A Dual-Perspective Approach to Understanding Collegial Information Mediation in the Workplace

by

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Dedication

To our God, Abba Father, who is faithful to us even during those times when we are faithless.

To my father, Ju-Seok Yang (양주석), who encouraged me to have a dream when I was growing up and supported my education with resources and prayers.

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Abstract

This dissertation is motivated by two problems. First, despite the advances of knowledge management systems, human mediation of information in the workplace cannot satisfactorily be supplanted by systems. Information mediation is embedded in daily interactions between colleagues as they play the dual roles of information seeker and information giver. While existing research emphasizes the importance of collegial information mediation for organizational success, it has focused exclusively on the seeker's needs and behavior, producing a gap in our knowledge of the giver's. Second, companies have been increasing their investment in implementing social software, but without understanding the complexity of the dynamic processes of information mediation between employees. To address these issues, this study takes a dual-perspective approach to examine how employees enter into and perform information mediation, how they assess interpersonal trustworthiness, information credibility, and value-in-experience, and what challenges and benefits they encounter while engaging in the process.

A mixed methods study was conducted at the Research & Development (R&D) department of a Fortune 500 manufacturing company in the Midwest. To capture naturalistic experiences of information mediation, and to collect in-depth narratives of those experiences, the study was carried out in two phases. In phase one, a two-week long online diary study was conducted with 75 employees. They were asked to record information-seeking diaries for one week, and information-giving diaries for the other week. In phase two, semi-structured interviews were conducted with 45 employees to obtain rich stories of the experiences they recorded in the diaries. At the beginning of the interviews, the bull's eye method was used to collect diagrammatic representations of individuals' relationships with each of the colleagues they listed in the diaries. Qualitative data was analyzed using content analysis and quantitative data was analyzed using statistical methods.

The findings have important implications for research on information behavior, design of workplace social software, and organizational practice. First, it was found that collegial information mediation can be characterized as a cooperative problem-negotiation and value-addition process, which involves multiple interventions by the same or multiple colleagues, using multiple communication media. This highlights the importance of coordination among multiple interventions as well as multiple media. Second, a typology of tasks that led to information mediation was identified. Task type was found to be a strong predictor of the decision of whom to consult for information. Task type and its perceived complexity also strongly influenced assessments of information credibility and value-in-experience. Notably, the direction of influences was disparate between the two perspectives. Third, this study found that when interchangeably playing the roles of information seeker and information giver, strategies individuals used when seeking information were carried over or shaped the strategies they used when providing information, and conversely. This was seen with respect to breadth and detail of information, communication style, thinking style, and media choice. Fourth, the study demonstrated that the main challenges of information mediation arose in the areas of communication, comprehension, attitude of acceptance, and time. These challenges provided a useful framework for developing design guidelines that can empower both information seeker and information giver. Lastly, this is the first study to specifically examine individual-level outcomes of collegial information mediation in the workplace. It provides strong evidence for the reciprocal benefits of engaging in information mediation, which provides strategic insights that may be useful to managers and practitioners.

Chapter 1

Introduction

1.1 Background

Information seeking and communication behaviors are a prominent part of everyday work in organizations. The efficiency and effectiveness of information flow among employees impact their level of awareness of problems and quality of decision making, which ultimately determine the success of organizations. Advances in information search systems have allowed employees to become more self-reliant than ever before in obtaining information. Despite the advances, employees still rely heavily on personal contacts with their colleagues as a primary method to gain important information and knowledge (Allen, 1977; Daft & Lengel, 1984; Auster & Choo, 1994; Fidel & Green, 2004). According to a social network study at a consulting company (Cross, Borgatti, & Parker, 2001), 85% of interviewed managers considered contacting other people to be critical to the successful completion of their project.

Consulting other people for information, rather than searching for online documents, is a common workplace occurrence for three reasons. First, tacit knowledge, such as personal know-how, insights, intuitions, and judgments, is hard to codify and document (Nonaka & Takeuchi, 1995; Polanyi, 1966). Second, codified information can be de-contextualized and highly processed through "uncertainty absorption" (March & Simon, 1958). According to March and Simon, uncertainty absorption often occurs in organizations because employees usually communicate with one another the inferences derived from a body of evidence, instead of the evidence itself. They noted that, through uncertainty absorption processes, employees become enormously limited in their ability to evaluate the correctness of information and its applicability to a new context. Third, people prefer oral communication over written communication (Daft & Lengel, 1984). Acknowledging the importance of person-to-person communication of expertise and experience between employees, organizations have been increasing their investment in

supporting technologies (Hendriks, 1999) such as social media (e.g., DiMicco et al., 2008).

The benefits of seeking information through colleagues are derived from the power of conversation. Through conversation, two people can reach a mutual understanding regarding problem definition and what information is needed. Several researchers have viewed this interpersonal information seeking process as *information mediation*, through which people intervene in each other's information seeking through advice or guidance (Ehrlich & Cash, 1999; Kuhlthau, 2004). Traditionally, librarians have been viewed as professional information mediators whose primary responsibility involves guidance in searching for information (Kuhlthau, 2004). In the context of daily work, however, information mediation is performed not only by professionals, but also informally by anyone within the organization even though their job descriptions do not explicitly include those responsibilities. The concept of *information mediation* illuminates how employees cooperatively develop and jointly negotiate their strategies for finding, evaluating, and using information with one another, which impact individual and, ultimately, organizational decision-making and performance. This suggests that the dynamics of information mediation in the workplace is an important area which deserves more empirical and theoretical attention.

In the workplace, information mediation is embedded in daily interactions between employees as they play the dual roles of information seeker and information giver. A recent study on engineers' information behavior in the workplace showed that they spend 12% of their working time receiving information, 8% providing information, and 4% in overhead activities related to information transfer (Marsh, 1997). This indicates that a substantial portion of their working time is spent not only on seeking information, but also on providing and sharing information. It is, therefore, critical to understand employees' perceptions and practices not only from the information seeker's perspective, but also from the information giver's perspective. This problem has not been studied.

Taking all those issues and research directions, this study investigates the dynamic process of information mediation between colleagues in the workplace from the dual perspectives of information seeker and information giver.

1.2 Definition of Collegial Information Mediation

To denote the phenomena of interest in this study, I coined a term, *collegial information mediation* or CIM.

In library and information science, a few researchers have investigated information mediation – formal information mediation (Ehrlich & Cash, 1999; Kuhlthau, 2004) and informal information mediation in the context of everyday life and workplace information seeking (Ehrlich & Cash, 1994, 1999; Sabelli, 2012). Although no consensus definition of information mediation has emerged, what has been agreed upon in the literature is that it involves guidance in another person's information seeking process. The most specific definition was provided by Kuhlthau (2004), who viewed information mediation as occurring in a zone of intervention or an "area in which an information user can do with advice and assistance what he or she cannot do alone or can do only with difficulty" (p. 129). This is based on developmental psychologist Vygotsky's (1978) concept of the zone of proximal development, which seeks to identify where assistance is most helpful to a learner. This indicates that information mediation is an intervention process in which actors actively seek or provide assistance from/to others in advancing from one stage to another in the course of information seeking. This is different from the notion of information exchange or information sharing in that the latter involves indirect or unsolicited information-receiving and information-giving in addition to direct or solicited versions (e.g., Kramer, Callister, & Turban, 1995). It also does not appropriately capture the idea that, rather than merely transferring information, people intervene in and influence each other's information needs and information-seeking behavior.

The term *collegial* is derived from Nebus' (2006) notion of "collegial information network." According to Nebus, a collegial information network is "an intellectual task-related network of colleagues" that comprises previous or present co-workers, friends, acquaintances, and professionals (p. 616). He differentiated this notion of collegial information network from Barnard's (1938) "informal organization": the collegial information network focuses only on an ego-centric network that includes individuals whom one contacts specifically for work-related task, rather than the total network of all employees in the organization. This definition of collegial information network clearly

represents the network of interest of this study as it focuses on the situations in which people turn to other employees within the same organization for work-related information.

Combining the notion of *information mediation* and *collegial information network*, I define *collegial information mediation* as a process in which people actively seek or provide advice and guidance from/to other colleagues within an organization in advancing from one stage to another in the course of finding, selecting, evaluating, or using information such that they intervene in and influence each other's information needs and subsequent information behavior.

1.3 Problem Statement

It appears that the human mediation of information can hardly be supplanted by a system. What has been consistently found in the past few decades of research on workplace information behavior is this: people constantly long for someone, not some additional system, to be there when seeking information and making decisions. About forty years ago, Allen (1977) reported that engineers and scientists in the workplace were nearly five times more likely to turn to other people for information than to non-humans such as databases. Despite the development of a variety of organizational information systems, a recent study on engineers' information behavior showed that they still rely heavily on other people for information, especially for solving problems, understanding information, and making decisions (Robinson, 2009). This suggests that there is a need to better understand and support collegial information mediation in the workplace.

Recently, organizations have increasingly adopted social software tools in the workplace, so-called Enterprise 2.0 (McAfee, 2006). This enables employees to become more engaged not only in information-seeking but also in information-providing activities. The current literature on information behavior in the workplace (e.g., Ellis & Haugan, 1997; Herztzum, 2002; Wai-yi, 1998), however, tends to focus exclusively on information seeker's perspectives. More recently, researchers have started to propose conceptual models that acknowledge the dyadic relationship between the information seeker and the information giver (e.g., Afifi & Weiner, 2004; Robson & Robinson, 2013). What is still lacking is a conceptual framework that applies specifically to the context of the workplace and empirical research examining employees' dual roles as information seekers and information givers.

Information mediation does not occur simply at the level of locating information. Existing literature shows that it also occurs at the level of advising or counseling (Kuhlthau, 2004) or at the level of evaluating information or jointly solving problems (Ehrlich & Cash, 1994). Kuhlthau (2004) noted that such higher level mediation, which is called "process-oriented" mediation, is especially important for seeking *meaning*, not to mention for seeking information. In other words, the information mediation process influences the seeker's information needs, subsequent information behavior, and eventually, decision making. While previous studies have contributed to our understanding of who gets involved in information mediation and what they do, this suggests that more research is needed to understand how the seeker is influenced or persuaded by the information mediation process. Also lacking in existing studies is how the seeker reacts to the information given and how his or her reactions influence the information giver in turn. The present study aims to fill this gap by investigating the dynamics of reciprocal influences underlying the information mediation process.

To examine the dynamics of influence, this study specifically investigates three sets of perceptions: interpersonal trustworthiness, information credibility, and value of experience. Interpersonal trust is one of the most widely studied constructs in a variety of disciplines, including organizational theory, psychology, management, and sociology. It has been regarded as a crucial factor that determines people's decisions about who to turn to (Levin & Cross, 2004) as well as the amount of information they are willing to reveal (Tasi & Ghoshal, 1998). Interpersonal trust also determines the extent to which the recipient of information will be influenced or persuaded (Hoveland, Lumsdain, & Sheffiled., 1949). Thus, this study examines how actors involved in information mediation perceive the interpersonal trustworthiness of each other and what effect this has throughout the information mediation process.

Another construct this study focuses on is information credibility. Credibility differs from trust in that the former refers to believability of information, while the latter is the dependability of a person (Tseng & Fogg, 1999). It indicates that persuasion occurs when not only the information giver is perceived to be trustworthy, but also when the information provided is perceived to be credible. While previous credibility research has contributed to our understanding of the seeker's perception and assessment of

information credibility, recent studies have begun to study the giver's perspective and have identified that the giver actively develops strategies to establish and signal credibility (e.g., St. Jean, Rieh, Yang, & Kim, 2011). The present study aims to add to the credibility literature by investigating both the seeker's and the giver's assessment of information credibility. It also intends to expand the scope of credibility research to include the issue of credibility of organizational information in daily work. This is an important area of research because communication of credible information is closely related to an organization's decision-making capacities.

Separate from information credibility, it is important to understand how actors perceive the value of an overall experience of information mediation. Saracevic and Kantor (1997) noted that value of information needs to be distinguished from value of service, as people assess not only the quality of information but also the quality of and benefits resulting from interaction. In order to systematically analyze the attitudes and practices involved in the process of information mediation, it is crucial to understand how the value of an experience or interaction is perceived by both the information seeker and the information giver.

All the issues discussed above define a problem area that needs to be investigated: how to understand and how to support the interplay among information, information seeker, and information giver in the process of collegial information mediation in the workplace. This is an important research problem because dyadic communication is the most information- and interaction-rich form of communication, and the most influential to change in individuals' attitudes and beliefs, which, in turn, shape their behaviors and decisions in the workplace. Knowledge of and support for this fundamental mode of communication, therefore, is pivotal to organizational success.

1.4 Objectives and Scope of Study

The overarching goal of this study is to understand people's perceptions and practices regarding collegial information mediation in the workplace, from the dual perspectives of information seeker and information giver. It investigates the entire process of collegial information mediation, from the initial identification of problem and decision to consult someone, to outcome resulted from the information mediation. Specific objectives of this study include: (1) To understand the circumstances and

motivations that lead people to enter into the process of collegial information mediation from the dual perspectives of an seeker and giver; (2) To identify the patterns of actions, interactions, and communication between people and the challenges they encounter while engaging in collegial information mediation, from the dual perspectives of the seeker and the giver; (3) To examine the nature of people's judgments of interpersonal trustworthiness, information credibility, and value-in-experience, and the interplay among these judgments throughout the process of collegial information mediation, from the dual perspectives of the seeker and the giver.

1.5 Research Questions

The specific research questions driving this study are:

1. What are the tasks that lead people to consult their colleagues for information in the workplace and how do they decide whom to turn to?
2. What are the practices and challenges of collegial information mediation?
3. In the process of collegial information mediation, how do people perceive the interpersonal trustworthiness, credibility of information, and value of the overall experience?
4. What are the outcomes of collegial information mediation regarding people's knowledge and subsequent information behavior?

1.6 Research Design

To effectively investigate the dynamic and interactive process of collegial information mediation, it is important to capture naturalistic experiences of both information seeking and information giving and to collect in-depth narratives of those experiences. The use of the combination of quantitative and qualitative approaches is needed to increase both the breadth and depth of understanding of the nature of collegial information mediation. Therefore, this study used a mixed methods approach which comprises two phases: (1) a two-week long online diary study, followed by (2) semi-structured interviews. To measure participants' social networks, the bull's eye method (Kahn & Antonucci, 1980) was also conducted before starting the interviews. The study was performed at the Research & Development (R&D) department of a Fortune 500

manufacturing company in the Midwest. This site was chosen carefully based on company characteristics that were pertinent to the research objectives.

