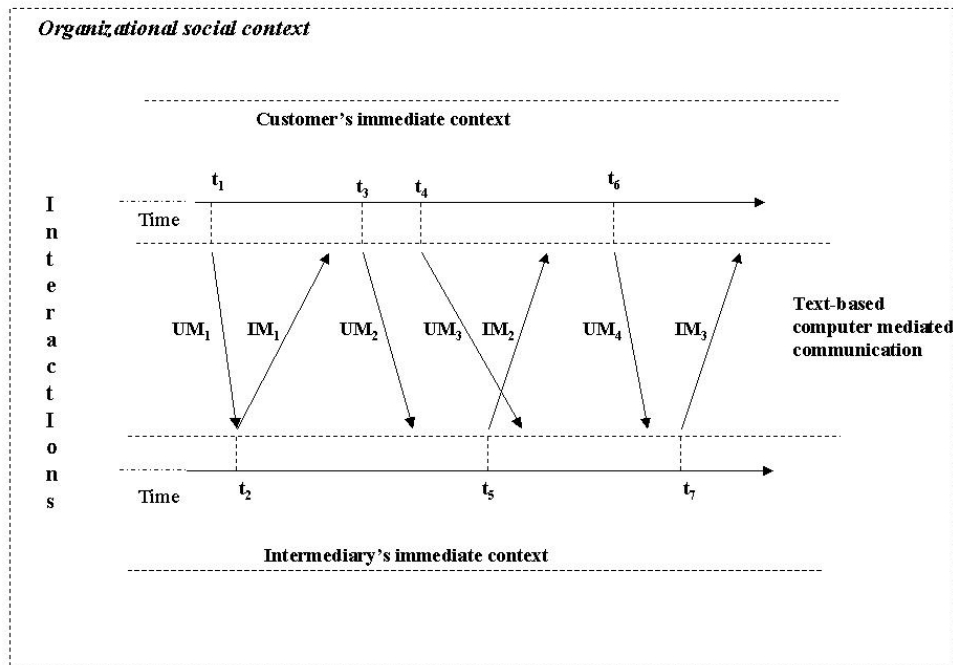
The knowledge acquired in conducting this study points to improvements in research design and in the implementation.

### 5.3.4.1 Research design

The conceptual model for interactions occurring during intermediations introduced in Chapter 2 (Figure 2-2) needs to be expanded in order to:

- Consider interactions without predefined time boundaries
- Take into account a larger social context: the organization's social context.

This modified conceptual model for interactions is represented in the Figure 5-1 below, where the immediate context of the individual and the organizational context are also taken into account.



**Figure 5-1: Expanded representation of interaction occurring during a digital intermediation**

The inclusion of a broader social context in the conceptual model implies the need for reviewing the methodology to incorporate investigations into that context. A possible approach to understanding factors in this environment would be the study of organizational group relationships, especially how relationships with the library occur, focusing on identifying how group relationships would influence individuals' behavior in interacting with the library.

The second change in the conceptual model that would expand time boundaries in interactions, calls for a longitudinal study in order to understand better question negotiation as a process and to identify factors that might be affecting such a process.

#### 5.3.4.2 Implementation

The experience in gathering and analyzing data led to reflections on how data collection could have been improved:

- Probing could go in more depth with customers and intermediaries;
- As answers were not always complete (i.e., they were hasty or tentative), they did not indicate reflection. The researcher would need to use different methods to investigate the unreflected ways of using the technology. The methodology would attempt to encourage informants to reflect on how it might have been different.

Focus group might be a helpful method.

## 5.4 Theoretical implications

When existent intermediation models are compared to this study's findings the results of such comparison are necessarily limited. As already discussed in Chapter 2, while studies in more traditional reference are inconclusive, digital reference research is

still in its infancy. Comparisons with existent models are difficult because the research from which those models emerged had different objectives and adopted diverse methodologies. However, some observations in this respect can be made as presented in the following sections.

#### 5.4.1 Intermediation

In Chapter 2 face-to-face and digital reference models related to this study were reviewed.

##### 5.4.1.1 Face-to-face reference models

The reference *task models* investigated what kind of information intermediaries gather from users in order to solve their information problem. Such a phenomenon could not be observed in this study because question negotiation in this setting usually did not occur through a direct conversation between intermediaries and customers. The researcher did gather information about what knowledge intermediaries used in understanding requests and how such knowledge affected the intermediary's responses to customers. For the reader's convenience Table 4-39 is reproduced here.

Intermediary's knowledge about the customer	Influence of that knowledge on intermediary's actions or responses
is not a clinician	searches for patient information
works on the pediatric floor	narrows the search to pediatric
searches by him/herself	suggests to the customer to search elsewhere
is thoughtful	carefully articulates the response
is an expert in the subject	zeroes in on the literature
inexperienced computer user	doesn't send the response through email
is a regular email user	sends the response through email
works in a particular committee	assumes urgent request
customer's professional interests	guides response content

**Table 4-39: Examples of the knowledge about a customer and a its influence on responses**

The information about customers gathered by intermediaries resembles Taylor's filters (Taylor, 1968) *determination of the subject and personal characteristics of inquirer* and Belkin's and colleagues, (1987), function *user model*. Comparisons with Lynch's (1978) and Cochrane's (1981) models are even more inadequate as these models developed task categorization at a higher level of abstraction, and this study did not directly investigate tasks. In general, face-to-face models are helpful only in a limited way in understanding the phenomenon explored in the present study.

#### 5.4.1.2 Digital reference models

The present study produced contradictory results when compared to the few existing empirical studies that investigated digital reference services. It is important to note, however, that here again comparisons are limited because of differences in the studies' goals, methodology and the settings in which these studies were conducted.

In a study that aimed to understand the process of building and maintaining digital reference services on the Internet, Lankes (1998a) found that the information-provision services studied treated users as questions and did not, therefore, delve into their actual information problems. Lankes studied digital reference services offered to a wide constituency and essentially anonymous on the Internet. The present study, on the contrary, found that intermediaries have specific knowledge about most of the customers who digitally request information, and that such knowledge is essential for them to appropriately answer customers' information requests.

While Abels and colleagues (Abels, 1996; Abels & Liebsher, 1994) indicated that questions can be negotiated successfully via e-mail, those researchers also acknowledge

that they needed to extend their study by using real settings. The present study revealed that question negotiation is a complex issue that went beyond the scope of the research design and thus it did not reach a full understanding of question negotiation in the digital environment. It did, however, point to discrepancies between intermediary and customer perspectives in this matter.

Hahn's study findings (1997, 1998) also show discrepancies with the findings of this study. Her study suggests that users and intermediaries have different models for ideal email communications: the intermediary expects an extended dialogue similar to face-to-face conversation, and users expect a more limited match of question statement with appropriate response. While some customers in the present study expressed their expectation for question negotiation, evidence of intermediaries avoiding question negotiation was even more definitive and, in contrast to Hahn's study findings, these intermediaries avoided dialogues to clarify questions.

Findings in this study also did not conform with the set of Miwa's study findings (2000) that revealed a discrepancy between the questions asked by a users (based on an analysis of the question transcriptions) and what the users later reported that they had asked. In the present study the researcher interviewed intermediaries concerning their interpretation of customers' requests and then checked with the customer to see if the intermediary had actually understood what the customer had requested. No discrepancy was found.

#### 5.4.1.3 Discussion of theoretical implications for intermediation models

The present study's findings do not totally coincide with the findings of previous studies in reference services. While finding less commonality with face-to-face

intermediation studies (Section 5.4.1.1) is not surprising, discrepancies with digital intermediation studies (Section 5.4.1.2) deserve further discussion. Characteristics of the investigated site and of the study design might help in understanding these discrepancies:

#### Organizational setting

While most previous studies were conducted on services offered to customers outside the organization providing the information (e.g., serving Internet users) or offered to a diversified population (students), the investigated site is focused on serving mostly health professionals working at a hospital. That creates a specific context where intermediaries have diverse opportunities to get to know customers and their work environment. Furthermore, interactions among customers and intermediaries occur within the organization's social environment, which might imply different sources of influence such as the organizational roles, norms, and values not present in other studies' sites.

#### Accuracy and comprehensiveness

Since sensitive information is so much a part of the environment of the site observed in this study, accuracy and comprehensiveness guide health and information professionals' actions. Customers need precise information in order to make health care decisions.

#### Time pressure

Beyond having to supply high-quality information, the intermediaries in this study had to do it within tight timeframes in order to satisfy customers' needs.



#### Question negotiation as a continuous and permanent process

While question negotiation in more traditional settings is conducted through a direct conversation between intermediaries and customers, in this setting question negotiation is a continuous process.

#### Contextual influence on intermediation

Few empirical studies in this area have actually taken into account contextual information. The present study has based data collection strategies on observations. This study's findings are strongly based on data collected through observations of intermediaries, and to a less extent, customers in their everyday work. By doing this, the researcher was able to identify the existence of contextual influences on digital intermediation.

In summary, this study's findings are not readily comparable to other studies in digital intermediation. Various aspects contributed to the discrepancies. The most salient one is that the investigated service belongs to a hospital and serves that particular community.

#### 5.4.2 Computer mediated communication models

Whereas this study's findings are not closely related to intermediation models presented in the previous section, findings show several aspects in common with computer-mediated communication (CMC) models. As discussed in Chapter 3, media-choice theories are classified as *rational* or *social* explanations of media choice. As this study was not designed to test these CMC models, the researcher can only speculate

about findings that appear to point in similar directions. A brief comparison of this study's findings and CMC models are presented in the following sections.

#### 5.4.2.1 Rational media choice models

Rational media-choice theories presuppose a rational decision. The rational media models are based on the common premise that individuals choose a medium motivated by efficiency, evaluating the medium's capability of adequately conveying the information they intend to communicate. Data suggests that customers do not always make rational decisions. While it was possible to identify similarities between factors affecting digital intermediation found in this study and independent variables in *social presence* (Short et al., 1976) and *information richness* (Daft & Lengel, 1986) theories, most of the categories of factors found in this study, however, were not accounted for by these theories. An alternative approach, the *social influence model of technology use* (Fulk et al., 1990) provides a more compatible view with the studied phenomenon. Fulk and colleagues stated that the rational choice theories "*fail to recognize a central premise of current organization theory: behavior occurs in a very social world which is far from neutral in its effects*". (Fulk et al., 1990, p. 117) Data in this study pointed to influences in the organizational social environment that transcends the immediate individual's social environment. Although this study did not explore in depth these sources of factors affecting digital intermediation, the social-influence model seems more in the line with this study's findings.

#### 5.4.2.2 Social media choice theories

The *social influence model of technology use* (hereafter SI model) states the propositions presented in the Table 5-3 below.

<p><b>Proposition 1:</b> Media evaluations (perceptions and attitudes) are function of:</p> <ul style="list-style-type: none"> <li>a) Objective media features</li> <li>b) Media experience and skills</li> <li>c) Social influence, in the form of direct statement by coworkers, vicarious learning, group behavioral norms, and social definitions or rationality; and</li> <li>d) Prior media use behavior</li> </ul>
<p><b>Proposition 2:</b> Task evaluations are a function of:</p> <ul style="list-style-type: none"> <li>a) Objective task features;</li> <li>b) Task experience and skills;</li> <li>c) Social influence, in the form of direct statements by coworkers, vicarious learning, group behavioral norms, and social definitions or rationality.</li> </ul>
<p><b>Proposition 3:</b> For any application, an individual's media use is a function of:</p> <ul style="list-style-type: none"> <li>a) Media evaluations (perceptions and attitudes);</li> <li>b) Media experience and skills;</li> <li>c) Social influence, in the form of direct statements by coworkers regarding the application, vicarious learning, group behavioral norms, and social definitions or rationality;</li> <li>d) Task evaluations; and</li> <li>e) Situational factors such as: individual differences, facilitating factors, and constrains.</li> </ul>

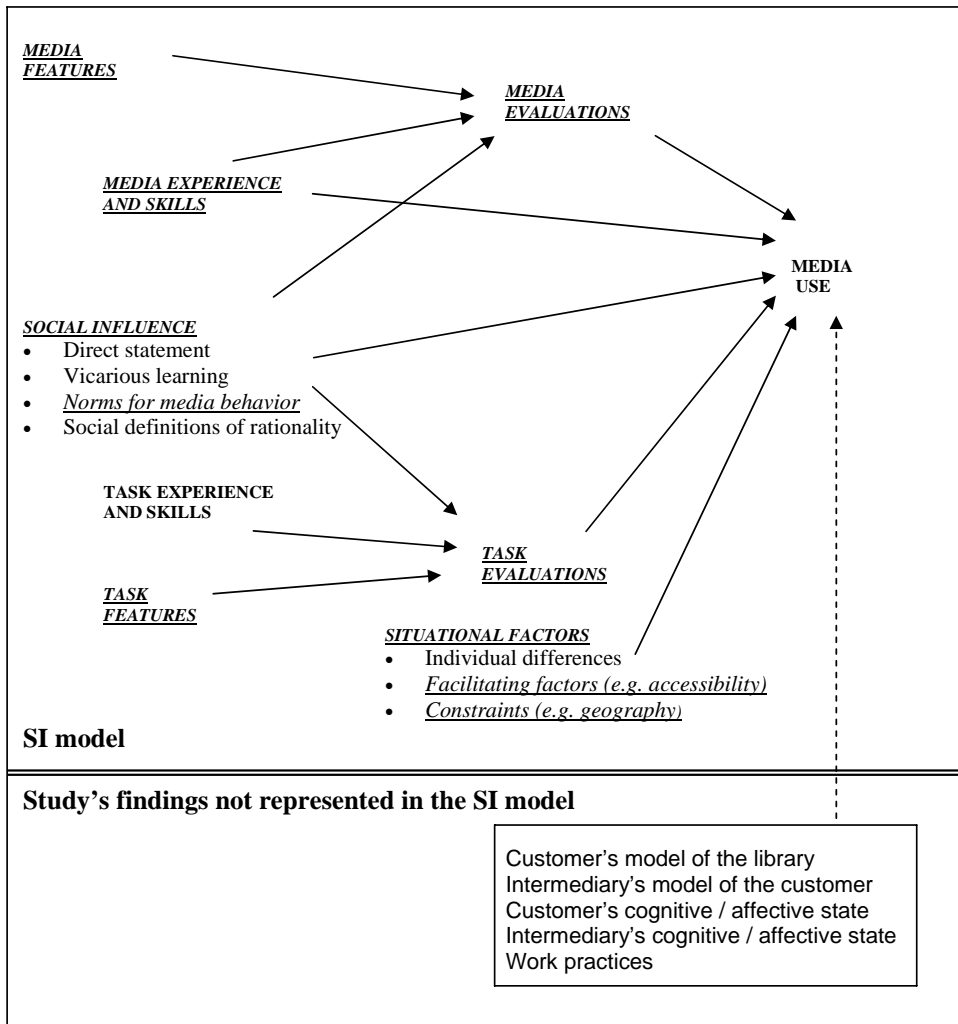
**Table 5-3: Propositions of the social influence model of technology use**

A comparison between the SI model and this study's findings shows a certain degree of conformity. Because the SI model did not guide this study, not all factors identified in this study are easily comparable to the SI model. However, some factors clearly support the model. Examples of such factors are shown in the Table 5-4 below.