Data were analyzed both qualitatively and quantitatively. Qualitative data in this study include the answers to open-ended questions in diaries and interviews transcripts. Content analysis was conducted on the answers to the diary questions, which resulted in the categories of task and mediation types. Interviews were audio-taped, transcribed, and then imported into NVivo 10 for qualitative data analysis. Coding schemes for the interview data were developed both deductively and inductively based on all of the information provided by participants through all of the data collection methods. Data from background questionnaires, diaries, and the bull's eye method were quantitatively analyzed using both Microsoft Excel and SPSS.

1.7 Structure of the Dissertation

This dissertation consists of six chapters. Chapter 2 provides a review of the relevant literature and outlines the conceptual framework that was proposed for this study. Chapter 3 outlines the research methods that were used in conducting this study. Chapter 4 details the results from this study. Chapter 5 discusses the findings from this study and the limitations of this study. Chapter 6 describes the implications and contributions of this research, offers several ideas for future research in this area, and closes with some concluding remarks.

Chapter 2

Literature Review

This literature review situates collegial information mediation in an interdisciplinary research context (see Figure 1) by covering four strands of literature that are seemingly disparate but, taken together, form the focus of this study.

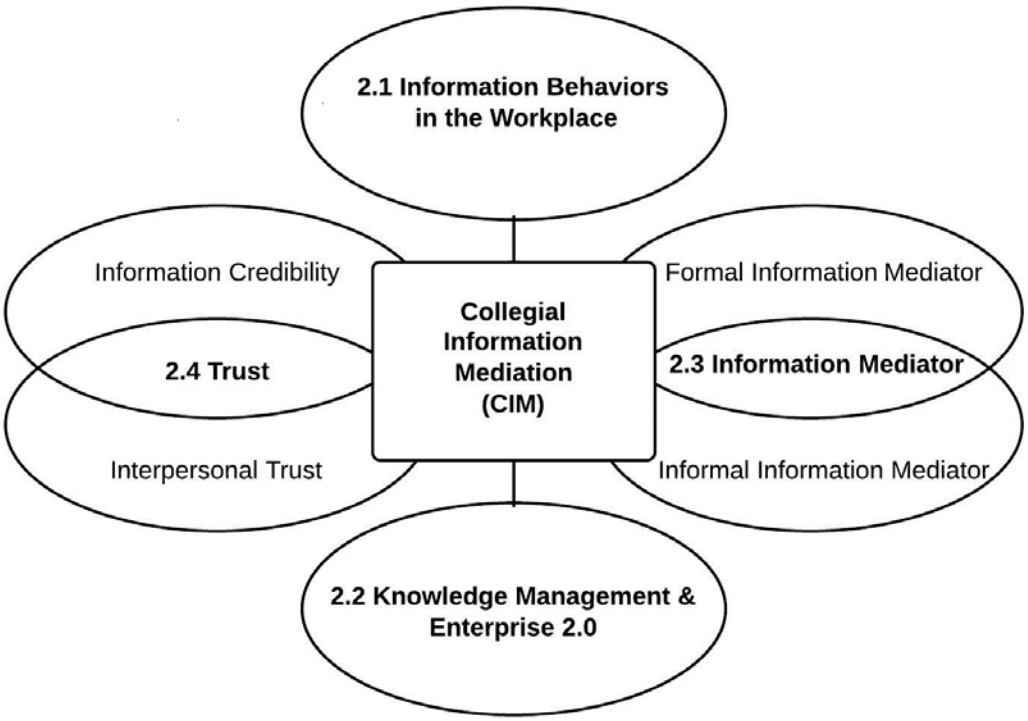


Figure 1: Research Area Map

In the first subsection, 2.1 Information Behaviors in the Workplace, many of studies that have looked at people's information behaviors in the workplace are reviewed. While the first section focuses on the individual's perspective, the second section discusses the perspectives developed in organizational and managerial spheres, including theoretical work on knowledge management and empirical studies on the adoption of web

2.0 technologies in companies. In the third subsection, some of the few studies on the role of information mediators are discussed. There is only limited research available dealing with this topic, but it still provides evidence of the need for further investigation of collegial information mediation. Lastly, the theoretical works that have been done on trust, including both interpersonal trust and trust in information, are discussed. The part on interpersonal trust reviews the research on trust in organizational and management science, as well as the communications research on source credibility. The part on trust in information reviews the literature on information credibility that has improved our understanding of the components of credibility and models of credibility assessment processes. These four strands of literature are then woven together, forming the conceptual framework for this dissertation research – an investigation of how employees enter into, engage in, and get influenced by collegial information mediation from both the information seeker's and giver's perspectives.

2.1 Information Behavior in the Workplace

This section of the literature review focuses on the extensive body of literature that has speculated on employees' information needs, types of information sources, factors affecting the selection of information sources, and their process of seeking and providing information in the workplace.

2.1.1 Nature of Information Need

Information mediation is initiated by an information seeker with the goal of satisfying her information need. Information need is the gap between current knowledge about a task under consideration and perceived requirements of the task (Belkin, Brooks, & Oddy, 1982). Studies in information science and knowledge management have investigated different types of information needs and factors affecting them.

In work organizations, information needs derive from the need for individual accomplishment, collaboration with colleagues, and social cooperation. Morrison (1993) categorized information needs in organizations into task mastery, role clarification, acculturation, and social integration. Task mastery refers to the job-related information necessary to accomplish a task; role clarification refers to information on the roles and

behaviors that others expect; acculturation refers to information on organizational culture and norms; and social integration refers to information on norms and expectations within a work group.

Information needs in organizations can also be categorized relative to the locus for the information (Swanson, 1978). Swanson proposed three scales of the locus: inner- or other-directed, internally- or externally-produced, and self- or other-referencing. According to Swanson, information is inner-directed when it is used for self-learning and internal management, which influences subsequent decision making, while information is outer-directed when it is used to manipulate other people. He argued that most organizational information is two-faced, having both an inner- and other-directed need.

Employees' information needs are influenced by a number of contextual factors such as work roles (Mintzberg, 1979), task complexity (Byström & Järvelin, 1995), project phases (Ellis & Haugan, 1997; Hirsh, 1999), and problem dimensions (MacMullin & Taylor, 1984). Each factor is described below.

Mintzberg (1979) identified five groups of participants in work organization and the characteristics of their information needs: workers at the operating core, who use information resources that are simple, concrete, and directly related to the task at hand; middle managers, such as information translators, who collect and summarize raw data about the operating core to convey to top administrators; top administrators, who need trend information from inside and outside the organization and whose information needs are fluid and less predictable; analysts of the technostructure, such as accountants and engineers, who need specialized information for standardization of outputs and work processes; and support staff, who engage in activities such as research and development, public relations, legal counsel, and other information-intensive activities that do not contribute directly to the attainment of task objectives. This is contrary to the findings by White (1986), who determined that employees' information needs are based more on the problem at hand than on set roles and responsibilities.

Task complexity is another factor that determines the type and level of information needs. Based on the a priori determinability of tasks, Byström and Järvelin (1995) categorized task complexity into automatic information processing, normal

information processing, normal decision, known genuine decision, and genuine decision tasks. Their main findings were that as task complexity increased from automatic information processing task to genuine decision tasks, the complexity of needed information increased, the need for domain information and problem solving information increased, and the share of general-purpose sources increased, while that of problem and fact-oriented sources decreased.

Information needs are also contingent on the stage of work process. Ellis and Haugan (1997) identified information-seeking patterns of engineers and research scientists in relation to the types and phases of their R&D projects. Based on probability of success, time to completion, competitive potential, and protection by patents, they categorized projects as incremental (developmental), radical (R&D), or fundamental (research). Hirsh (1999) classified the stages of research processes into pre-investigation/investing, development, and transfer stages. She reported that while employees rely mostly on external information sources for both business and technical information in the pre-investigation/ investing stage, they rely more extensively on internal information sources for business information in the stage of developing a product plan.

MacMullin and Taylor (1984) identified a set of information traits related to the dimensions of problems (see Table 1). They suggested that depending on the characteristics of the problem at hand, people seek different types of information.

Table 1: Problem Dimensions and Information Traits (MacMullin & Taylor, 1984)

Problem Dimensions	Information Traits
Design---Discovery	Quantitative continuum
Well-structured---Ill-structured	Data continuum (hard or soft data)
Complex---Simple	Temporal continuum (historical or forecasting)
Specific---Amorphous goals	Solution continuum (single solution or options range)
Initial state understood---Not understood	Focus continuum (precision or diffusion)
Assumptions agreed upon---Not agreed upon	Specificity of use continuum (applied or theoretical)
Assumptions explicit---Not explicit	Substantive continuum (applied or descriptive)
Familiar pattern---New pattern	Aggregation continuum (clinical or census)
Risk great---Risk not great	Causal or diagnostic continuum
Susceptible---Not susceptible to empirical analysis	
Internal---External imposition	

Overall, the literature reviewed here indicates that employees have complex information needs that are influenced by both individual- and organizational-level factors. Depending on the nature of the need, they look for different types of information, ranging from highly context-sensitive information requiring assistance from other individuals to context-free information that can be easily stored and retrieved. The main interest of this study is to investigate the former, as the challenges reside mostly in the communication of intentions, meanings, and values.

2.1.2 Types of Information Sources

Depending on the type of information needed, employees choose between different sources. A number of studies have categorized these sources as interpersonal (relational) and impersonal (non-relational) (e.g., Hansen, Nohira, & Tierney, 1999; Lamb, King, & Kling, 2003; Zimmer, Henry, & Butler, 2007). Interpersonal sources involve some form of personal contact with an individual, while impersonal sources do not require direct contact with an individual (Lamb, King, & Kling, 2003).

The distinction between the two types of sources is important because the information that oral language can convey is different from what can be conveyed through written language. Daft and Lengel (1984) argued that the different characteristics of the sources, such as immediateness of feedback and language types, determine their information richness. Face-to-face conversation conveys the richest information while numeric data conveys the least rich information. They proposed that the success of organizational work depends on the organization having an appropriate level of information richness, enabling effective information processing for the management of uncertainty and ambiguity.

Studies have identified the importance of interpersonal information-seeking. Kraut, Fish, Root, & Chalfonte's (1990) analysis of a variety of data from R&D organizations revealed the importance of personal contact with colleagues, particularly with regard to informal communication. They argued that informal communication is necessary for organizational coordination in the face of novelty, unexpectedness, and uncertainty in organizations. Zipperer (1993) also identified reasons why engineers preferred to obtain information directly from colleagues: first, colleagues can provide

feedback, either as trusted sources or as an impetus for problem-solving; second, a colleague's memory might be the only access point to field documents; third, close relationships with colleagues enable the selection of trustworthy experts within a particular subject domain. Employees, therefore, deliberately build, maintain, and activate personal networks (Nardi, Whittaker, & Schwarz, 2000). Nardi et al. viewed intentional networks as an alternative to traditional organizational charts, which insufficiently capture the complexity of work roles.

For communicating knowledge from person to person, the visibility of experts and their expertise is crucial. A number of systems have been designed to help people find experts through expert directories and queries to the experts (e.g., Balog, Azzopardi, & Rijke, 2006; Campbell, Maglio, Cozzi, & Dom, 2003; Craswell, Hawking, Vercoustre, & Wilkins, 2001; McDonald & Ackerman, 1998, 2000; Mockus & Herbsleb, 2002). More recently, organizations have deployed social media to support the communication of knowledge. DiMicco et al. (2008) argued that organizational social networking sites enable employees to develop the kind of long-term relationships that traditional expertise-sharing systems do not support.

Employees also gather necessary information from impersonal sources. Kalman, Monge, Fulk, and Heino (2002) summarized the advantages of knowledge in electronic repositories: first, knowledge holders and knowledge seekers can asynchronously carry out tasks at their own pace; second, knowledge holders can satisfy multiple requests through a single contribution to the repository; third, knowledge seekers can obtain needed information without having familiarity with knowledge holders personally; and lastly, knowledge seekers can go beyond organizational boundaries to search for information at a low cost. Impersonal sources also function as what Bowker and Star (1999) called "boundary objects." In their study of an air traffic control team, Halverson and Ackerman (2003) identified the important functionality of a cheat sheet as a knowledge codification tool and boundary object that brings together knowledge across organizational boundaries.

In seeking information in the workplace, therefore, employees rely on both relational and impersonal sources. Yuan, Rickard, Xia, and Scherer (2011) found that

both information seeking (seeking codified knowledge) and expertise seeking (seeking non-codified knowledge) happen simultaneously. Their study emphasized the irreplaceable and complementary relationship between the two types of sources. In their study of engineers' design processes, Hertzum and Pejtersen (2000) found that searching for people sources and searching for document sources are interwoven. According to this study, people sources serve as document locators while documents serve as people locators. Their study emphasizes the need for designing document archives to search for people and for enhancing information services dedicated to people searches.

2.1.3 Factors Affecting the Selection of Information Sources

The selection of information sources is affected by a variety of factors. A review of the literature reveals eight major categories of factors (see Table 2). Traditionally, accessibility, quality, cost, and familiarity have been studied as primary factors affecting source selection. More recently, researchers have investigated other factors such as trust, work task, information types, and social influence. Each study listed in Table 2 is described in further detail below.

Table 2: Factors Affecting the Selection of Information Sources in the Workplace

Factors	Literature
Accessibility	Accessibility with information sources (Rosenberg, 1967) Accessibility of information channel (Allen, 1977) Source accessibility (O'Reilly, 1982) Access to a person in a timely manner (Borgatti & Cross, 2003) Technical accessibility (Yuan, Carboni, & Ehrlich, 2010) Accessibility (Su & Contractor, 2011)
Quality	Expected quality of information channel (Gerstberger & Allen, 1968; Allen, 1977) Perceived importance of written carrier (Anderson, Glassman, McAfee, & Pinelli, 2001) Person's knowledge and skills (Borgatti & Cross, 2003) Authoritativeness of information resources (Hirsh & Dinkelacker, 2004) Knowledge a person possesses (Mackenzie, 2005) Communication style and cognitive ability (Mackenzie, 2005) Perceived degree of expertise (Hofmann et. al, 2009) Expertise (Su & Contractor, 2011)
Cost	Principle of least effort (Zipf, 1949) Principle of least effort (Anderson et al., 2001) Cost of information seeking (Borgatti & Cross, 2003) Time saving (Fidel & Green, 2004) Time taken to track down information (Hirsh & Dinkelacker, 2004)
Familiarity	Familiarity with information sources (Rosenberg, 1967) Degree of experience (Gerstberger & Allen, 1968) Past experience with written carrier (Anderson et al., 2001)

	Intellectual accessibility (Fidel & Green, 2004) Relationship built with a person (Mackenzie, 2005) Social accessibility (Hirsh & Dinkelacker, 2004)
Trust	Trust (Hertzum, 2002) Trustworthiness (Hoffman & Lei, 2009)
Work task	Task complexity (Anderson et al., 2001; Byström & Järvelin, 2005; Yuan et al. 2010) Task uncertainty (Anderson et al., 2001)
Information types	Information about immediate business environment vs. broader environment (Auster & Choo, 1994) Specificity of knowledge needed (Yuan et al, 2010)
Social influence	Social influence from the colleagues (Su & Contractor, 2011)

Early studies (Rosenberg, 1967; Gerstberger & Allen, 1968; and Allen, 1977) focused on three factors, including accessibility of, expected quality of, and familiarity with the information sources. Those studies suggest a strong consensus on the importance of the accessibility factor, compared with quality and familiarity, in determining the frequency of use of information sources. O'Reilly (1982) studied how perceived source quality, source accessibility, task complexity, task uncertainty, and individual characteristics affect the frequency of use of information sources. His findings also generally indicate that accessibility is most strongly related to frequency of use of various information sources.

Fidel and Green (2004) distinguished between intellectual and physical accessibility. They viewed familiarity with the source as intellectual accessibility. Their findings indicate the criticality of intellectual accessibility, as opposed to physical accessibility and time efficiency, for information gathering. It is interesting to note that in their study, the different accessibility factors were more extensively employed for different information sources: familiarity with the source was the most frequent reason for choosing human resources while saving time was the most frequent reason for selecting documentary information sources. In addition to accessibility, Fidel and Green also identified seven quality factors. Among the quality factors, the expected possibility that the source could meet information needs was perceived to be as important as other accessibility factors. However, they pointed out that the distinction between accessibility and quality factors is blurred. For example, when one chooses to use a familiar source, it may be not only because it is more time saving (accessibility), but also because the source is known from past experience to have quality information. This study calls for

designing tools to increase familiarity with human sources, which in turn increases accessibility to the sources.

Another study by Yuan et al. (2010) distinguished between social and technological accessibility. Using survey data from global sales teams, they identified that social and technical accessibility, as well as the awareness of expertise distribution (transitive memory), are critical in sharing expertise. They defined social accessibility as an assessment of whether the expert was accessible to solve problems within a required time frame while defining technical accessibility as media multiplexity based on the assumption that the more media one uses the greater chance one has of communicating with experts. Contradicting their prediction, Yuan et al. did not find any interaction effect between media multiplexity and social accessibility or between media multiplexity and awareness of expertise distribution. That is, media multiplexity exerted no effect on the level of social accessibility or awareness of who knew what, while having a significant effect only on expertise retrieval. Overall, this study emphasized the role of diverse communication media at work.

Concern for information accessibility is deeply related to the fact that human behavior follows the "principle of least effort" (Zipf, 1949). Anderson et al.'s (2001) study on aerospace engineers' and scientists' information seeking revealed that participants preferred oral, internal, and direct communication over written, external, and intermediary-involved communication owing to their tendency to use the most convenient methods. Similarly, in their study of Hewlett Packard Labs researchers, Hirsh and Dinkelacker (2004) found that researchers selected information sources based on the amount of time it took to track down information as well as the authoritativeness of the information resources. However, when the cost was measured to include psychological factors such as obligation, self-esteem, and reputation, the cost variable did not exert a significant effect on the frequency of seeking information from other people (Borgatti & Cross, 2003).

Quality of information sources was further analyzed in Mackenzie's (2005) study on managers' information-seeking behavior at an insurance company. His study revealed that participants assessed the expected quality of information sources based on their

communication and cognitive (e.g., intuition and insights) abilities. The willingness of information givers to share and communicate was another factor that Mackenzie found to affect information seeking. Overall, this study revealed that a relationship with a particular person was the primary reason for selecting that person as an information source. Interestingly, the primary reasons for why they selected a particular individual differed depending on the role or position of the managers.

While most of the previous studies on engineers' information seeking considered cost to be the main factor in selecting information sources, Hertzum (2002) identified trust as the primary factor after making unobtrusive observations of eight months of project meetings and interviews. Across all types of information sources, his study revealed that quality-related factors that determine trustworthiness – appropriateness (of organizational unit, project experience, task, and external organization), technical quality, currency, and representativeness – were of more concern than cost-related factors such as accessibility, ease of use, and cost of use. His study argues that engineers' preference for internal sources stems from their preference for sources whose trustworthiness can be easily determined, as much as from their preference for easily accessible sources. He also reported that, with regard to technical quality, engineers trusted colleagues with hands-on experience rather than those appointed as formal experts. According to Nochur and Allen (1992), formal appointment of technology experts may increase contact with knowledgeable sources while not necessarily increasing contact with staff who actually use the technologies. Overall, Hertzum's study showed that observational studies can provide meaningful results as to how people assess quality of information. Nonetheless, the notions of credibility, trust, and information quality were not explicitly differentiated in the study.

In the context of help-seeking behaviors of nurses, Hofmann and Lei's (2009) study also examined the effect of help seekers' perceptions of help providers' trustworthiness, accessibility, and expertise on the likelihood of seeking help. Their survey data revealed that when a help provider was perceived to possess a high degree of expertise, an interaction effect between trust and accessibility arose: given that a help provider was perceived as an expert, with low trust, accessibility was strongly related to

seeking help from a help provider, whereas with high trust, accessibility was not significantly related to seeking help. They found that a person who was not perceived to be an expert but to be trustworthy and accessible was contacted for help. According to the study's authors, the people who are least likely to be contacted are those who are seen as having a high degree of expertise but are at the same time perceived as lacking accessibility and trustworthiness.

With regard to the effect of the characteristics of work tasks, Anderson et al. (2001) reported significant effects of task uncertainty on the number of information carriers used but no significant effects of task complexity. In contrast, Byström and Järvelin (1995) found that, as task complexity increases, the internality of the information sources decreased and the number of sources used increased. Yuan et al. (2010) also found a significant effect of task complexity on the choice between interpersonal relationship and electronic resources. In Yuan et al.'s study, the more complex the task or question, the more likely people were to turn to other colleagues in order to gain more nuanced and hands-on perspectives.

The type of information sought also affects information seeking and use. Auster and Choo (1994) conducted an interview study of CEOs' information behavior in the process of "environment scanning," or gaining and using information about events and trends in an organization's external environment. Their study revealed that CEOs use different information media for different kinds of environmental information: while CEOs consulted personal sources for more immediate business environment information (e.g., competitor information), they relied on impersonal sources for information about broader environments such as general social, political, and technological changes. Regarding the level of specificity of knowledge needed, Yuan et al. (2010) found that the more specific the knowledge needed, the more likely people are to go to a person.

In their study on consultants' information seeking, Su and Contractor (2011) identified social influence from colleagues as an important factor in determining the choice between human and digital knowledge. They found that with greater uncertainty and time pressure, consultants were more likely to imitate the information seeking practices of their colleagues, especially those with whom they had frequent social

communication. According to Su and Contractor, seeking information from digital sources was strongly influenced by whether close colleagues were seeking information from those digital sources.

Overall, the studies reviewed here determined that a number of factors interact in different ways to impact the selection of information sources. This dissertation research builds on the these studies by examining the factors that cause employees to turn to interpersonal sources rather than impersonal sources, as well as the factors that prompt them to choose a particular interpersonal source over other interpersonal sources.

2.1.4 Information Seeking and Providing Behavior

This section focuses on activities and processes involved in seeking information in the workplace. It also examines information providing activities and processes, which have been relatively understudied. Even the studies that have been done have focused mostly on motivational factors in information sharing.

2.1.4.1 Information Seeking Behavior

While studies on information seeking at work have traditionally focused on the sources of information and factors affecting the choice of those sources, more recent studies have investigated the specific activities and processes of information seeking. In their study of information-seeking patterns of engineers and research scientists in the R&D department at an international oil company, Ellis and Haugan (1997) modeled the process of information seeking, including eight categories of behavioral patterns as follows:

- Surveying: initial search for information to obtain an overview of the subject area, or to locate key people in the field
- Chaining: following chains of referential connection between sources that are obtained from a document search or colleagues
- Monitoring: maintaining awareness of a field through regularly following sources
- Browsing: scanning of materials which is an important part of surveying and monitoring activities
- Distinguishing: ranking information sources according to their relative importance based on information seekers' perceptions

- Filtering: screening out relevant from non-relevant information by using certain criteria or mechanisms
- Extracting: working through sources to locate material of interest
- Ending: actually finishing the information seeking process which is mainly caused by the end of a project

Ellis and Haugan reported that, except for browsing, extracting, and ending, all the activities involved personal contact with colleagues. For example, chaining was performed not only by following document references but also by following personal contacts, while filtering was carried out not only through a system search but also by colleagues who passed on information. They also noted that the behavioral patterns of scientists and engineers were very similar even though the types of information sources they used were different.

Adapting Pejtersen and Fidel's (1998) human-work interaction model, Xie (2006) conducted a mixed-method study that included a Web survey, diaries, and telephone interviews at a large-scale international company. She identified different dimensions of each of four interactive activities including task, decision, collaborative, and information strategy activities.

Table 3: Dimensions of Human-Work Domain Interaction (Xie, 2006, p. 132)

Types of interactions	Dimension I	Dimension II	Dimension III
Task activities	Nature of task: Routine Typical New	Types of tasks: Update information Look for specific information Look for items with common characteristics Look for known items	Time frame: Extremely urgent Urgent Non-urgent
Decision activities	What to do: Need support for domain knowledge Need support for system knowledge Need support for information seeking skills	How to do: Plan oriented Situation oriented Plan-situation oriented	When to stop: Obtain complete information Enough information Partial information
Collaborative activities	Types of collaborators: Clients People within the project team/department Experts within the company Experts outside the company Vendors/Consultants	Types of interactions: Gain background knowledge Acquire guidance Verify information Obtain direct answer	Types of channels: Face to face Phone E-mail/fax
Strategy activities	Types of behaviors: Scan Search Acquire Compare Consult Link Learn Select Read	Types of resources: Human Electronic Printed	Types of shifts: Shift resources Reformulate queries (narrow down/broaden up/try synonymous/change format) Shift behavior

Among Xie's four activities, her categorization of collaborative activities – gaining background knowledge, acquiring guidance, and verifying information – included specific activities that may be involved in the information mediation process. Her study re-emphasized the importance of understanding corporate activities as interactions between work domain and actors by detailing the dimensions of the interaction activities from the level of application to the design of digital library.

Kuhlthau's (2004) study on lawyers' information seeking revealed evidence of different stages in the seeking process. She delimited the stages related to the level of uncertainty felt as follows:

- Initiation: a person becomes aware of a lack of knowledge while feeling uncertainty and apprehension
- Selection: a person identifies general area and experiences a brief sense of optimism and readiness to begin the search
- Exploration: a person feels uncertainty, confusion, and doubt if information found is inconsistent
- Formulation: a person forms the problem and experiences less uncertainty
- Collection: a person gains information relevant to the problem and experiences interest and involvement in the project
- Presentation: once the search is completed, a person can explain what she has learned to others

Participants in her study identified the task of preparing a case for trial as the most complex task which is characterized by uncertainty in the early stage of the information seeking process. They viewed uncertainty as a signal that suggested the task requires a high level of creativity and, therefore, looked for more exploratory rather than specific information. Overall, Kuhlthau's study shows that information seeking is most extensive in the initial phase of a project, while later in the process, as information seekers become knowledgeable about problems, they become selective.

Similarly, Wai-yi's (1998) case study of auditors' information seeking revealed five stages of the process, including task initiation, focus formulation, idea formation, ideas finalization, and the passing on of ideas. She further categorized the idea formation stage into three situations, including an ideas assuming situation in which a person aims to support an idea by collecting information in the focused area; an ideas confirming situation in which a person makes a judgment on the information collected through third

party confirmation; and an ideas rejecting situation in which a person encounters conflicting ideas and decides to revert to previous stages.

In studying information-seeking processes of art administrators, Zach (2005) sought to determine what caused people to stop seeking more information and move onto the next phase. Zach reported that participants made decisions to stop when they felt comfortable with the inputs acquired or when they experienced external time constraints. Sometimes the two factors – comfort and time – conflicted, in which case they ended up satisficing. Different from other professional groups such as engineers or lawyers, however, Zach pointed out that art administrators did not consider information seeking to be a discrete step in their normal decision-making process.

Ashford and Cummings (1983) laid a foundation for a research on a specific kind of information seeking – feedback seeking. According to Ashford and Cummings, feedback derives from a desire to get useful information about one's performance that can be used to reduce uncertainty, self-evaluate, gain competence, and correct errors. Based on the literature on employee feedback seeking, Morrison and Bies (1991) developed a model of the feedback seeking process. Interestingly, in the process of feedback seeking, people exhibited concern about factors that have not been identified in studies on the information-seeking process. The motivation to protect ego is significant because feedback is evaluative information that can hurt one's self-esteem, while the motive to manage impressions complicates the feedback-seeking process because of the conflict between the need to get useful information and the need to present a favorable image. According to Morrison and Bies' model, those motives impact when, from whom, and how individuals ask for feedback.

With the development of technologies for communication and information sharing, information seeking, which has been viewed as an individual activity, has increasingly become understood as a collaborative process. More recently, researchers have investigated collaborative aspects of information seeking and retrieval at work. By reviewing the relevant literature, Foster (2006) defined the research field of collaborative information seeking as "the systems and practices that enable individuals to collaborate during the seeking, searching, and retrieval of information" (p. 330). Hertzum (2008)

proposed that collaborative information seeking is the combination of information-seeking and collaborative-grounding activities. According to him, those two activities dynamically change the balance between individual and shared understanding and, therefore, collaborative information seeking involves a continual effort to maintain the balance between the two so that an adequate level of common ground is established.

In their study with Microsoft and Boeing design teams, Bruce et al. (2003) defined collaborative information retrieval (CIR) as "any activity that is undertaken by members of a work team to collectively resolve an information problem" (p. 140). They assumed that CIR might include cases in which team members use the same information-seeking path together, use different information-seeking paths in parallel or sequentially, or are guided by a person who in the past had already found the same or similar information. In both work teams, they found that not all information behaviors were collaborative: collaboration occurred when the teams identified, analyzed, and defined information needs and developed information-seeking strategies while the retrieval of information itself was conducted individually.