SOCIAL INFLUENCE MODEL		EXAMPLES OF FACTORS
Media evaluation	Objective media features	manipulates digital texts overcomes schedule conflicts overcome spatial distances
	Social influence	assumed script for interacting assumed convenience for the customer assumed convenience for the intermediary
Task evaluation	Objective task features	straightforward request easy and quick response
Situational factors	Facilitating factors	availability of computers

**Table 5-4: Example of factors found in this study supporting the SI model**

The SI model is schematically represented in the Figure 5-2 below.



**Figure 5-2: SI model and this study's findings**

The terms underlined and in Italics are those, at least partially, supported by the present study. The box at the bottom of the figure represents the categories of factors found in the present study that do not have correspondence in the SI model.

The five categories identified in the present study that are not represented in the SI model (bottom of Figure 5-2) actually may contain a few factors that support the SI model. Nevertheless, the important discrepancy found between the present study's findings and the SI model is that the concepts underlying these categories are not included in the SI model as explained below.

*The customer's model of the intermediary / Intermediary's model of the library*

This study identified a class of factors affecting digital intermediation referring to the model that a person has about the other person (or department) with whom he or she wants to communicate. The SI model does not indicate any influence on media use related to the target person/department.

*The customer's or Intermediary's cognitive / affective states*

The SI model does not indicate influences of what an individual knows or feels. The *individual differences*, a situational factor indicated in the SI model refers to an individual's cognitive *style*, an individual's media *style* (psychological predisposition to select certain medium over others) (Fulk et al., 1990), which differs from cognitive and affective *state*.

*Work practices*

Various factors identified in the work-practices category do not seem to be consistent with the SI model, such as the *fits existent work practices* factor. Such factors are related to the individual's immediate work environment but not necessarily to the organizational social environment.

In summary, the advantage of the SI model over rational media choice models is its potential to explain a much wider range of media-related behavior and its emphasis on social influence. However, this study found factors not accounted for by this model such as factors related to the target person or to work practices.

While *the social-influence model* does not account for influences stemming from knowledge of the target person, the *channel expansion theory* (Carlson & Zmud, 1994, 1999), suggests that experiential factors affect how individuals perceive the richness of a medium. Four kinds of experiences are mentioned in the theory: experience with the channel; experience with the message topic; experience with the organizational context; and experience with the communication participants. With different degrees of emphasis, this study found factors related to all of these kinds of experiences. In particular, the experience that intermediaries have with the customer seems the most relevant.

#### 5.4.2.3 Discussion of theoretical implications for CMC models

This study contributes to an understanding of media choice/use by identifying factors not considered in other models. This study also specified how factors might affect media use, i.e., it indicated those that positively or negatively influenced the use of a digital medium. The social influence model and channel expansion theory, on the other hand identify other factors not fully investigated by the present study. The exploration of social contexts at the organizational level would complement this study, furnishing a more complete view of factors affecting digital intermediation.

## 5.5 Quality of the study

Considerations of the quality of this study's design and methodology were presented in Chapter 3. This section revisits the transferability issue and discusses the

study's quality based on principles of evaluating interpretive field studies in information systems proposed by Klein and Myers (1999).

Yin recognizes that the transferability question for case studies does not have a simple answer (Yin, 1989). According to Yin, *"The short answer is that case studies, like experiments, are generalizable to propositions and not to populations or the universe."* (p.21) Lincoln and Guba, while acknowledging that naturalistic studies can only set out working hypotheses together with a description of time and context in which the phenomenon occurred, are more specific discussing transferability. They indicate that the researcher can only provide a thick description *"necessary to enable someone interested in making a transfer to reach a conclusion about whether transfer can be contemplated as a possibility."* (p. 316)

This study's findings emerged from a close relationship to the contexts in which the phenomena occurred. As suggested by the above-mentioned methodologists, this study generated only working hypotheses and transferability would be dependent on similarities of contexts. It is interesting to note that because organizational changes are currently underway at the study site, part of this study's findings might not even hold for the same setting if the same study were conducted again. The organization is expanding and the library needs to deal with a completely new set of customers. One might wonder how intermediaries would process digital information requests in this new environment, since they have not yet acquired knowledge of the new customers.

At the debriefing meeting held with the library staff at the end of this study, the issue of scalability in their changing environment was discussed. Intermediaries expressed their belief that the library's service could expand to absorb the new customers.

The goal seemed to be the same: to acquire knowledge about customers in order to serve them better. An intermediary said, *"We are now more careful than we were in the past when we knew people,"* meaning that they might not be able to bypass question negotiation as much as they used to do. There was an expectation that more negotiation would be done through email. *"Doctors are more computer literate,"* said the head of the library. The researcher expects that this transition phase will bring with it different factors affecting digital intermediation. This re-emphasizes the fact that transferability of this study's findings is strongly dependent on the context of the target site.

Although not much can be said about transferability of findings without a deep understanding of similarities between the study site and the target contexts, there are salient characteristics of this study site that seem to be relevant in characterizing its context, and, therefore, potentially helpful in pursuing comparison of contexts. These characteristics are reflected in the cross-category dimensions (see Section 4.8.9 for details):

- (a) Time – Customers and intermediaries work under time pressure;
- (b) Trust – Customers trust on intermediary's ability to find accurate information in a timely fashion.
- (c) Knowledge (or assumptions) about customers – Intermediaries acquire knowledge about customers (or make assumptions about customers based on this knowledge) so that they can better understand and respond customers' requests.

By considering these three dimensions as relevant elements for transferability analysis, the researcher is not suggesting that those are sufficient for concluding feasibility of



transferring findings. Sites with such characteristics, however, can be viewed as potential candidates for dealing with similar sets of categories of factors affecting digital intermediation.

While Guba and Lincoln propose criteria to evaluate quality of a naturalistic study that are analogous to more traditional approaches, Klein and Myers (Klein & Myers, 1999) proposed an alternative set of seven principles for conducting and evaluating interpretive field studies in information systems. These principles are:

1. The fundamental principle of the hermeneutic circle
2. The principle of contextualization
3. The principle of interaction between the researcher and the subjects
4. The principle of abstraction and generalization
5. The principle of dialogic reasoning
6. The principle of multiple interpretations
7. The principle of suspicion

An analysis of the present study suggests that, at least in part, it conforms to most of these principles. In particular, two of them point to major strengths of the present study.

#### *Principle of contextualization*

##### The principle of contextualization

... requires that the subject matter be set in social and historical context so that the intended audience can see how the current situation under investigation emerged." (p. 73)

This study provided such a context since it described, to the extent possible, the environment where the interactions occurred and circumstances involved in such

interactions. Additionally, contextualization is a major focus of this study in that it assumes that the contexts of participants play an important role in understanding the phenomenon.