Another study by the same authors (Poltrock et al., 2003) identified specific CIR activities performed by those teams. Their list of CIR activities included identifying needs collaboratively, retrieving information collaboratively from other people, communicating about information needs and sharing information, and coordinating information retrieval activities. They also reported that across the CIR process designers viewed design proposals themselves as queries for retrieving information from other people. The designers considered soliciting feedback rather than explicitly requesting information as a better strategy for acquiring information from people sources. Using the proposals as queries enabled information sources to be more engaged in information giving by eliciting their reactions rather than forcing them to recall information.

Hansen and Järvelin's (2005) field study addressed CIR in the context of handling patent applications. In this study, CIR was defined as "an information access activity related to a specific problem solving activity that, implicitly or explicitly, involves human beings interacting with other human(s) directly and/or through texts (e.g., documents, notes, figures) as information sources in an work task related information seeking and

retrieval process either in a specific workplace setting or in a more open community or environment" (p. 1103). By this definition, they drew a distinction between active, explicit information searching, for which CIR stands, and sharing of (already-obtained) information. Analysis of their observational data revealed that collaborative activities happened more frequently during information-seeking tasks, including information collection, need formulation/representation, and source selection, than during information retrieval tasks such as query (re)formulation or relevance judgment.

In summary, throughout the stages of the information seeking process, employees face different challenges and thus need different kinds of assistance. Information seeking becomes collaborative as they work on the challenges together across the process. The above discussion emphasizes the importance of process-oriented information services, to which not enough attention has been given by researchers and system designers.

2.1.4.2 Information Providing Behavior

While existing frameworks of information behavior at work have mainly focused on information seekers, discussion and research on information givers are lacking. Afifi and Weiner (2004) pointed out that the notion of source in previous information behavior frameworks ignored the dyadic relationship between information seekers and information givers. Their model specifically acknowledged the role of information givers and represents how their feedback affects information seekers' assessment of and decision making about information. According to Afifi and Weiner, information givers assess both the outcome and the efficacy of giving feedback in the process of information management. They characterized the outcome of giving feedback with regard to the overall outcome of revealing information, the importance of the outcome, and the probability of the outcome. Their efficacy measure includes information givers' self-assessment of the ability to cope with any effect from sharing information and the ability of communicating information effectively, as well as the information givers' assessment of the information seekers' ability and willingness to manage information that they receive.

More recently, Robson and Robinson (2013) proposed a model that that combines the insights from information seeking models developed in library and information

science with those developed in communication theory. The model included information products, such as literature, databases, websites, blogs, presentations, and mass media programs, and providers of those products as information sources, such as authors, reviewers, publishers, colleagues, libraries, producers of databases, governments, and companies. Robson and Robinson assumed that personal and contextual factors as well as needs, wants, goals, and perceptions that result from them may motivate or inhibit not only information users' decisions about which sources to use, but also information provider's decisions about what to communicate and how. They also included utility and credibility as key influencers affecting users' choice of information sources and judgment of information and communication. Their model, however, does not specifically capture the information providers' judgment and perceptions of utility or credibility, as its focus is still predominantly on the seekers' perspectives.

Existing literature on information sharing has focused exclusively on the information givers' motivational forces. Szulanski (1996) identified that employees' motivational forces derive from either their personal belief structures or institutional structures of their organization. According to Szulanski, personal beliefs refer to the those for which the expected benefit, either individual, group, or organizational, from knowledge will outweigh the cost, while institutional structures refer to organizational cultures or climates which determine what are considered norms or values.

Bock, Zmud, Kim, and Lee (2005) further categorized Szulanski's (1996) motivational drivers into economic (e.g., monetary rewards, points toward promotion), social-psychological (e.g., reciprocal relationship with others, self-worth based on competence or efficacy), and sociological drivers (e.g., organizational climate that promotes fairness, innovation, and affiliation). Bock et al. found that extrinsic reward has a negative impact on the development of favorable attitudes toward knowledge sharing. Lin (2007) also reported that expected organizational rewards have no significant effect on the sharing of information, while reciprocal benefits, self-efficacy, and enjoyment in helping others are significant factors that motivate sharing.

According to Constant, Kiesler, and Sproull (1994), attitudes about providing information depend on the form of the information, that is, whether the information is a

tangible product or intangible expertise. They hypothesized that information givers make distinctions between ideas presented in documents and ideas presented in conversation, and that the two forms of information have different influences on their attitude about sharing information. Using a vignette that describes hypothetical situations related to sharing a computer program (information as product) and computer advice (information as expertise), their experimental study revealed the following: In sharing tangible information, beliefs that the organization owns the information strengthens the propensity to share information; however, sharing expertise depends on their own need for self-expression. Constant et al.'s study shows that organizations need different strategies and technologies to support different kinds of information sharing.

Overall, the literature reviewed identifies the importance of intrinsic motivation in providing information at work. As more organizations implement social software to increase inter-organizational information sharing, the issue of how to motivate the employees to provide information becomes more crucial. The present study aims to further identify sources of intrinsic motivation by examining how employees decide to what extent to they are willing to assist their colleagues.

2.1.5 Summary: Information Behavior in the Workplace

The literature on information behaviors in the workplace has contributed to our understanding of employees' information needs, information sources used, factors affecting the choice of information sources, and activities and processes involved in their information seeking. The studies have consistently demonstrated the importance of interpersonal sources, or informal communication with colleagues, and identified a number of factors that affect their choice between interpersonal and impersonal sources. Traditionally, accessibility, level of knowledge and skill, cost, and familiarity have been studied as main factors that influence the selection. More recently, trust, work task, and information types have been recognized as additional factors impacting the choice of information sources. These newly recognized factors serve as a foundation for developing a conceptual framework of the present study.

Compared to people's information seeking behavior, information providing behavior has not yet been studied as extensively. However, as Afifi and Weiner (2004)

pointed out, both information seeking and information giving practices need to be studied together to gain a complete understanding of human information behavior. Only recently have researchers begun to propose conceptual models that involve the dual perspectives of information seeker and information giver, and more empirical research needs to be undertaken. With that gap in mind, the present study empirically examines both perspectives in the context of information mediation between colleagues in the workplace.

2.2 Knowledge Management and Enterprise 2.0

While the previous section reviewed the literature on workplace information practice at the individual actor level, this section reviews the literature on knowledge management and knowledge management systems, especially the Enterprise 2.0 movement, that have been discussed in the organizational and managerial sphere.

2.2.1 Types of Knowledge

The nature of knowledge and knowing has been explored by researchers in many organizational studies. Two broad epistemological approaches reflect the distinction between explicit and tacit knowledge. According to Nonaka and Takeuchi (1995), explicit knowledge has characteristics of being objective, rational, metaphysical, sequential, and digital (or context-free), while tacit knowledge has characteristics of being subjective, experiential, physical, simultaneous, and analog (or requiring simultaneous processing of practices). Their view is that knowledge creation occurs through the interaction between tacit and explicit knowledge, which entails four modes of knowledge conversation: (1) socialization creates sympathized knowledge (from tacit to tacit knowledge); (2) externalization creates conceptual knowledge (from tacit to explicit knowledge); (3) combination creates systemic knowledge (from explicit to explicit knowledge); and (4) internalization creates operational knowledge (from explicit to tacit knowledge).

Nonaka and Tackeuchi's model (1995), though, was criticized by later researchers (e.g., Gourlay, 2006) for oversimplifying the differences between explicit and tacit knowledge without considering their relationship as a continuum. Keen and Tan (2007) pointed out the danger of the explicit-tacit dichotomy and suggested there is a third type

of knowledge, implicit knowledge, which is knowledge that has not been made explicit, but could be. According to McInerney and Koening (2011), an example of implicit knowledge might be that one might think that based on the organizational chart that for a certain area person A would be the decision maker but in fact it is person B (p. 45). They mention that what organizations need is to convert implicit knowledge to explicit knowledge, which requires both collecting (explicit knowledge) and connecting (people for tacit knowledge) knowledge management strategies.

Gorman (2002) categorized knowledge – both declarative and tacit, especially in the context of technology transfer, into information (what), procedural (how), judgment (when to apply a particular procedure), and wisdom (why). He emphasized that combining these four types of knowledge with the problem of embeddedness and embodiment of knowledge serves as an important framework for knowledge transfer.

Similar to Gorman's categorization, Blackler (1996) identified four types of knowledge, including embrained (e.g., concepts and abstractions), embodied (e.g., knowhow), encultured (e.g., shared understanding and culture), embedded (e.g., routines), and encoded (e.g., symbols) knowledge. Based on those knowledge types, he also categorized organizations, respectively, as symbolic-analyst dependent, expert-dependent, communication-intensive, and knowledge-routinized organizations. With regard to knowing, Engeström (1987) categorized it into mediated, situated, provisional (or continually constructed), pragmatic, and contested knowings.

2.2.2 Knowledge Communication

The dynamic nature of knowledge creates barriers to transferring, communicating, and reusing knowledge in organizations. Researchers have developed strategies and systems for organizations to cope with these barriers.

With regard to transferring best internal practices, Szulanski (1996) explored the issue of stickiness and identified barriers to transfer. According to him, during the transfer process, actors experience problematic situations (e.g., milestones are missed or some participants' expectations about the transfer are not fully met). He suggested that the extent to which those problematic situations are experienced is the "eventfulness" that is an outcome of the "stickiness" of knowledge transfer. In other words, if the transfer is

sticky, it causes more problems during the transfer and thus requires more ad hoc solutions on the recipient side. His further analysis of the origins of internal stickiness revealed three important causes of the difficulty: lack of absorptive capacity, causal ambiguity (e.g. ambiguity in understanding how factors of best practice interact with each other), and the arduous relationship between source and recipient. He suggested that all three of those origins represent knowledge-related barriers which do not accord with previous studies that attribute stickiness to motivational barriers.

Thomas, Kellogg, and Erickson (2001) emphasized the importance of considering human and social factors in communicating knowledge. They introduced practical techniques for creating and communicating knowledge, including the Bohm Dialogue (i.e., noncompetitive discussion for building new knowledge), systematic use of metaphor, storytelling, and expressive communication which is less concerned with achieving immediate goals such as hallway conversation as opposed to instrumental communication. Among these, they noted that expressive communication best served as a means of building trust. This led to their conclusion that knowledge management systems should be designed from the social perspective, providing a social proxy or visual signals for awareness. They introduced the term “knowledge socialization” as an alternative to knowledge management that starts from the technological view. Those ideas are reflected in their design of the Babble chat system and StoryML, a markup language for stories that annotates form, function, and trace.

From the perspective of knowledge reuse, Markus (2001) typologized situations and roles of actors: (1) shared work producers are the creators of knowledge for later use, and thus most of their problems derive from what to capture rather than reuse itself; (2) shared work practitioners are members of communities of practice whose main problems are location and selection, while application of knowledge is less of a problem; (3) expertise-seeking novices have the greatest difficulties because of their lack of ability to formulate search questions, locate knowledge, judge the quality of knowledge, and apply expert advice; and (4) secondary knowledge miners seek to answer new questions through analysis of knowledge produced by others but are different from novices in that miners have analytical expertise. Markus also distinguished the purpose and content of

knowledge repositories based on whether the authors document for themselves, similar others, or different others. He concluded that the role of intermediaries, who abstract, index, and sanitize the knowledge, is important in the reuse of knowledge.

2.2.2.1 Knowledge Codification and Expert Location

In communicating and managing knowledge, Hansen, Nohria, and Tierney (1999) identified the existence of two strategies in organizations: (1) codification strategy assumes that knowledge can be codified and stored in computer systems and (2) personalization strategy is applied to knowledge that is difficult to codify into systems and requires person-to-person communication. Expert location is therefore an essential component of the personalization strategy. The following two subsections review the studies that have investigated each of the strategies.

a. Knowledge Codification

For communicating knowledge, organizations have relied on codification. For example, the rush cheat sheet (RCS) of an air traffic control team (Halverson & Ackerman, 2003) functioned as a codification tool for its organizational knowledge. Halverson and Ackerman found that RCS brings together knowledge across organizational boundaries as a boundary object by formalizing and crystallizing the solutions to recurring traffic problems while removing details. Regarding the maintaining of data in RCS, they suggested the term “boundary streams,” which implies dynamicity in adaptation and adoption at the macro level and constant updating at the micro level.

Codification of knowledge, however, creates unintended loss of meaning, or what Weick (1993) called “cosmology episodes.” He pointed out that electronic information processing represents events in incomplete, ambiguous form such that real meaning is lost.

With regard to efficient knowledge codification, Schulz and Jobe’s study (2001) proposed that different kinds of knowledge should be codified into matching forms of codification. Their matched codification hypothesized that (1) technical knowledge exerts the greatest performance effect when codified in numbers or codes; (2) marketing knowledge exerts the greatest performance effect when codified in text form; and (3)

strategic knowledge exerts the greatest performance effect when codified in people form. The data from their survey of multinational companies supported their hypotheses on the positive effects on performance of focused strategy and matched codification.

b. Expert Location

Some knowledge is more difficult to codify due to its tacitness. For communicating knowledge person-to-person, the visibility of experts and their expertise is crucial. Before questioning how to locate experts, it is worthwhile to look at what in fact constitutes expertise.

Studies in cognitive psychology have revealed that experts store knowledge in chunks, which is referred to as a "production system." Underscoring the role of human expertise, Simon (1991) viewed an organization as a "collection of production systems." Lunce, Iyer, Courtney, and Schkade (1993) defined experts as those who possess not only domain-specific knowledge but also the ability to apply the knowledge and predict outcomes of the application of knowledge. They argued that people measure expertise based on reliability and accuracy of the outcome predictions. Goldman's (2001) definition of cognitive experts is based on the assumption that people evaluate experts according to what they have learned empirically about each expert. He defined experts as those (1) who have more belief in true propositions than in false propositions; (2) who have the capacity to generate new knowledge and answers to questions within a domain; and (3) who can answer primary questions (i.e., principal questions of interest) and secondary questions (i.e., state of evidence and arguments on the primary questions). With those properties of experts, Goldman identified five sources of evidence that novices might use to trust one expert over others:

- Arguments presented by contending experts to support experts' views and to critique rivals' views
- Agreement from additional experts on one side or the other of the subject in questions
- Appraisal by meta-experts of experts' expertise
- Evidence of the experts' interests and biases in relation to the question
- Evidence of the experts' past track records

As a practical challenge in novice-expert problems, Goldman (2001) suggested more research on the "kinds of communicational intermediaries [who] might help make the novice-expert relationship more one of justified credence than [of] blind trust" (p. 109).

Awareness of expertise location is rooted in the theory of transactive memory (Faraj & Sproull, 2000). According to Wegner (1987), transactive memory is the capacity to remember who is likely to have a particular item in the future or who knows what. Transactive memory affects group performance and learning. Hollingshead (2000) investigated how perceptions of coworkers' expertise or transactive memory affect people's learning of work-related knowledge. The results showed that people learn and recall more information in their own areas of expertise when they perceive that others have different rather than similar expertise and vice versa. Based on the results, Hollingshead concluded that people are motivated to maximize their collective knowledge by remembering more information outside of their area.

McDonald and Ackerman's (1998, 2000) study begins with a field study conducted at a software company followed by a system design for expertise location. Three stages of expertise location are identified, including expertise identification, selection, and escalation (McDonald & Ackerman, 1998). In a subsequent study in 2000, they examined two heuristics for locating expertise: (1) change history heuristics, in which people look at version control systems to identify who last modified the codes, and (2) tech support heuristics, in which people search support databases to identify problems most similar to the problems at hand. Based on the findings, they developed an expertise recommender, in which the user can choose between two heuristics as well as between personal social networks and departmental networks, then choose to escalate the initial recommendations for experts.

Other examples of the expertise location system are as follows. Craswell et al. (2001) designed P@NOPTIC Expert, a web-based expert-finding system. It analyzes all the intranet documents and then presents a list of employees who are most frequently mentioned, along with contact information and matching documents as evidence. Mockus and Herbsleb (2002) designed an expertise browser that presents the relationship between products (or artifacts) of the software company (e.g., code, documentation, design, and

functionality) and the people (or organizations) that most likely have expertise about the products. This system focused on finding project-related expertise while reducing overload on "expertise experts" (Mockus & Herbsleb, 2002). Campbell, Maglio, Cozzi, and Dom (2003) applied a hyperlink-induced topic search algorithm that analyzes the patterns of email communications using reputation and resourcefulness scores in expert finding. The algorithm was based on the assumption that more email is sent to a person who is likely to provide good information. Balog, Azzopardi, and De Rijke (2006) compared an expert finding model solely based on the documents associated with the experts and a model that locates documents on the topic first and then finds associated experts. The inclusion of topicality resulted in better performance in finding experts. Later Balog (2007) emphasized the need for more research on the social search (e.g., who is related to person X and what is the nature of their connection?) in addition to the topical people search and profiling. Contrary to traditional document retrieval, entity retrieval, such as people search, focuses on entities indirectly represented in documents.

In designing expertise location systems, Ackerman and Halverson (2004) recognized the social-technical gap as a main problem in sharing expertise; this gap is also a fundamental problem in using CSCW systems in general. According to them, knowledge sharing is a social practice that includes nuanced behaviors of how and with whom to share information, constant negotiation of norms of information use, and discussion of incentives for experts and users. Their argument is that the gap arises when those social requirements are not supported by technical capabilities. As they introduced, some systems have attempted to reduce the gap by combining repositories with social networks (e.g., Answer Garden), self-feeding expertise finding (e.g., expertise locator), and lightweight social spaces (e.g., Babble and Loops). Ackerman and Halverson concluded that the structural and relational aspects of social capital are critical in designing systems for sharing expertise. So far, research on expert finding has focused extensively on expertise identification while expertise selection has been a concern mostly of industries (Serdyukov et al., 2008).

2.2.3 The Emergence of Enterprise 2.0

Recently, in order to better support knowledge communication, companies have adopted Web 2.0 technologies in the workplace. To describe the new trend of organizational social software, McAfee (2006) coined the term "Enterprise 2.0." According to Buhse and Stamer (2008), while Enterprise 1.0 relies on hierarchical structures, Enterprise 2.0 adopts the reverse strategy to support self-organized structures to enhance innovation and credibility and, therefore, the motto for Enterprise 2.0 should be "the art of letting go." McAfee (2006) defined six main features of Enterprise 2.0 technologies using the acronym SLATES (search, links, authoring, tags, extensibility, signals).

- **Search**: Users must be able to find what they are looking for. This can be supported by better design of page layouts and navigation aids, but full-text search is preferred.
- **Links**: Users must be able to use links to refer to content.
- **Authoring**: Users must have authoring tools so that they can collaboratively generate high-quality content. This will change a static intranet to a dynamic work of many.
- **Tags**: Users must have a way to categorize content. Tags emerge over time and lead to categorization that reflects the relationships of content the users actually use.
- **Extensions**: System must be able to recommend other appropriate information, which extends the content currently showing.
- **Signals**: Users must be able to subscribe to new content and their awareness of activities must be supported through automated notifications.

Buhse and Stamer noted that Enterprise 2.0 offers employees the opportunity to go beyond their job description to express their views and opinions. They viewed the implementation of social software as supporting the process of generating the "wisdom of crowds," referring to what journalist James Surowiecki (2005) wrote in his book with the same title: "Corporate strategy is all about collecting information from many different sources, evaluating the probabilities of potential outcomes, and making decisions in the face of an uncertain future" (p. 21). Buhse and Stamer also pointed out that Enterprise 2.0 enables companies to foster weak tie relationships, which was studied as an important means to access previously untapped knowledge by Granovetter (1973).

According to Koch (2008), development and implementation of enterprise social software have much to learn from the field of CSCW. Adapting Sauter, Mühlherr, and Teufel's (1994) three core concepts that characterize groupware – communication, coordination, and cooperation – Koch identified a core concept of social software called the "social software triangle" (See Figure 2).

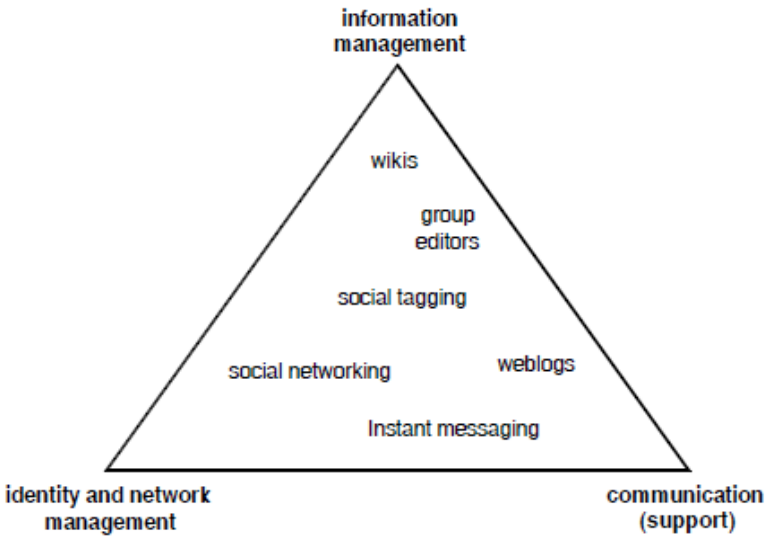


Figure 2: Social Software Triangle (Koch, 2008, p.5)

Koch said the difference between enterprise social software and groupware is that the former is characterized by (1) self-oriented communication, (2) bottom-up implementation and voluntary participation, (3) co-evolved conventions, and (4) large numbers of users, while the latter and early knowledge management systems are characterized by (1) group-oriented communication, (2) top down implementation and enforced participation, (3) pre-planned modes of collaboration, and (4) small numbers of users over limited periods of time. He pointed out that in implementing enterprise social software, the most important lesson to learn from CSCW research is to attain a balance between effort and benefit for all users, as noted by Grudin (1989).

Vuori and Okkonen (2012) examined how traditional knowledge refining processes differ from those enabled by the use of social media in the workplace. They found that the collaborative setting created by social media enables the sharing and combining of mutual insights as well as discussion of conflicting insights on current

topics, and therefore adds value to an outcome by forming a more multifaceted and truthful understanding of issues. They pointed out that this differs from the traditional refining process where feedback is indirect and sometimes even absent. Similarly, Alberghini, Cricelli, and Grimaldi (2013) reported that while in the Enterprise 1.0 era, the top down approach to knowledge management focused on the "pre-packaged or taken-for-granted interpretation of information" (p. 322), the adoption of Enterprise 2.0 tools changed the focus to bottom-up frameworks that enable the development of collective intelligence. Figure 3 shows the evolution of the perspectives they identified based on the review of knowledge management literature.

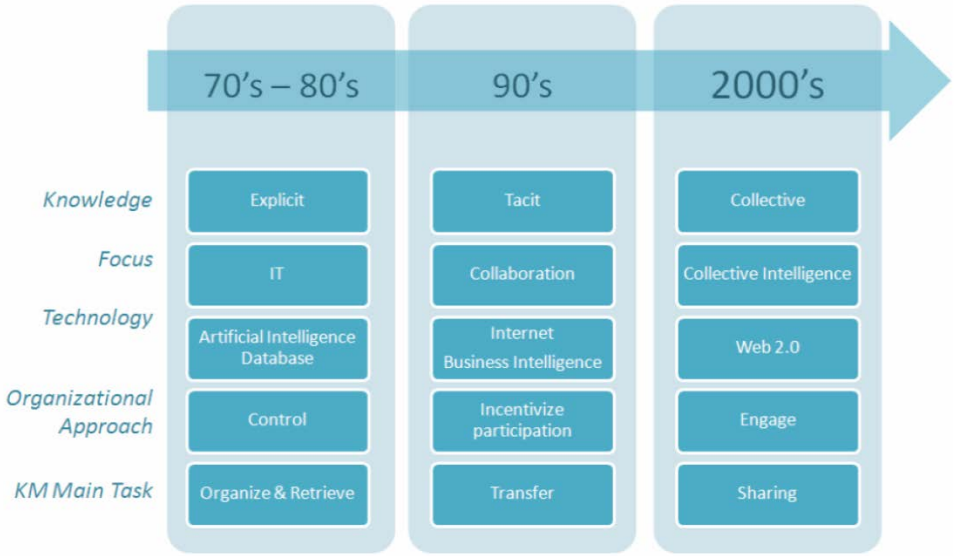


Figure 3: Evolution of Different Knowledge Management Perspectives (Alberghini, Cricelli, & Grimaldi, 2013, p.5)

A number of empirical studies have been carried out on the use behavior of individual Enterprise 2.0 technologies, mostly that of blogs, wikis, and social networking sites.

There has been an increasing interest in the use of corporate blogs as a new form of intra-organizational communication. Efimova and Grudin (2007) studied Microsoft's internal blogging community to understand how, where, and why employees blog. Jackson, Yates, and Orlikowski (2007) investigated IBM's internal corporate blog, focusing on types of users, use patterns, and benefits for both the individual and the

community. Yardi, Golder, and Brzozowski (2009) viewed the use of internal corporate blogs from the perspective of attention economy. They identified how the economy breaks down in the workplace and suggested some mechanisms to overcome them. More recently, researchers have extended their focus to corporate micro-blogging. For example, Müller and Stocker (2011) studied the use of the References@BT microblog in a company and identified its usefulness and individual and organizational benefits. By comparing the employees' use of internal and external microblogs, Ehrlich and Shami (2010) identified a difference in their content. While the internal ones were used to obtain technical assistance and as a part of a dialogue, the external ones were used for updating statuses and sharing general information.

Wiki is another platform that has been studied as a tool for knowledge dissemination in the workplace. According to Majchrzak, Wagner and Yates (2006), enterprise wikis are used to facilitate work processes, collaboration, and knowledge reuse. By asking wiki owners in describing their usage and its benefits, Farell, Kellogg, and Thomas (2008) identified four types of use, including team communication, quick collaboration, contribution and volunteerism, and learning support. McAfee's (2006) study on the use of wikis in an investment bank identified the ability of wikis to reduce information overload by replacing email communication for certain issues. Hasan and Pfaff (2007) studied cases of wiki rejection in companies and found that managers had concerns about flattening of organizational hierarchies and showed a reluctance to share control in the documentation process. Similarly, Holtzblatt, Damianos, and Weiss (2010) conducted a case study to identify factors impeding wiki use in the workplace. First, they uncovered reluctance to share information due to the extra cost of sharing, the sensitive nature of information, unwillingness to share unfinished work, and concern about the openness of information. Second, they found the heavy reliance on other tools over wikis, due to work practices, lack of guidelines or standards for using wikis, and cultural sensitivities.

While there is an abundance of research on the use of public social network sites (SNS), little research exists so far that investigates the use of SNS in a corporate context. Dimicco et al. (2008) researched the motivations of social networking in the context of

IBM, focusing on its internal SNS called Beehive. They identified that in using SNS, users wanted to connect with their colleagues on a personal level, to advance their career with the company, and to campaign for their projects. It was also found that status updates and profiles were used primarily for work-related purposes, while shared content, such as photos and lists, were used for personal reasons. Skeels and Grudin (2009) studied the use of Facebook and LinkedIn among Microsoft employees. They found four major tensions affecting the use of SNS in the workplace: (1) the legitimacy of using any SNS in the workplace, (2) mix of personal and professional personas, (3) lack of delineation of hierarchy, status, or power boundaries, and (4) the risk of disclosing confidential information across the firewall. Based on those challenges, they suggested some design implications for boundary crossing. Archambault and Grudin's (2012) longitudinal study of the use of Facebook and LinkedIn at Microsoft between 2008 and 2011 identified the near-universal adoption of the SNS even though there were differences in growth depending on gender, age, and hierarchical level. They reported that user behaviors and concerns have changed, with signs of leveling off.

While most of the studies on the use of social media within organizations have focused on one tool at a time, Yuan et al. (2013) investigated how social media tools are used in combination with earlier generations of communication (e.g., email, instant messaging, telephone, and video conferencing) and KM tools (e.g., databases and digital archives). They identified that redundancies between existing KM tools and social media create competing, instead of complementary, relationships between the two, which results in the separation of resources and user groups. They recommended that in order to effectively support knowledge sharing, organizations provide an integrated platform in which different generations of tools with overlapping functionalities and goals should be avoided.

2.2.4 Summary: Knowledge Management and Enterprise 2.0

Knowledge management (KM) refers to processes and practices through which organizations generate value from knowledge (Grant, 2007). Compared to information science research, knowledge management research has deployed more organizational- and overall-knowledge-flow-level measures rather than individual- and behavioral-level

ones. This indicates that information science research can be informed by theoretical and empirical studies on knowledge management to expand the scope of understanding of the impact of information services and technologies on organizational-level knowledge flow and networks. On the other hand, information science research can bring to the discussion of knowledge management its perspective on individuals' information needs and behavioral patterns.