#### Principle of multiple interpretations

The principle of multiple interpretations, according to the authors,

... requires [the researcher] to examine the influences that the social context has upon the actions under study by seeking out and documenting multiple viewpoints along with reasons for them. (p. 77)

The present study investigated perspectives of customers and intermediaries concerning the same interactions in which they had participated. The study also explicitly provided the researcher's perspective.

### **5.6 Guiding questions and findings**

This case study was guided by two questions:

*What are the factors that are perceived as affecting digital intermediation?*

*How and under what circumstances might these factors affect digital intermediation?*

These guiding questions helped the researcher to focus on investigating the potential factors affecting digital intermediation, keeping her attention on the context where intermediation occurred. They were open enough to allow an investigation of a wide range of factors and, at the same time, they were specific enough to keep the researcher on focus. Consequently, the study findings are a direct reflection of the guiding questions. Findings point to a set of factors that potentially affect digital intermediation. These

factors emerged from a variety of sources. Findings also indicate how these factors might affect digital intermediation as well as a detailed description of circumstances in which these factors operate.

In summary, the chosen questions guided the present study well. They did not overly restrict the study but, rather, they were extremely helpful in guiding data collection and analysis.

## **5.7 Practical implications**

This study can benefit information-provision service and system developers as suggested below:

### *Information-provision services*

Information-provision services can consider the factors found in this study as guidance for the design or improvement of their services. In particular, this study points to an important aspect of this kind of service, which is the ability of intermediaries to understand customer's digital requests. One of the most helpful lessons learned in this study is the importance of a full integration of the information-provision service with its customer's environment. Data suggests that information services should not be isolated from the "business" of those whom they are serving. Through a close participation in customer's everyday life, intermediaries are better equipped to answer their requests, especially their digital requests, which often carry so little contextual information.

The role and attitude of intermediaries towards question negotiation is another issue to be taken into account. While in the setting investigated in this study intermediaries bypassed question negotiation, at least in its traditional sense, the same

might not be true for other settings. If this is a common attitude, however, it reinforces the need for alternative ways to conduct question negotiation. The investigated site did in fact find an effective way to do it through full integration in the hospital's environment. This integration supplied the information that question negotiation might have otherwise provided.

The data also suggests that individuals have a preference for synchronous or asynchronous communications according to the situation they are facing. Thus, information-provision services should consider offering diverse media to communicate with customers in order to serve customers' needs better.

### System design

In terms of software design, the most evident system characteristic that prevents intermediaries from more fully using technology in the process of answering customer's requests is its lack of features that would allow intermediaries to nicely package the information to be sent to customers. The study findings also point to various other technology attributes affecting positively or negatively the use of a digital medium. System designers may take into account these factors when developing systems for information-provision services.

The use of user profiles has been the subject of much effort in the Information Retrieval community. The present study findings reinforce the need for information about users in order to better satisfy their information needs. In this setting, the information that intermediaries acquire about customers proved to be a major contributor to their service success. This study found three kinds of knowledge used by intermediaries:

- (a) customers' attributes (e.g., profession, status in the organization);
- (b) organizational context (e.g., objectives of committees or programs in which the user is participating, time pressure, activities in the hospital floors); and
- (c) patterns of behavior of customers (e.g., topics that a customer has searched before, media that customer has preferred).

A design and implementation of a system to support digital intermediation might take into account the kinds of knowledge needed by intermediaries. In pursuing the implementation of such systems, however, some issues should be considered, such as: How to choose the most effective level of detail about users? How to preserve their privacy? How to represent user information in a system and integrate it into functionality? How to avoid system errors and over-specification due to incorrect or insufficient dynamic user profiles?

Beyond pointing to specific practical issues, this study also raises a question at the practical level *How can digital reference services offered on the Internet work without contextual information?*

This study points to the knowledge of customers as essential to successful digital intermediation. Although this study does not imply transferability of findings, one may wonder how can digital reference services offered on the Internet work? These services work with very little or no information about the customer or the situation involved in the information request. How can they properly serve their customers?

## **5.8 Summary of contributions of the study**

This study made contributions at the research and pragmatic levels as summarized below.

### 5.8.1 The research level

- Augments our understanding of digital intermediation by addressing various factors affecting digital intermediation in three aspects: media use, question negotiation and personal communication preference;
- Provides a preliminary framework that can guide future research;
- Makes contributions to existing models;
- Shows the helpfulness of CMC models in identifying factors affecting digital intermediation;
- Makes methodological contributions to studies of customer-intermediary interactions. This study showed the importance of investigating perspectives of both sides of interactions;
- Describes a new genre of question-negotiation not yet addressed in existing intermediation models.

### 5.8.2 The pragmatic level

- Provides helpful insights for information provision services that already offer or plan to implement digital intermediation.
- Describes a successful information-provision service that can be used as a model for those who are planning to implement such a service.
- Gives guidance to system designers.

## 5.9 Future Research

Based on this study's findings and considering the remaining questions identified in Section 5.3.3, a plan for future research would include an expansion or

refinement of the set of sources of factors perceived as affecting digital intermediation in order to produce a more comprehensive descriptive framework for digital intermediation. The expansion would aim to:

- Better understand factors affecting digital intermediation by more deeply investigating customer's contexts;
- Investigate organizational influences. In particular, to understand how group relationships might shape interactions with the library within the organization;
- Test the descriptive framework at other sites, i.e., in sites with similar characteristics of the investigated one;
- Distinguish factors that pertain to a broader class of factors affecting digital communications within the organization in general from those that are particular to the communication with the library.

In particular, this study points to two aspects of digital intermediation that are still in need of a further understanding: question negotiation and personal communication preference. First of all it seems important to explore in depth intermediaries' practices with respect to question negotiation, including a redefinition or expansion of what question negotiation entails. Question negotiation (or lack of it) is a factor in other digital-intermediation settings besides the one studied here (e.g., Lankes, 1998a). A deeper understanding of this issue in a variety of settings would provide a better indication of how suitable are digital media for implementing reference services that include reference interviews.

### **5.10 Reflections on the study**

The researcher began this study thinking that factors affecting digital intermediation were strongly related to the individual's choice of using a digital medium. Thus, the research design proceeded from this view. It focused on the intermediation process, especially targeting those points where media decisions were made. It was surprising to discover from the very start of the fieldwork that individuals do not always have clear in their minds what their reasons are for communicating through a digital medium. Something else beyond a rational weighing of choices seemed to influence individuals in such decisions, but the research approach to studying the phenomenon was not fully adequate for exploring all facets of it. Even so, this study greatly extended the understanding of digital intermediation and provided some promising directions for future studies. The picture that emerged was not entirely the one envisioned at the time the study was designed, but the process of discovery through a naturalistic case study was, perhaps, even more satisfying because of the unexpected.



## **Appendix A: Interview dates**

The time lag between the interaction dates and the face-to-face interview dates varied from customer to customer depending mainly on their time schedule. Thus, there were interviews that were conducted in the same week of the interaction and interviews that occurred a few weeks after the interaction. The time varied between two days and thirty days. Follow-up questions started at the end of October, 2000. Customers answered these questions through November and December, 2000.

The following table presents the dates of the request, interviews, and follow-up questions and corresponding time lags.

Request Date	Interview date	Time lag (days)	Follow up questions	Answers to follow-up questions	Time lag (days)
06/07/00	06/14/00	7	10/30/00	10/30/00	0
06/06/00	06/14/00	8	11/06/00	11/10/00	4
06/16/00	06/23/00	7	10/30/00	11/01/00	2
06/16/00	06/22/00	6	11/20/00	12/07/00	17
06/15/00	06/22/00	7	11/01/00	11/01/00	0
06/21/00	06/29/00	8	11/06/00	left hospital	
06/28/00	07/27/00	30	11/06/00	11/17/00	11
06/29/00	07/07/00	8	11/06/00	11/14/00	8
07/05/00	07/14/00	9	11/06/00	11/06/00	0
07/06/00	07/24/00	18	11/06/00	11/06/00	0
07/07/00	07/13/00	8	No need	--	--
07/11/00	07/25/00	14	11/06/00	did not answer	
07/12/00	07/20/00	8	11/06/00	11/10/00	4
07/24/00	07/28/00	4	No need	--	--
0724/00	08/03/00	10	No need	--	--
07/27/00	08/01/00	4	11/09/00	12/18/00	39
07/27/00	08/01/00	5	No need	--	--
07/31/00	08/02/00	2	11/07/00	11/13/00	6
08/02/00	08/09/00	7	No need	--	--
08/07/00	08/11/00	4	11/07/00	11/07/00	0
08/22/00	08/30/00	8	11/07/00	11/07/00	0
08/23/00	08/30/00	7	11/07/00	11/17/00	10
09/01/00	09/19/00	18	11/08/00	11/09/00	1
09/15/00	09/29/00	14	No need	--	--
10/08/00	10/11/00	3	No need	--	--

**Table A-1: Customer interviews and interaction dates**

Opportunities for interviews with intermediaries depended on their availability.

The interviews and follow-up questions were all done during the fieldwork period at the library.

## Appendix B: Code-naming

All codes are prefixed by capitalized alphabetical symbols identifying the source of the data being codified:

CP -	customer's perspective –	to codify customer's interviews
IP -	Intermediary perspective –	to codify intermediary's interviews
CM -	customer's messages –	to codify messages from customers
IM -	Intermediary's messages –	to codify messages from intermediaries

Codes prefixed by CP identify the customer's perspective coding scheme, codes prefixed by IP identify the Intermediary's perspective scheme, and codes prefixed by IM and CM identify the interaction-log scheme.

Following these alphabetic symbols there are between one and three groups of two-digit numbers separated by a period. These identify first, second and third levels of the code schemes. The numbers assigned to the codes have no value of importance or frequency of appearance – they are just management facilitators. The periods used on the code names indicate subordination.

So, for example,

CP 21 REASONS TO USE EMAIL – is a code family – a first level code,  
 CP 21.01 Technology – is a category – a second level code, and  
 CP 21.01.01 allows editing – is a specific code – a third level code

## Bibliography

- Abels, E. G. (1996). The E-mail reference interview. *RQ*, 1996(Spring), 345-358.
- Abels, E. G., & Liebsher, P. (1994). A new challenge for intermediary-client communication: The electronic network, *The Reference Librarian* (Vol. 41/42, pp. 185-196): The Harworth Press, Inc.
- Adams, D. A., & Todd, P. A. (1992). Perceived usefulness, ease of use, and usage of information technology: A replication. *MIS Quarterly*, 16(2), 227-247.
- Allen, B. L. (1996). Expressing Information Needs, *Information Tasks: Toward a user-Centered Approach to Information Systems* (1st ed., pp. 306). San Diego, CA: Academic Press, Inc.
- Belkin, N. J. (1984). Cognitive models and information transfer. *Social Sciences Information Studies*, 4, 111-129.
- Belkin, N. J., Borgman, C. L., Brooks, H. M., Bylander, T., Croft, W. B., Daniels, P. J., Deerweter, S., Fox, E. A., Ingwersen, P., Rada, R., Jones, K. S., Thompson, R., & Walker, D. (1987). Distributed expert-based information systems: An interdisciplinary approach. *Information Processing & Management*, 23(5), 395-409.
- Belkin, N. J., Brooks, H. M., & Daniels, P. J. (1987). Knowledge elicitation using discourse analysis. *International Journal of Man-Machine Studies*, 27, 127-144.
- Belkin, N. J., & Windel, G. (1983). Using MONSTRAT for the analysis of information interaction. Paper presented at the 5th International Research Forum in Information Science (IRFIS5), Amsterdam, The Netherlands.
- Berry, J. W. (1990). Imposed etics, emics, and derived etics: Their conceptual and operational status in cross-cultural psychology, *Emics and etics: The insider / outsider debate* (pp. 84-98). Newbury: Sage Publications.
- Borgman, C. L. (1996). Why are online catalogs still hard to use? *Journal of the American Society for Information Science*, 47(7).
- Boucher, V. (1976). Nonverbal communication and the library reference interview. *RQ*, 1976(Fall), 27-33.
- Bristow, A. (1992). Academic reference service over electronic mail. *College & Research Libraries*, 53(Nov. 1992), 631-637.
- Bristow, A., & Buechley, M. (1995). Academic reference service over electronic mail: An update. *College & Research Libraries*, 56(July/August 1995), 459-462.
- Brooks, H. M., & Daniels, P. J. (1986). Research on information interaction and intelligent information provision mechanisms. *Journal of Information Science*, 12(1986), 37-44.
- Bryce, A. (1988). Text structures and the user-intermediary interaction. *RQ*(Summer 1988), 536-541.
- Bushallow-Wilbur, L., De Vinney, G., & Whitcom, F. (1996). Electronic mail reference service: A study. *RQ*, 35(3), 359-371.
- Carlson, J. R., & Zmud, R. W. (1994). Channel expansion theory: A dynamic view of media information richness and perceptions. *Academy of Management Best Papers Proceedings*, 280-284.
- Carlson, J. R., & Zmud, R. W. (1999). Channel expansion theory and experiential nature of media richness perceptions. *Academy of Management Journal*, 42(2), 153-170.

- Carlson, P. J., & Davis, G. B. (1998). An investigation of media selection among directors and managers: From self to other orientation. *MIS Quarterly*(September 1998), 335-359.
- Carter, D., & Janes, J. (2000). Unobtrusive data analysis of digital reference questions and service at the Internet Public Library: An exploratory study. *Library Trends*, 49(2), 251-265.
- Cochrane, P. (1981). *Presearch interview project executive summary, project bibliography, and sample data* ( ERIC: ED-205 190). Syracuse, NY: Syracuse University.
- Coeira, E. (2000). When conversation is better than computation. *Journal of the American Medical Informatics Association*, 7(3), 277-286.
- Cook, T. D., & Campbell, D. T. (1979). *Quasi-Experimentation: Design & Analysis Issues for Field Settings*. Boston: Houghton Mifflin Company.
- Crouch, W. W. (1981). *Verbal behaviors of librarians in presearch interviews* ( ERIC: ED-205 187). Syracuse: Syracuse University.
- Cullen, R. (1997). The medical specialist: Information gateway or gatekeeper for the family practitioner. *Bulletin of the Medical Library Association*, 85(4), 348-355.
- Daft, R., & Lengel, R. (1986). Organizational information requirements, media richness and structural design. *Management Science*, 32(5), 554-571.
- D'Alessandro, D. M., Qian, F., D'Alessandro, M., Ostrem, S. F., Choi, T. A., Erkonen, W. E., & Galvin, j. R. (1998). Performing continuous quality improvement for a digital health sciences library trough an electronic mail analysis. *Bulletin of the Medical Library Association*, 86(4), 594-601.
- Dalrymple, P. W. (1990). CD-ROM MEDLINE use and users: information transfer in the clinical settings. *Bulletin of the Medical Library Association*, 78(3), 224-232.
- D'Ambra, J., Rice, R. E., & O'Connor, M. (1998). Computer-mediated communication and media preference: An investigation of the dimensionality of perceived task equivocality and media richness. *Behaviour and Information Technology*, 17(3), 164-174.
- D'Angelo, B. J., & Maid, B. (2000). Virtual classroom, virtual library: Library services for an online writing laboratory. *Reference & User Services Quarterly*, 39(3), 278-283.
- Davenport, E. R. (1997, May 13-15). *The situated intermediary: Remote advice giving in a distributed reference environment*. Paper presented at the Eighteenth National Online Meeting, New York, NY.
- Davenport, E. R., Procter, R., & Goldenberg, A. (1997). Distributed expertise: Remote reference service on a metropolitan area. *The Electronic Library*, 15(4), 271-278.
- Dee, C., & Blazek, R. (1993). Information needs of the rural physician: A descriptive study. *Bulletin of the Medical Library Association*, 81(3), 259-264.
- Derr, R. L. (1982). *A classification of questions in information retrieval by conceptual presupposition*. Paper presented at the ASIS Annual Meeting.
- Derr, R. L. (1984). Question: Definitions, structure, and classification. *RQ*, 1984(Winter), 187-190.
- Dervin, B., & Dewdney, P. (1986). Neutral questioning: A new approach to the reference interview. *Reference Quarterly*, 25(4), 506-513.