The literature covered here shows that the implicit nature of knowledge complicates its communication and transfer, which in turn requires the development of methods to support the process. Two main knowledge communication strategies that have been widely studied are knowledge codification and personalization, but more recently, researchers (e.g., Hansen, Nohria, & Tierney, 1999) have emphasized the importance of balancing the two. Enterprise 2.0 is the movement to bring web 2.0 technologies and user engagement culture into an organization's intranet. Those technologies have the potential to contribute both to knowledge codification (e.g., corporate blog, wiki) and personalization (e.g., enterprise social networking site). In the present study, the fundamental empirical data of employees' information-seeking and -providing practices will inform the design and implementation of Enterprise 2.0 tools.

2.3 Information Mediators

While there is only limited literature available on information mediators, existing studies have revealed the significant role of information mediators in the process of seeking and using information. This section reviews the literature on the nature of intervention by formal information mediators such as information professionals and librarians, as well as that by informal information mediators in both everyday life and workplace information seeking.

2.3.1 Definition of Information Mediators

There is no consensus yet on the definition of information mediator; however, there is general agreement that an information mediator is a person who provides guidance in the process of seeking and using information (Eysenbach, 2008; Kuhlthau, 2004; Ehrlich & Cash, 1994). The most specific definition is offered by Kuhlthau (2004),

who viewed the information mediator as “a person who assists, guides, enables, and otherwise intervenes in another person’s information search process” (p. 107). Some studies (Ehrlich & Cash, 1999; Eysenbach, 2008; Abrahamson & Fisher, 2007) use the term “information intermediary” or “mediary” interchangeably with “information mediator.” However, Kuhlthau (2004) argued that the term “mediator” implies human intervention between the information and the information seeker, while the term “intermediary” does not necessarily involve any human interaction.

2.3.2 Formal Information Mediators

Traditionally, librarians have been viewed as professional information mediators whose job includes information mediation as a primary duty. Kuhlthau (2004) made a distinction between formal and informal mediators, and examined the role of the former in the context of library reference services. Her study revealed that information mediators provide different levels of mediation which involve specific interventions as follows (see Table 4):

Table 4: Levels of Mediation (Kuhlthau, 2004, p.115)

Level	Description
1 Organizer	No intervention Self-service search in an organized collection
2 Locator	Ready-reference intervention Single fact or source search; query/answer
3 Identifier	Standard reference intervention Subject search; group of sources in no particular order; problem/interviews/sources
4 Advisor	Pattern intervention Subject search; group of sources in recommended order; problem/negotiation/sequence
5 Counselor	Process intervention Constructive search; holistic experience; problem/dialogue/strategy/sources/sequence/redefinition

According to Kuhlthau (2004), at level 1, the information mediator does not provide any direct intervention. The information seeker searches systems by themselves. At level 2, simple fact or item searches are conducted. Information seekers have a clear idea of what they need. At level 3, the information seeker has a topic to investigate rather than a simple question and the information mediator identifies sources that are related to

the topic. The mediator recommends sources without any particular sequence or interpretation. At level 4, the information mediator guides information seekers through a sequence of sources on a topic. At level 5, the information mediator assists information seekers over time, through the dynamic process of seeking meaning. The mediator continues the conversation with the seeker regarding the seeker's emerging problem. Through this categorization, Kuhlthau makes an important distinction between source-oriented (levels 1 through 4) and process-oriented (level 5). Building on this distinction, this study aims to add to understandings of the levels of mediation by measuring the degree of fact- or value-orientation of the mediation.

Ehrlich and Cash (1999) examined the role of intermediaries in a broader context. They identified specific values intermediaries add in three different settings including corporate libraries, customer support, and news service. Their value categories provide a useful framework for understanding different situations where the intervention of information mediators is needed:

- Formulation: intermediaries help people understand and formulate questions through reference interviews or other similar mechanisms
- Experience: passing on skills they gained in their craft over time as well as knowledge they accumulated over a broad range of subjects
- Expertise: bringing domain knowledge, search expertise, or both
- Source validation: validating the quality of the information
- Customization: tailoring the information to the individuals' current needs
- Aggregation: combining information from many sources into one place
- Commentary: adding personal information
- Service: doing some of the work which people could do for themselves but choose not to, such as looking up information or entering queries

Among those, Ehrlich and Cash identified formulation, expertise, source validation, and service as the primary values that librarians add through their information mediation duties. While Kuhlthau (2004) emphasized the role of librarians as counselors who offer personalized service to users over time, Ehrlich and Cash did not include customization as a service that librarians provide. Regarding the future of professional intermediaries, Ehrlich and Cash argued that some job roles will merge or be replaced by software agents.

Overall, several studies acknowledge the importance of formal information mediators and provide concrete evidence of their value. In organizational work settings, however, information is mediated not only by professionals but also informally by anyone within the organization. The next section examines the concepts and issues essential to understanding the role of informal information mediators.

2.3.3 Informal Information Mediators

Recently, several studies have examined the role of informal information mediators at work and in everyday life. Informal information mediators are those who serve as information mediators even though their job descriptions do not explicitly include those duties.

A similar concept to that of informal information mediators was introduced by Allen (1977) in his seminal work on the notion of technological gatekeepers, which indicates an individual organizational member who keeps fellow researchers in touch with the broad world of research. He reported that such people appear to discuss problems with a much wider number of colleagues more frequently than the norm for the organization. The gatekeepers can be viewed as a subset of informal information mediators, as both share a feature in common; that is, they provide information even though it is not part of their job description.

By observing customer support organizations, Ehrlich and Cash (1994) found that informal information mediation occurs in the process of daily work. The informal information mediation they observed included providing assistance in identifying, interpreting, and applying information, synthesizing information across data types, asking the right questions, and making correct diagnoses, and in separating relevant from irrelevant information. Participants turned to experts in certain areas on an ad hoc basis even during customer calls. Interestingly, they reported that one expert was relied upon primarily because of her breadth of knowledge and ability to interpret information, and emerged as an all-purpose information mediator rather than just a subject-area expert.

In spite of its indispensability, the value of information mediation is often invisible to information seekers, organizations, and managers (Ehrlich & Cash, 1999). Ehrlich and Cash (1999) conducted a follow-up to their 1994 observational study,

reporting that the role of information mediation is often invisible to information seekers even if they rely on information mediators to identify problems and to learn what kind of information is available. According to the study authors, the mediation role is also invisible to the organization when the mediation is embodied in tools such that people do not see how and by whom information resources were constructed. Last, Ehrlich and Cash pointed out that the mediation role is invisible to management when managers fail to view information use as a collaborative activity and fail to see the role of mediation in maintaining the "cross-organizational stability so that novice workers can be brought into the community and more experienced workers are free to tackle new challenges" (p. 160).

Even though they did not specifically use the term "information mediators," Cross, Borgatti, and Parker (2001) also reported the benefits of asking help from colleagues in seeking and using information. Their interview study with managers in a global consulting organization revealed specific benefits as follows:

- Solutions: they provide specific solutions to the problem at hand
- Meta-knowledge: they point to important information or a person with expertise
- Problem reformulation: they help individuals to think differently about a specific problems
- Validation: they validate an individual's solution or plan and bolster the individual's belief in his/her own thinking.
- Legitimation: the ability to cite a respected person as having reviewed a solution can increase the credibility of a proposed solution and allow people to move forward

Those benefits, excepting legitimation, are very similar to those that have been reported in other studies on information mediators.

Information mediation has also been studied in the context of everyday information seeking. Abrahamson and Fisher (2007) defined lay information mediaries as "those who seek information in a non-professional or informal capacity on behalf of others without necessarily being asked to do so, or engaging in follow-up." Based on prior general models of information behavior, they developed a behavior model of the lay information mediary. Instead of using the term "information seekers," Abrahamson and

Fisher used the term “imposer” to indicate the people who impose the information need upon the information mediary. They defined pre-imposers as those who imposed information need on the imposers, as in the case of a teacher imposing an assignment on a student, who then receives assistance from a lay information mediary. This model describes the relationship between pre-imposer, imposer, lay information mediary, and information system as well as four contextual factors that motivate information mediaries, including cognitive, affective, physical, and social factors. According to this model, information mediation occurs when a mediary is cognitively motivated by perceiving the foregoing information barriers of an imposer, affectively motivated by feeling uncertainty and ambiguity, physically motivated by perceiving an imposer’s disability or geographic barriers, and socially motivated by the desire to build social capital and networks. This study employed a broader definition of information mediator by including situations in which a person seeks information for others without necessarily being asked to do so. My study focuses on situations in which information mediation is intended by its actors to examine their expectations and intentions for entering into an information mediation process.

Eysenbach (2008) discussed the role of informal information mediators in the context of seeking health information on the Web. Eysenbach coined the term “apomediation” to describe a third way of identifying credible information and information sources (i.e., networked collaborative information processing and filtering) which are enabled by Web 2.0 technologies. He used the prefix “apo” to mean “stand by, away from, and separate” while “inter” means “in between,” to distinguish the role of apomediaries (e.g., users of rating and recommendation systems, social networking sites, social bookmarking, blogs, wikis, and communication tools) from that of intermediaries (e.g., professional information brokers) or disintermediation (e.g., direct system search). Regarding the issue of credibility assessment, he hypothesized the main difference between intermediation and apomediation environments: the credibility of intermediaries influences the credibility of the information they provide, whereas in the context of apomediation agents (people or tools) simply guide information seekers to information while limiting their individual power to select or alter the information introduced. He

argued that credibility issues need to be approached differently for different information seeking and processing environments (see Table 5).

Table 5: Issue in an Apomediation vs. Intermediation Environment (Eysenbach, 2008)

Credibility Issues	Intermediation Environment	Apomediation Environment
Expertise	Based on traditional credentials (e.g., seniority, professional degrees)	Based on first-hand experience or that of peers
Bias	May promote facts over opinion, but opportunity for intermediary to introduce biases	May bestow more credibility to opinions rather than facts
Source Credibility	Based on the believability of the source's authority; source credibility is more important than message credibility	Based on believability of apomediaries; message credibility and credibility of apomediaries are more important than source credibility
Message Credibility	Based on professional and precise language, comprehensiveness, use of citations, etc.	Based on understandable language, knowing or having experienced issues personally
Credibility Hubs	Static (experts)	Dynamic (opinion leaders)
Credibility Evaluations	Binary	Spectral

Eysenbach's notion of apomediation provides a new perspective in understanding credibility judgment of information in the participatory Web environment. In the apomediation environment, he argued, credibility judgment is not based on the authority of a source, but rather the believability of information mediators. This provides a useful framework for examining how first-hand experience and opinions of colleagues, not necessarily as sources of information but as information mediators, influence information seekers' judgment of information credibility.

Niedzwiedzka (2003) studied information behavior of managers and found out that they prefer turning to intermediaries including managers of a lower level, information officers, and co-workers over personal use of information services or direct interaction with search systems. She further categorized the intermediaries into formal contacts, which mainly include the contacts with subordinates such as division managers, and informal contacts, which involves casual contact with fellow professionals or a peer group within an organization or the whole sector. Based on these findings, she proposed a new information behavior model, revising Wilson's (1996) global model of information behavior. This model represents the view that a user can select one, the other, or both of

the information seeking strategies: one is the personal use of formal information services or search systems and the other is the use of the help and services of other people.

More recently, Sabelli (2012) studied the role of social mediators, which include social workers, psychologists, doctors, teachers, sociologists, community workers, social educators and members of neighborhood committee, on young women's process of appropriation of information and knowledge. She identified those social mediators as "transmission belts" between young women and information resources.

Overall, researchers have acknowledged that informal information mediators play essential but under-recognized roles in the flow of information and knowledge. This is an area that deserves more research because social software has increasingly enabled employees to interact with and seek help from one another throughout the process of finding, evaluating, selecting, and using information. The question of whether informal information mediation through social software will substitute for or complement formal information mediation remains unanswered.

2.3.4 Summary: Information Mediators

The literature reviewed here contributes to our understanding of the roles and values of information mediators in information seeking and use. It has provided strong evidence that information mediation is still an indispensable process for finding relevant and credible information, which cannot be completely mimicked through software agents.

Especially in the context of everyday work, more research is needed to better support the dynamics and process of informal information mediation between colleagues. Especially lacking is discussion about how information mediation actually influences its recipients' judgment of information and subsequent decision making. Another area that merits further investigation is how the process of information mediation benefits those who provide information. Information mediation is embedded in daily interaction between employees (Ehrlich & Cash, 1999), even though their job description does not explicitly include it as a responsibility. To encourage effective information mediation, therefore, it is critical to understand the experiences and challenges of those who provide information.

2.4 Trust Perception

This section of the literature review focuses on the body of literature that has attempted to define the concept of trust, trust in humans and trust in information. Literature on interpersonal trust has investigated trust and distrust in organizations and accumulated evidence for its benefits for individuals and organizations. Information credibility has been studied widely in library and information science and communication, contributing to our understanding of the processes and strategies of credibility judgment of information.

2.4.1 Trust in Humans

2.4.1.1 Concept of Interpersonal Trust

Interpersonal trust has been studied as a crucial factor that affects intra-organizational knowledge sharing. Mayer, Davis and Schoorman (1995) defined trust as "the willingness of a party to be vulnerable" (p. 712). Levin and Cross (2004) defined perceived trustworthiness as "the quality of the trusted party that makes the trustor willing to be vulnerable" (p. 1478). Trust increases the amount of information that can be exchanged (Tsai and Ghoshal, 1998). When a recipient perceives a source as trustworthy, it is more likely that the recipient will accept the message (Hovland, Lumsdaine, & Sheffield, 1949; Tyler & Degoey, 1996).

Combining the psychological and sociological approaches to trust, Worchel (1979) classified trust into three layers: dispositional trust, the psychological disposition or personality trait of an agent to be trusting or not; learned trust, an agent's general tendency to trust or not to trust another agent as a result of experience; and situational trust, in which basic tendencies are adjusted in response to situational cues such as quality or amount of communication.

The structure of trust can be differentiated depending on whether it is based on emotionality or rationality (Lewis & Weigert, 1985). According to McAllister (1995), trust has a cognitive basis (cognition-based trust) when an individual chooses whom to trust based on a rational reason to trust the other party, while it has an affective basis (affection-based trust) when an emotional bond links individuals to trust each other.