- Dervin, B., & Nilan, M. (1986). Information Needs and Uses. In M. E. Williams (Ed.), *Annual Review of Information Science and Technology* (Vol. 21, pp. 3-33). Washington, DC: American Society for Information Science.
- Detlefsen, E. G. (1998). The information behaviors of life and health scientists and health care providers: Characteristics of the research literature. *Bulletin of the Medical Library Association*, 86(3), 385-390.
- Diesing, P. (1971). *Patterns of Discovery in the Social Sciences*. Chicago, IL: Aldine Atherton, Inc.
- Dorsh, J. L. (1997). Equalizing rural health professionals' information access: Lessons from a follow-up outreach project. *Bulletin of the Medical Library Association*, 85(1), 39-47.
- Eichman, T. L. (1978). The complex nature of opening questions. *RQ*(Spring 1978), 212-222.
- Ej, H. (1989-90). The underused medical literature. *Annals of Internal Medicine*, 11(+), 99-100.
- El-Shinnawy, M., & Markus, M. L. (1997). The poverty of media richness theory: explaining people's choice of electronic mail vs. voice mail. *International Journal of Human-Computer Studies*, 46, 443-467.
- El-Shinnawy, M., & Markus, M. L. (1998). Acceptance of communication media in organizations: Richness or features? *IEEE Transactions on Professional Communication*, Dec 1998.
- Fidel, R. (1993). Qualitative methods in information retrieval research. *LISR*, 15(1993), 219-247.
- Fishman, D. (1998). Managing the virtual reference desk: How to plan an effective reference e-mail system. *Medical Reference Services Quarterly*, 17(1), 1-10.
- Florance, V. (1996). Clinical extracts of biomedical literature for patient-centered problem solving. *Bulletin of the Medical Library Association*, 84(3).
- Florance, V., & Welch, W. H. (1992). Medical knowledge for clinical problem solving: A structural analysis of clinical questions. *Bulletin of the Medical Library Association*, 80(2), 140-149.
- Folger, K. (1997). *The virtual librarian: Using desktop videoconferencing to provide interactive reference assistance*. Paper presented at the ACRL 1997 National Conference.
- Fulk, J. (1993). Social construction of communication technology. *Academy of Management Journal*, 36(5), 921-950.
- Fulk, J., & Boyd, B. (1991). Emerging theories of communication in organizations. *Journal of Management*, 17(2), 407-446.
- Fulk, J., Schmitz, J., & Steinfield, C. W. (1990). A social Influence Model of Technology Use. In J. Fulk & C. W. Steinfield (Eds.), *Organizations and Communication Technology* (pp. 117-140). Newbury Park: Sage Publications.
- Fulk, J., Steinfield, C. W., Schmitz, J., & Power, J. G. (1987). A social information processing model of media use in organizations. *Communication Research*, 14(5), 529-552.
- Garnsey, B. A., & Powell, R. R. (2000). Electronic mail reference services in the public library. *Reference & User Services Quarterly*, 39(3), 245-254.

- Garton, L., & Wellman, B. (1995). Social impacts of electronic mail in organizations: A review of the research literature, *Communication Yearbook* (Vol. 18, pp. 434-453).
- Genova, B. K. (1981). *Nonverbal behaviors in presearch interviews* (NLM Grant No. 1 RO1 LM03074-01). Syracuse: Syracuse University.
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York, NY: Aldine de Gruyter.
- Glogoff, S. (1983). Communication theory's role in the reference interview. *Drexel Library Quarterly*, 19(2), 56-73.
- Gothberg, H. (1976). Immediacy: A study of communication effect on the reference process. *Journal of Academic Librarianship*, 2(3), 126-129.
- Graesser, A. C. (1985). An introduction to the study of questioning. In A. C. Graesser & J. B. Black (Eds.), *The Psychology of Questions* (pp. 1-15). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.
- Graesser, A. C., Person, N., & Huber, J. (1992). Mechanisms that Generate Questions. In T. W. Lauer & E. Peacock & A. C. Graesser (Eds.), *Questions and Information Systems* (1st ed., pp. 167-187). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.
- Gray, S. M. (2000). Virtual Reference Services: Directions in academic libraries. *Reference and User Services Quarterly*, 39(4), 365-375.
- Gruppen, L. D. (1990). Physicians information seeking: improving relevance through research. *Bulletin of the Medical Library Association*, 78(2), 165-172.
- Guba, E. G., & Lincoln, Y. S. (1982). Epistemological and methodological bases of naturalistic inquiry. *ECTJ*, 30(4), 233-252.
- Hahn, K. (1997). *An Investigation of an E-Mail-Based help Service*. College of Library and Information Services, University of Maryland at College Park. Available: <http://www.clis.umd.edu/research/reports/tr97/03/9703.html> [1999, June 25].
- Hahn, K. (1998). Qualitative investigation of an e-mail mediated help service. *Internet Research: Electronic Networking Applications and Policy*, 8(2), 123-135.
- Haug, J. D. (1997). Physician's preferences for information sources: a meta analytic study. *Bulletin of the Medical Library Association*, 85(3), 223-232.
- Headland, T. N., Pike, K. L., & Harris, M. (1990). *Emics and etics: The insider/outsider debate* ( Vol. 7). Newbury Park: Sage Publications.
- Hert, C. (1995). *Information retrieval as situated action*. Paper presented at the Annual Meeting of the American Society for Information Science, Chicago, IL.
- Howard, E. H., & Jankowski, T. A. (1986). Reference services via e-mail. *Bulletin of the Medical Library Association*, 74(1), 41-44.
- Janes, J. (1996). Serving the Internet public: The Internet Public Library. *The Electronic Library*, 14(2), 122-126.
- Katz, W. (1997). *Introduction to Reference Work* (7th ed. Vol. 1). New York: The McGraw-Hill Companies, Inc.
- Kiesler, S., Siegel, J., & McGuire, T. W. (1984). Social psychological aspects of computer-mediated communication. *American Psychologist*, 38(10), 1123-1134.
- King, D. N. (1987). The contribution of hospital library information services to clinical care: A study in eight hospitals. *Bulletin of the Medical Library Association*, 75(4).

- King, R. C., & Xia, W. (1997). Media appropriateness: Effects of experience on communication media choice. *Decision Sciences*, 28(4), 877-910.
- Klein, H., & Myers, M. (1999). A set of principles for conducting and evaluating interpretative field studies in information systems. *MIS Quarterly*, 23(1), 67-94.
- Ladner, S., & Tillman, H. (1993). Using Internet for reference. *Online*, 1993(January), 45-51.
- Lankes, R. D. (1998a). *Building and Maintaining Internet Information Services*. Unpublished Doctoral Dissertation, Syracuse University, Syracuse.
- Lankes, R. D. (1998b, February 1998). *Virtual Reference Desk: Briefing Packet*. ERIC Clearinghouse on Information & Technology. Available: [www.vrd.org](http://www.vrd.org).
- Lankes, R. D. (1998c). *The Virtual Reference Desk: Building a network of expertise for America's Schools. White Paper*. Syracuse, NY: ERIC Clearinghouse on Information & Technology.
- Lankes, R. D. (2000). The birth cries of digital reference. *Reference and User Services Quarterly*, 39(4), 352-390.
- Leckie, G. J., Pettigrew, k. E., & Sylvain, C. (1996). Modeling the information seeking of professionals: A general model derived from research on engineers, health care professionals, and lawyers. *Library Quarterly*, 66(2), 161-193.
- Lessick, S., Kjaer, K., & Clancy, S. (1997). *Interactive Reference Service (IRS) at UC Irvine: Expanding reference service beyond the reference desk*. Paper presented at the ACRL 1997 National Conference.
- Li, J., & Wu, G. (1998). Characteristics of reference transactions -- challenges to librarians' roles. *Bulletin of the Medical Library Association*, 86(4), 610-612.
- Lincoln, Y., & Guba, E. G. (1985). *Naturalistic Inquiry*. Newbury Park, CA: SAGE Publications.
- Lynch, M. J. (1978). Reference interviews in public libraries. *The Library Quarterly*, 48(2), 119-142.
- Marchionini, G. (1995). *Information Seeking in Electronic Environments*. Cambridge, UK: Cambridge University Press.
- Mardikian, J., & Kesselman, M. (1995). Beyond the desk: Enhanced reference staffing for electronic library. *Reference Services Review*, 1995(Spring), 21-28.
- Markus, M. L. (1990). Toward a "Critical Mass" theory of interactive media. In J. Fulk & C. W. Steinfield (Eds.), *Organizations and Communication Technology*. Newbury Park: SAGE Publications, Inc.
- Markus, M. L. (1994). Electronic mail as the medium of managerial choice. *Organizational Science*, 5(4), 502-527.
- Matheson, K. (1991). Social cues in computer-mediated negotiations: Gender makes a difference. *Computers in Human Behavior*, 7(1991), 137-145.
- McGlamery, S., & Coffman, S. (2000). Moving reference to the web. *Reference and User Services Quarterly*, 39(1).
- McKibbin, A. (1998). Evidence-based practice. *Bulletin of the Medical Library Association*, 86(3), 396-401.
- Medical Library Association. (2000). *Standards for Hospital Libraries: Glossary*. Available: <http://mlanet.org/publications/standards/hospital/glossary.html> [2001, 12/09/2001].



- Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis*. Thousand Oaks: SAGE Publications.
- Miwa, M. (2000). *Use of Human Intermediation in Information Problem Solving: A User's Perspective*. Unpublished doctoral dissertation, Syracuse University, Syracuse.
- Mon, L. (2000). Digital reference service. *Government Information Quarterly*, 17(3), 309-318.
- Morgan, E. L. (1996). *See you see a librarian: Final report.*: North Carolina State University.
- Munoz, J. L. (1977). The significance of nonverbal communication in reference interview. *RQ*, 1977(Spring), 220-224.
- Ngwenyama, O. K., & Lee, A. S. (1997). Communication richness in electronic mail: Critical Social Theory and Contextuality of meaning. *MIS Quarterly*(June 1997), 145-167.
- Oddy, R. N., Liddy, E. D., Balakrishnan, B., Bishop, A., Elewononi, J., & Martin, E. (1992). Towards the use of situational information in information retrieval. *Journal of Documentation*, 48(2), 123-171.
- O'Mahony, S., & Barley, S. R. (1999). Do digital telecommunications affect work and organization? The state of our knowledge. *Research in Organizational Behavior*, 21, 125-161.
- Pagell, R. (1996). The virtual reference librarian: Using desktop videoconferencing for distance reference. *The Electronic Library*, 14(1).
- Philip, B. (1997, March 27, 1997). *An examination of the past, present and future of electronic mail reference service*. Available: <http://hollyhock.slis.ualberta.ca/598/brenda/emailref.htm> [2000, February 28].
- Procter, R., Goldenberg, A., Davenport, E. R., & McKinlay, A. (1998). Genres in support of collaborative information retrieval in the virtual library. *Interacting with Computers*, 10(June), 157-175.
- Procter, R., McKinlay, A., Goldenberg, A., Davenport, E. R., Burnhill, P., & Cannel, S. (1997, September, 1997). *Enhancing community and collaboration in the virtual library*. Paper presented at the European Conference on Research and Advanced Technology for Digital Libraries, Pisa.
- Rafaeli, S. (1988). Interactivity: From new media to communication, *Sage Annual Review of Communication Research: Advancing Communication Science* (Vol. 16, pp. 111-134). London: Sage.
- Rice, R. E. (1993). Media appropriateness: Using social presence theory to compare traditional and new organizational media. *Human Communication Research*, 19(4), 451-485.
- Rice, R. E., Kraut, R. E., & Fish, R. S. (1994). Individual, structural and social influences on use of a new communication medium. *Academy of Management Best Papers Proceedings*, 285-289.
- Robins, D. (1998). *Dynamics and dimensions of user information problems as foci interaction in information retrieval*. Paper presented at the 61st Annual Meeting of the ASIS.
- Roysdon, C. M., & Elliot, L. (1988). Electronic integration of library services through a campuswide network. *RQ*, 28(Fall), 82-93.