While the consistency of one's behavior and words might provide the basis for the former, demonstration of concern and interpersonal care are expressed in the latter type of trust. He argued that a relationship starts from perceived cognitive trust but can be transformed through experience into affective trust.

Some studies have also broken down organizational trust into benevolence- and competence-based trust. According to Levin and Cross (2004), benevolence-based trust is the belief that an individual will not harm another even if the opportunity is present, while competence-based trust is the belief that another person has expertise in a certain area. The factors determining benevolence-based trust include common language, common vision, and discretion, while those determining competence-based trust include receptivity and strong ties. Casciaro and Lobo (2005) reported that, between "competent jerks" and "loveable fools" as work partners, people choose likability over ability. Levin and Cross' study (2004) revealed that competence-based trust was especially important for receiving tacit knowledge while benevolence-based trust is always likely to matter regardless of the type of knowledge sought.

Interpersonal trust determines not only the decision about who to accept input from, but also the decision about who to share knowledge with. Andrews and Delanaye's (2000) study on scientists' knowledge sharing revealed that trust is a main component of the "psychosocial filter" in knowledge importing and sharing. They found that scientists filtered knowledge importing by evaluating the credibility of a knowledge supplier, while they filtered knowledge sharing by evaluating the trustworthiness of a knowledge recipient based on the perception of what the recipient was likely to do with sensitive information.

By including ability, integrity, and benevolence as three main factors influencing trust, Mayer et al. (1995) also developed an integrative model that explains the development of trust over time. According to their model, the effect of integrity on trust is most pronounced early in a relationship before developing any meaningful benevolence data, while the effect of perceived benevolence on trust increases over time as the relationship develops. Robert, Denis, and Hung (2009) compared trust based on the knowledge of a trustee's ability, integrity, and benevolence to Meyerson, Weick, and

Kramer's (1996) notion of "swift trust." Meyerson et al. defined swift trust as trust that is formed instantly by temporary team members. Robert et al. found that the effects of in-group bias toward team members and individuals' general disposition to trust are prominent in the early stages of developing swift trust, while the effect weakened as individuals obtained knowledge of team members.

While recognizing the importance of trust, researchers have also studied distrust, which impedes the development of trust. Distrust has been defined as a "lack of confidence in the other, a concern that the other may act as to harm one, that he does not care about one's welfare or intends to act harmfully, or is hostile" (Grovier, 1994, p. 240). Fein (1996) examined the effect of distrust and suspicion on judgment and demonstrated that distrust triggers more sophisticated attributional analyses "characterized by active, careful consideration of the potential motives and causes that may influence people's behaviors" (p. 1167).

Lewicki, McAllister, and Bies (1998) argued for the possibility of coexistence of trust and distrust, pointing out that the previous literature had ignored the ambivalence of both positive- and negative-valent constructs. Using a two-dimensional framework, they identified four relationships between trust and distrust and how different relationships determine the characteristics of conversation between actors (see Figure 4 on the next page). With low trust and low distrust, conversation tends to be simple and casual because actors have no reason to be confident or to be watchful. With high trust and low distrust, actors seek ways to further develop the relationship through rich and complex conversation because there is a reason to be confident in the other but no reason to be suspicious. With low trust and high distrust, conversation tends to be cautious and conveys cynicism because actors have no reason to have confidence in the other but rather reason to be suspicious. With high trust and high distrust, actors try to limit their interdependence to areas that reinforce trust because they have reason to be confident in certain of the other's aspects as well as reason to be suspicious in other aspects. They argued that, of the four conditions, the condition of high trust and high distrust is most prevalent in work relationships in organizations today.

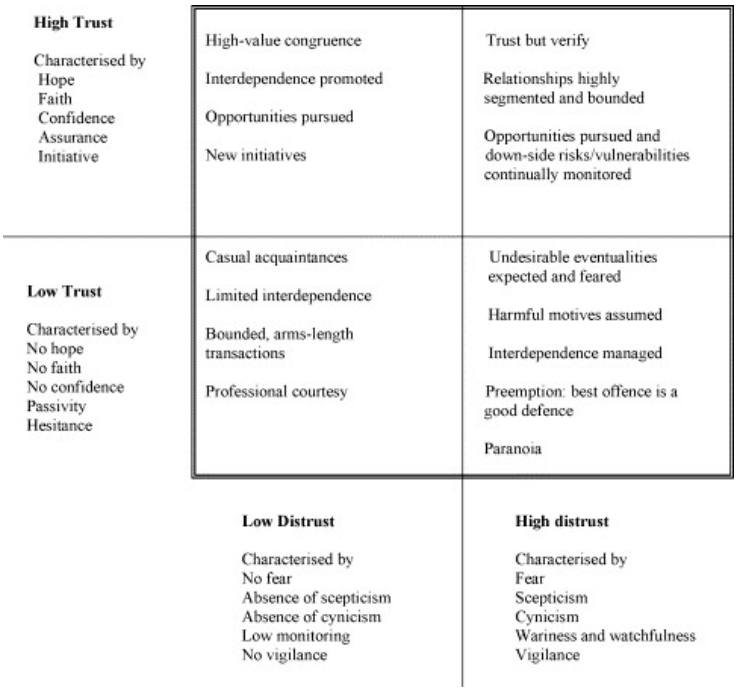


Figure 4: Integrating Trust and Distrust: Alternative Social Realities (Lewickie, McAllister, & Bies, 1998, p. 445)

Based on the review of trust literature, Kramer (1999) categorized the antecedent conditions that enable the emergence of trust, including psychological, social, and organizational factors that affect people's expectations about others' trustworthiness. The six bases of trust he identified include dispositional trust, history-based trust, third parties as conduits of trust, category-based trust, role-based trust, and rule-based trust. A simpler categorization was introduced by Elangovan and Shapiro (1998). They distinguished between personal trust (trust is based on person-to-person interaction) and impersonal trust (trust is based on the position within organization, not the individual who holds the position).

2.4.1.2 Evolution of Interpersonal Trust

Building on the previous discussion on types of organizational trust, researchers also examined how trust is developed and maintained over time. Shapiro, Sheppard, and Cheraskin (1992) proposed that there are three types of trust: (1) deterrence-based, which is sustained by threat of sanctions (2) knowledge-based, sustained by the ability to predict the other party's behavior, (3) and identification-based, sustained by a complete empathy

with the other party. Similarly, Lewicki and Bunker (1996) categorized trust development into three stages. According to them, calculus-based trust is grounded, in the first stage, in the fear of punishment for violating the trust or in reward from preventing it, followed by the development of knowledge-based trust, which enables people to predict the results of trustworthiness based on experience over time, and develops further into a shared identification-based trust in which people believe that the object of trust will not take advantage of their vulnerability. Lewicki and Bunker argued that relationship building always begins with the development of calculus-based trust activities and progressively matures.

Currall and Epstein (2003) analyzed the case of Enron, which filed for bankruptcy in December 2011, to investigate how trust plays a role in organizational performance and success. It resulted in the identification of the evolutionary pattern of trust development (see Figure 5).

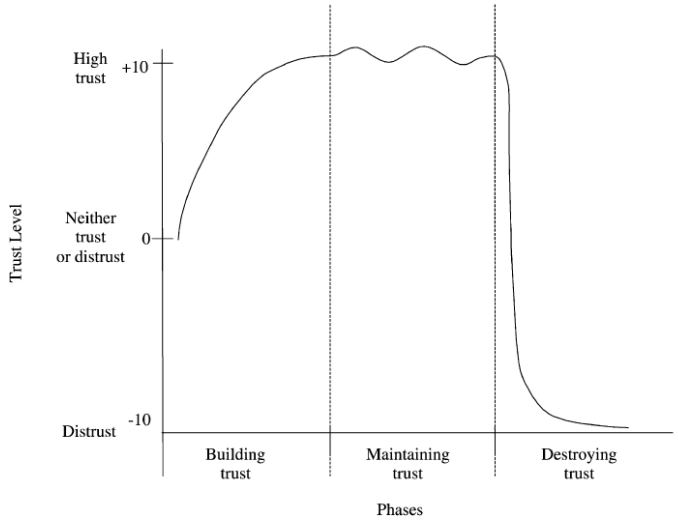


Figure 5: Evolutionary Phases of Trust (Currall & Epstein, 2003, p.197)

According to Currall and Epstein, the evolutionary pattern involves three stages: (1) Early in the relationship, trust usually starts around the zero point due to the lack of information about the trustworthiness; (2) In the trust-building stage, trust is built based on the evidence of benevolence, competency, and commitment to be trustworthy; (3) Once trust has been built, there is no more demand for evidence of trustworthiness (the authors pointed out that this explains why some people who developed trust in Enron

were resistant to new information that Enron executives should not be trusted); and (4) In the existence of solid evidence of untrustworthiness, trust gets destroyed and distrust emerges.

Jones and George (1998) examined how trust evolves and changes over time, explaining two states of trust – conditional and unconditional trust. They proposed that people ususally start with conditional trust, but, through the experience of trust, unconditional trust becomes a primary mechanism through which they experience trust. They found that the experience of trust takes the interaction of people's values, attitudes, and moods and emotions and argued that the all three factors are neccesary to analyze the transformation of trust. Their model shed additional light on the discussion of dissolution of trust (e.g., Butler, 1983).

Henttonen and Blomqvist (2005) studied the evolution of trust in the context of a global virtual team and identified that the antecedents of trust in the virtual context in the trust-building stage are similar to traditional antecedents. The positive social cues for trust-building they found include communication behavior, such as timely, in-depth feedback and open communication, initiative-taking, fostering of cooperation, and social similarity, which is similar to Kramer's (1999) notion of category-based trust. They also identified that trust may dissolve in the presence of failure to communicate, failure to retain contextual information, failure to provide information evenly, and difficulties in interpreting the meaning of silence.

2.4.1.3 Role of Interpersonal Trust

Trust researchers also sought answers to the question of what the role and impact of interpersonal trust in an organization are. Kramer (1999) identified three types of benefits of trust, including its benefit in reducing transaction costs, promoting spontaneous sociability, such as cooperative, altruistic, and extra-role behaviors that enhance an organization's collective well-being, and increasing voluntary deference to organizational authorities, which enables the acceptance of unfavorable procedures or outcomes.

With regard to its effect on the organizational knowledge management, trust has been discussed as a prerequiste for tacit knolwedge sharing (e.g., Roberts, 2000; Rolland

& Chauvel, 2000). Arguing that the knowledge mangement literature uses trust in a very generic sense, Ford (2001) developed propositions about the relationship between different types of trust and various knowledge management processes based on a review of the literature (see Table 6). Based on these propostions, he argued that in order for an organization to implement knowledge management successfully, it needs multiple types of trust to be promoted within the organization.

Table 6: Propositions on the Relationship between Trust and Knowledge Management (Ford, 2001)

Knowledge Processes	Propositions
Knowledge Creation	1a: For individual-generated knowledge: the presence of organizational trust, which is either deterrence-based or institution-based trust, will be associated with more knowledge creation than occurs with no trust at all. 1b: For individual-generated knowledge: the presence of interpersonal trust with the supervisor, which is either deterrence-based, institution-based, or knowledge-based trust, will be associated with more knowledge creation than occurs with no trust at all. 2a: For group-generated knowledge: the presence of organizational trust, which is institution-based trust, will be associated with more knowledge creation than if there is no trust present. 2b: For group-generated knowledge: the presence of trust in the group will be associated with more knowledge creation than if there is simply organizational trust, or no trust present. 2c: For group-generated knowledge: the presence of interpersonal trust, which is identification-based or relational trust, will be associated with more knowledge creation than if there is simply group trust, organizational trust, or no trust present.
Knowledge Acquisition	3a: For knowledge acquisition, the presence of personal trust will be associated with more knowledge acquired than without personal trust. 3b: For knowledge acquisition, the presence of interpersonal trust, which is either knowledge-based, competency, relational, cognition-based, or identification-based trust, will be associated with more knowledge acquired than without the presence of interpersonal trust.
Knowledge Codification	4a: The presence of impersonal trust of the data quality, which is trust in the system, will be associated with more knowledge codification. 4b: The presence of organizational trust will be associated with more knowledge codification than if there was no organizational trust. 4c: For knowledge maps (i.e., "Yellow Pages" for expertise): the use of pictures or videos in the knowledge maps increases interpersonal trust.
Knowledge Transfer	5a: For conditions of little or no interpersonal trust: the presence of organizational trust, which is institution-based trust, will be associated with more knowledge transfer. 5b: For conditions of little or no sanctions or policies: the presence of interpersonal trust, which is knowledge-based, identification-based or relational trust, will be associated with more knowledge transfer. 5c: For conditions of distrust: knowledge transfer will be blocked and will be associated with more knowledge transfer. 5d: A company in which there is strong organizational trust and interpersonal trust present will have more knowledge transfer than companies in which there is solely organizational or interpersonal trust.

	5e: The presence of knowledge transference will lead to an increase in interpersonal trust between the individuals of the organization, thus leading to more knowledge transfer. 5f: The presence of distrust will be associated with knowledge blocks and failure in knowledge management if prevalent with an organization.
Knowledge Application/ Use	6a: The presence of organizational trust, which is institution-based trust, will be associated with higher knowledge use and application. 6b: The presence of interpersonal trust with the supervisor, with could be deterrence-based, institution-based or knowledge-based trust, will be associated with higher knowledge use and application than without it.

It was also widely acknowledged that trust can lead to cooperative behavior in organizations (Axelrod, 1984; Mayer et al., 1995; McAllister, 1995). Distinguishing between conditional and unconditional trust, Jones and George (1998) developed a model that shows direct and indirect effects of unconditional trust on interpersonal cooperation and teamwork. Regarding the indirect effects, they identifed seven kinds of social processes that are promoted by the "sharing of values" characteristic of unconditional trust. They argued that those proccesses can lead to the development of synergistic team relationships and, as a result, can enhance team performance. The social processes are as follows:

- **Broad role definitions:** When unconditional trust exists, individuals want to cooperate and to do whatever they can for the common good.
- **Communal relationships:** The shared values underlying unconditional trust guide people to strive for communal relationships characterized by helpfulness and responsibility.
- **High confidence in others:** The sharing of values promotes high confidence in others, as one can be assured of others' ultimate intentions and objectives.
- **Help-seeking behavior:** Seeking help is not threatening under unconditional trust.
- **Free exchange of knowledge and information:** The shared values underlying trust provide individuals with the assurance that knowledge and information will be used for the greater good.
- **Subjugation of personal needs and ego:** The shared values underlying unconditional trust lead people to subjugate their own needs and egos for the greater good because of the greater assurance that others will act in good faith.
- **High involvement unconditional trust:** The unconditional trust provides individuals with the assurance they need to become fully involved in a team endeavor.