- Rudy, I. A. (1996). A critical review of research on electronic mail. *European Journal of Information Systems*, 4(4), 198-213.
- Ryan, S. (1996). Reference service for the Internet community: A case study of the Internet Public Library Division. *LISR*, 18, 241-259.
- Salancik, & Pfeffer, J. (1978). A social approach to job attitudes and task design. *Administrative Science Quarterly*, 23(June 1978), 224-253.
- Saracevic, T. (1980). A research project on classification of question in information retrieval: Preliminary work. *Annual Meeting of the American Society for Information Science*, 146-148.
- Saracevic, T. (1989). *Modeling and measuring user-intermediary-computer interaction in online searching: Design of the study*. Paper presented at the 52nd Annual Meeting of the American Society for Information Science.
- Saracevic, T., & Kantor, P. (1988a). A study of information seeking and retrieving. II. Users, questions, and effectiveness. *Journal of the American Society for Information Science*, 39(3), 177-196.
- Saracevic, T., & Kantor, P. (1988b). A study of information seeking and retrieving. III. Searchers, searches, and overlap. *Journal of the American Society for Information Science*, 39(3), 177-196.
- Saracevic, T., Kantor, P., Chamis, A. Y., & Trivison, D. (1988). A study of information seeking and retrieving. I. Background and methodology. *Journal of the American Society for Information Science*, 39(3), 161-176.
- Schilling, K., & Wessel, C. B. (1995). Reference librarians' perceptions and use of Internet resources: Results of a survey of academic health sciences libraries. *Bulletin of the Medical Library Association*, 83(4).
- Schilling-Eccles, K., & Harzbecker, J. J. (1998). The use of electronic mail at the reference desk: Impact of a computer-mediated communication technology on librarian-client interactions. *Medical Reference Services Quarterly*, 17(4), 17-27.
- Schmitz, J., & Fulk, J. (1991). Organizational colleagues, media richness, and electronic mail: A test of the social influence model of technology use. *Communication Research*, 18(4), 487-523.
- Shaw, E. (1996). *Real-time reference in a MOO: Promise and problems*. Available: <http://www-personal.si.umich.edu/~ejshaw/research2.html> [2000, 03/31/2000].
- Shelly, A., & Sibert, E. (1992). Qualitative analysis: A cycle process assisted by computer. In G. L. Hueber (Ed.), *Qualitative Analyse: computereinsatz in der sozialforschung* (pp. 74-114). Munich, Vienna: R. Oldenbourg Verlag.
- Short, J., Williams, E., & Christie, B. (1976). *The Social Psychology of Telecommunications*. London: John Wiley & Sons.
- Silva, M., & Cartwright, G. F. (1994). The Internet and reference librarians: A question of leadership. *The Reference Librarian*, 41/42(159-172).
- Sloan, B. (1998). Service perspective for digital library remote reference services. *Library Trends*, 47(1), 117-143.
- Sproull, L., & Kiesler, S. (1986). Reducing social context cues: Electronic mail in organizational communication. *Management Science*, 32(11), 1492-1512.
- Stake, R. E. (2000). Case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (2nd ed., pp. 1065). Thousand Oaks, CA: SAGE Publications, Inc.

- Stalker, J. C., & Murfin, M. E. (1996). Why reference librarians won't disappear: A study of success in identifying answering sources for reference questions. *RQ*, 35(4, Summer 1996), 489-503.
- Stavri, P. Z. (1996). Medical problem attributes and information-seeking questions. *Bulletin of the Medical Library Association*, 84(3), 367-374.
- Steinfeld, C. W. (1992). Computer-mediated communications in organizational settings: Emerging conceptual frameworks and directions for research. *Management Communication Quarterly*, 5(3), 348-365.
- Still, J., & Campbell, F. (1993). Librarian in a box: The use of electronic mail for reference. *Reference Services Review*, 21(Spring 93), 15-18.
- Strauss, A. L., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: SAGE Publications.
- Straw, J. E. (2000). A virtual understanding: The reference interview and question negotiation in the digital age. *Reference and User Services Quarterly*, 39(4), 376-379.
- Strong, G. (1996). Toward virtual future, *The Reference Librarian. The roles of reference librarians: Today and Tomorrow* (Vol. 54, pp. 153-161): The Haworth Press, Inc.
- Tarby, W., & Hogan, K. (1997). Hospital-based patient information services: A model for collaboration. *Bulletin of the Medical Library Association*, 85(2), 158-166.
- Taylor, R. (1968). Question-negotiation and information seeking in libraries. *College & Research Libraries*, 29(3), 178-194.
- Tenopir, C., & Ennis, L. (1998). The impact of digital reference on librarians and library users. *Online*, 22(6), 84-86.
- Thompson, M. L. (1997). Characteristics of information resources preferred by primary care physicians. *Bulletin of the Medical Library Association*, 85(2), 187-192.
- Trevino, L. K., Daft, R., & Lengel, R. (1990). Understanding managers' media choices: A symbolic interactionist perspective. In J. Fulk & C. W. Steinfield (Eds.), *Organizations and Communication Technology* (pp. 71-93). Newbury Park: Sage Publications.
- Tsafirir, J., & Grinberg, M. (1998). Who needs evidence-based health care? *Bulletin of the Medical Library Association*, 86(1).
- Veenstra, R. J. (1992). Clinical medical librarian impact on patient care: A one-year analysis. *Bulletin of the Medical Library Association*, 80(1), 19-22.
- Vishik, C. (1999). Intermediation and quality uncertainty in the Internet environment. *Journal of Education for Library and Information Science*, 40(4), 263-281.
- Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research*, 19(1), 52-90.
- Webster, J. (1995). Rational and social theories as complementary explanations of communication media choices: Two policy-capturing studies. *Academy of Management Journal*, 38(6), 1544-1572.
- Weise, F. O., & Borgendale, M. (1986). EARS: Electronic access to reference service. *Bulletin of the Medical Library Association*, 74(4).
- Wersig, G., & Hennings, R. D. (1984). *The Intellectual Architecture of Information Systems: A Broad Range Research Agenda*. Paper presented at the Fifth International Research Forum in Information Science (IRFIS5). Representations

- and Exchange of Knowledge as a basis of Information Processes, Heidelberg, F.R.G.
- Whitaker, B. (1989). Electronic mail in the library: A perspective. *Library Trends*, 37(3), 357-365.
- White, M. D. (1981). The dimensions of the reference interview. *RQ*(Summer 1981), 373-381.
- White, M. D. (1989). Different approaches to the reference interview. *The Reference Librarian*(25/26), 631-646.
- White, M. D. (1998). Questions in reference interviews. *Journal of Documentation*, 54(4), 443-465.
- White, M. D. (1999). *Analyzing Electronic Question/Answer Services: Framework and Evaluations of Selected Services* (CLIS technical report 99-02). Maryland: University of Maryland.
- Wildemuth, B. (1994). Information-seeking behaviors of medical students: a classification of questions asked of librarians and physicians. *Bulletin of the Medical Library Association*, 82(3), 295-304.
- Wilson, M. (2000). Evolution or entropy? Changing reference/user culture and the future of reference librarian. *Reference and User Services Quarterly*, 39(4), 387-390.
- Woolf, S. H., & Benson, d. A. (1989). The medical information needs of internists and pediatricians at an academic medical center. *Bulletin of the Medical Library Association*, 77(4).
- Yin, R. K. (1989). *Case Study Research: Design and Methods* ( Vol. 5). Newbury Park: SAGE Publications.
- Zulmat, J. R., & Pasicznyuk, R. W. (1998). The Internet and reference services: A real-world test of Internet utility. *Reference and User Services Quarterly*, 38(2), 165-172.

## BIOGRAPHICAL DATA

NAME OF THE AUTHOR: Sílvia Barcellos Southwick

PLACE OF BIRTH: Campo Grande, MS – Brazil

DATE OF BIRTH: February 25, 1954

## GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

Universidade de Brasília, Brasília, DF – Brazil

Instituto de Pesquisas Espaciais, São José dos Campos, SP – Brazil

## DEGREES AWARDED:

Master of Science in Applied Computation, 1981, Instituto de Pesquisas Espaciais

Bachelor of Science in Electrical Engineering, 1976, Universidade de Brasília

## AWARDS AND HONORS

VRD 2000 Conference student paper award

## PROFESSIONAL EXPERIENCE

Prior to my enrollment in the Ph.D. program, I worked for the *Instituto Brasileiro de Informações em Ciência e Tecnologia* (Brazilian Government) for 14 years where I participated in several projects dealing with the design and implementation of information systems for libraries and information centers.