2.4.1.4 Source Credibility and Persuasion

In the communication literature, trust and source credibility have often been treated as overlapping constructs. Source credibility has been traditionally studied in relation to the issue of persuasion. The literature on the effects of source credibility on persuasion deserves to be reviewed and summarized on its own because the factors and interaction effects identified in those studies will prove useful in investigating how information givers' trustworthiness influence information seekers' subsequent decision-making.

Researchers have tried to examine whether a high credibility source will be more effective than a low credibility source in changing beliefs, attitudes, or behaviors of the recipients. Source credibility has commonly been held to consist of expertise, the extent to which a speaker is perceived to be capable of correct assertions, and trustworthiness, the degree to which a recipient perceives the assertions made by the speaker to be valid (Hovland, Janis, & Kelley, 1953). Other dimensions that have been proposed are dynamism and objectivity (Whitehead, 1968) and authoritativeness and character (McCroskey, 1966).

By reviewing five decades of studies in communications, psychology, and consumer research, Pornpitakpan (2004) summarized different types of interaction effects of source credibility on persuasion. He categorized the interaction variables examined in these studies into five categories including source, message, channel, receiver, and destination. Examples of the variables are listed in Table 7. His review revealed that more research is required for exploring the interaction variables, especially the similarities between sources and recipients, complexity and length of message, recipients' personal traits, and recipients' access to attitude-relevant information in their memory.

Table 7: Interaction Variables between Source Credibility and Persuasion (Pornpitakpan, 2004)

Categories	Interaction Variables
Source variables	Physical attractiveness of the source (Joseph, 1977) Similarity between the source and recipient (Feldman, 1984) Gender of the source (Freiden, 1984)
Message variables	Timing of source identification (Sternthal, Ruby, & Leavitt, 1978) Presence of evidence (Hendrick & Borden, 1970) Presence of supporting arguments (Maddux & Rogers, 1980)

	Argument quality (Petty & Cacioppo, 1981) Message congruity with the source's self-interests (Walster, Aronson, & Abrahams, 1966) Message discrepancy from recipients' initial opinion (Bochner & Insko, 1966) Threat of message (e.g., social disapproval) (Miller & Hewgill, 1966) Message style (Wegner, Wenzlaff, Kerker, & Beattie, 1981) Language intensity (Hamilton, Hunter, & Burgoon, 1990). Quantitativeness of the message (Yalch & Elmore-Yalch, 1984) Inclusion of refutation (Hass & Reichig, 1977)
Channel variables	Media modality (Worchel, Andreoli, & Eason,1975) Direct experience with the object (Wu & Shaffer, 1987) Time pressure (Higgins, 1999)
Receiver variables	Initial disposition (Bock & Saine, 1975) Issue involvement (Petty & Cacioppo, 1981) Authoritarianism: blind submission to authority (Johnson & Steiner, 1967) Dogmatism: degree of rigidity one has toward unfamiliar information (DeBono & Klein, 1993) Access to attitude-relevant information in memory (Wood & Kallgren, 1988) Certainty orientation (Sorrentino, Bobocel, Gitta, & Olson, 1988) Locus of control (Ritchie & Phares, 1969) Comprehension (Ratneshwar & Chaiken, 1 991) Need for cognition: enjoyment of effortful cognitive activities (Kaufman, Stasson, & Hart, 1999) Age (Freiden, 1984)
Destination variables	Passage of time after exposure to the communication (Hovland et al., 1949) Second counter persuasive appeal following an initial message (Hilibrand, 1964)

Among the studies on source credibility and persuasion, those discussed below specifically identified the interaction effect of the message variable on the relationship between source credibility and persuasion. These studies provide the general theoretical groundwork for this study in understanding how perceived trustworthiness of information givers and the quality of their advice affect the information seeker's acceptance of the advice and attitude change.

The Elaboration Likelihood Model (ELM) provides a general framework for understanding attitudinal changes in individuals as they encounter messages and the sources of the messages (Petty & Cacioppo, 1981, 1986). In the ELM, arguments are viewed "as bits of information contained in a communication that are relevant to a person's subjective determination of the true merits of an advocated position" (p. 133). Petty and Cacioppo discussed source factors in relation to the recipient's motivation and ability to process a message. They found that when people are unmotivated and unable to process a message, they tend to rely on cues for the source factor such as expertise and attractiveness. In contrast, when they are highly motivated and able to process the

message, they are concerned with the quality of the message itself and as a result become less reliant on the source factor.

Tormala and his colleagues (2006) suggested a new framework that explains the effects of source credibility after message processing on persuasion in relation to argument quality and strength. Their study showed that when the persuasive message was strong, high credibility sources induced more persuasion; however, when the argument was weak, high credibility sources induced less persuasion than did low credibility sources. They concluded that high credibility can "backfire" in some persuasion situations.

Tormala and his colleagues (2007) also advanced Petty and Cacioppo's (1981, 1986) Elaboration Likelihood Model (ELM) research by including the timing of source information as an important factor. Their dependent variables included the level of confidence in thoughts that recipients have – thought confidence – and the number of favorable thoughts – thought favorability. According to their findings, under the high elaboration condition, when source information followed rather than preceded the message, source credibility affected thought confidence but not thought favorability, whereas when source information preceded the message it affected thought favorability but had no impact on thought confidence. They indicated that knowing a source has high credibility before reading a message affects the valence of issue-relevant thinking, thereby increasing the favorability of the thought.

In summary, the studies reviewed here show that message-related variables such as message quality and recipients' abilities to process message have a significant interaction effect on the relationship between source credibility and persuasion. Building on these previous works, this study is based on the premise that the level of persuasion or influence of information givers' advice is not only affected by the trustworthiness of the information givers, but also by the quality of advice that they provide.

2.4.2 Trust in Information

2.4.2.1 Concept of Information Credibility

Credibility refers to the believability and persuasiveness of information or information sources. Credibility has been defined as a combination of trustworthiness and expertise (Hovland, Janis, & Kelley, 1953; Fogg, 2003) that determines the believability of information (Fogg & Tseng, 1999; Tseng & Fogg, 1999). Tseng and Fogg (1999) distinguished credibility from trust by defining the former as believability of information and advice and the latter as dependability or reliability of the object, person, system, and process through which the information is delivered. By investigating the evolution of definitions, Rieh (2010), defines credibility as "people's assessment of whether information is trustworthy based on their own expertise and knowledge" (p. 1338).

With regard to information quality, Hilligoss and Rieh (2007) explicitly defined its relationship to information credibility. They viewed information quality as "a subject judgment of goodness or usefulness of information in certain information use settings" (Hilligoss & Rieh, 2007, p. 1469). However, the authors of this study posit that facets of information quality, including usefulness, goodness, accuracy, currency, and importance, are not always available for assessment (e.g., information may be useful but inaccurate). In such cases, one question people ask is whether they can believe the information or not, and thus credibility becomes a "chief aspect of information quality" (Hilligoss & Rieh, 2007, p. 1469).

Credibility is conceptualized in several ways. Fogg & Tseng (1999) identify four types of credibility. Presumed credibility arises from the perceiver's assumptions about a source of information. Reputed credibility refers to a situation where a person believes in something based on what a third party has reported. Surface credibility is assigned based on a person's simple inspection of superficial characteristics, for example, the cover of book. Finally, experienced credibility is based on a person's first-hand experience with a source over time.

2.4.2.2 Processes and Strategies of Assessing Information Credibility

More recently, credibility researchers have started looking at the entire process of credibility assessment and developing models of credibility assessment. Synthesizing the literature, Wathen and Burkell (2002) proposed a model for how users judge the credibility of online information. Their model considered the credibility assessment process to be a staged judgment involving the pass or fail evaluation of information. They then categorized the stages into three categories including evaluation of surface, message, and content credibility. They argued that website users make the decision to stay or leave a website based on the assessment of credibility at each stage. They also determined the assessment of online information to be iterative rather than linear.

Rieh (2002) developed another process model based on her analysis of academic information seeking. She studied scholars' information-searching behaviors with respect to their judgment of information quality and cognitive authority and found that they made predictive and evaluative judgments iteratively until their searches finished. Her study participants engaged in predictive and evaluative phases of judgment in which their existing knowledge and experiences primarily influenced the former while source characteristics influenced both phases.

Fogg's (2003) prominence-interpretation theory describes the process of how people access online credibility. His theory proposes that website users are engaged in two activities: the user notices something – prominence – and the user makes a judgment about what was noticed – interpretation. Prominence indicates the "likelihood that a website element will be noticed and perceived" (p. 722), which is affected by five factors including user involvement, website topic, user task, user experience, and individual differences. Interpretation is "a person's judgment about an element under examination" (p. 723), which is influenced by user assumptions, user skills or knowledge, and user context. Fogg viewed the prominence-interpretation process as a repetitive subconscious process.

Metzger (2007) proposed a dual processing model of website credibility judgment that distinguished exposure, evaluation, and judgment phases. She proposed that in the exposure phase, website users' motivation and ability to evaluate information are

important factors that determine how they approach credibility assessment. Her model predicts that users who are highly motivated to find credible information will take a more systematic approach, whereas users who are less motivated will take more heuristic and peripheral approaches.

Hilligoss and Rieh (2007) proposed “a unifying framework of credibility assessment in which credibility is characterized across a variety of media and resources with respect to diverse information seeking goals and tasks” (p. 1468). Their model identified three distinct levels of credibility judgments: construct, heuristics, and interaction. The construct level pertains to how a person constructs, conceptualizes, or defines credibility. The heuristics level involves general rules of thumb a person uses to make judgments of credibility, applicable to a variety of situations. The interaction level refers to a person’s credibility judgments based on content, peripheral source cues, and peripheral information object cues. They found that context serves as a social, relational, and dynamic framework in the process of credibility assessment. Their study also observed three stages in credibility judgment: prediction, evaluation, and follow-up judgments.

Some researchers have begun viewing credibility judgment as a social and conversational process. Lankes (2008) suggested that in the participatory information environment, credibility judgment should be approached as reliability judgment, shifting from the traditional authority approach. He found that as information becomes self-sufficient, users rely on themselves to synthesize and evaluate its credibility. This participatory information network enables users to engage in conversations about information credibility with other users, which decreases their need to rely on pre-established consensus on information authority. Similarly, Flanagin and Metzger (2007) argued that the decoupling of credibility and authority challenges “our conception of authority as being centralized, impenetrable, and singularly accurate” and changes “the model of single authority based on hierarchy to a model of multiple authorities based on networks of peers” (p. 17).

Recently, a few researchers have examined information seekers' credibility assessments in relation to user-generated content (UGC). For example, Kim (2010)

investigated the credibility perception of users of the Yahoo!Answers site and found out that the users rely more on criteria related to the message, such as the tone of writing and logic, than criteria related to the source. She identified the answers' attitude as a novel criterion for the credibility assessment. Sundin and Francke (2009) studied high school students' credibility assessments in Wikipedia and identified that the traditional credibility assessment criteria, such as the origin of source and authorship, were considered to be important criteria. Lim and Simon (2011) also examined students' credibility judgments of Wikipedia articles and identified the strategies the students used when they were uncertain about the credibility. They reported that their respondents scanned the length of an article, the list of contents, and the references, checked for a warning message, and scanned or clicked on external links. They also found out that only small percentages of respondents checked out the history of edits and/or the discussion page.

Despite the recent interest by credibility researchers in UGC, only a few studies have investigated content contributors' credibility assessment when they produce their content. In a recent article, Flanagin & Metzger (2007) investigated contributors of volunteered geographic information and found that people's motivations to contribute information to social media are closely related to information credibility because people may introduce bias or deception based on their desired outcomes. Francke and Sundin (2010) investigated how the editors on the Swedish Wikipedia site consider credibility when they edit and read Wikipedia articles. They found that editors' credibility assessments were based on authorship, verifiability, and the editing history of an article rather than merely whether the information was correct. More recently, St. Jean et al. (2011) studied a broader population of content contributors, including those who contribute to blogs, wikis, online forums, social tagging, photo-sharing, music-sharing, and video-sharing sites. They grouped credibility judgments made when gathering information for content creation or mediation activities into three levels: intuitive, heuristic, and strategy-based. Regarding the process of content contribution, they identified three distinctive ways of establishing credibility that were applied during different phases of contribution: ensuring credibility during the content creation phase;

signaling credibility during the content presentation phase; and reinforcing credibility during the post-production phase. They also discovered that the strategies used for assessing credibility during information gathering tend to be carried over to the strategies used for establishing the credibility of content.

Overall, the information credibility literature demonstrates that people are concerned about different aspects of information credibility and, accordingly, apply different assessment methods. Previous findings provide insights to this study for examining how information givers contribute to information seekers' judgments about the credibility of information and how credibility judgment, through the information mediation process, becomes a social and collaborative activity.

2.4.3 Summary: Trust Perception

The literature covered in this section shows that the concept of interpersonal trust is multifaceted, with cognitive, emotional, and behavioral components, and that trust building is an experiential process that integrates all of those elements. In comparing trust in humans and information, I found that the major components of interpersonal trust are very similar to those of information credibility. Both trust perceptions attend to the qualities of having necessary ability and knowledge, and those of being reliable and consistent. Most research to date has focused on either human trustworthiness or information credibility without studying them within an integrated conceptual and analytical framework.

Most information credibility studies have been conducted in the context of online information seeking. Comparatively, when it comes to organizational work settings, credibility issues in the use of organizational information have not been widely investigated. Part of the reason for the lack of research in this area could be that the notion of credibility has been traditionally developed by communication and consumer researchers. Nevertheless, it is critically important to expand the scope of credibility research to include issues related to judging the credibility of organizational information, because they are closely related to organizations' decision-making capacities. This study examines information mediation between colleagues as a collaborative process of judging information credibility at work.

2.5 Conceptual Framework

This section intends to establish a conceptual framework and discuss theoretical issues related to understanding the dynamics of collegial information mediation. The conceptual framework proposed for this study reflects both a synthesis of the literature included in the review and general hypotheses for this study. It is based on all of the work included in the literature review; however, three main theoretical issues constitute the building blocks of this framework: (1) information behavior in the workplace; (2) information mediation; (2) judgment of interpersonal trustworthiness, information credibility, and value of the experience. In the following, scope conditions of a proposed framework of collegial information mediation (CIM) and an overview of this framework are described, situated in the theoretical perspectives of the three strands of literature (see Figure 6 on the next page).

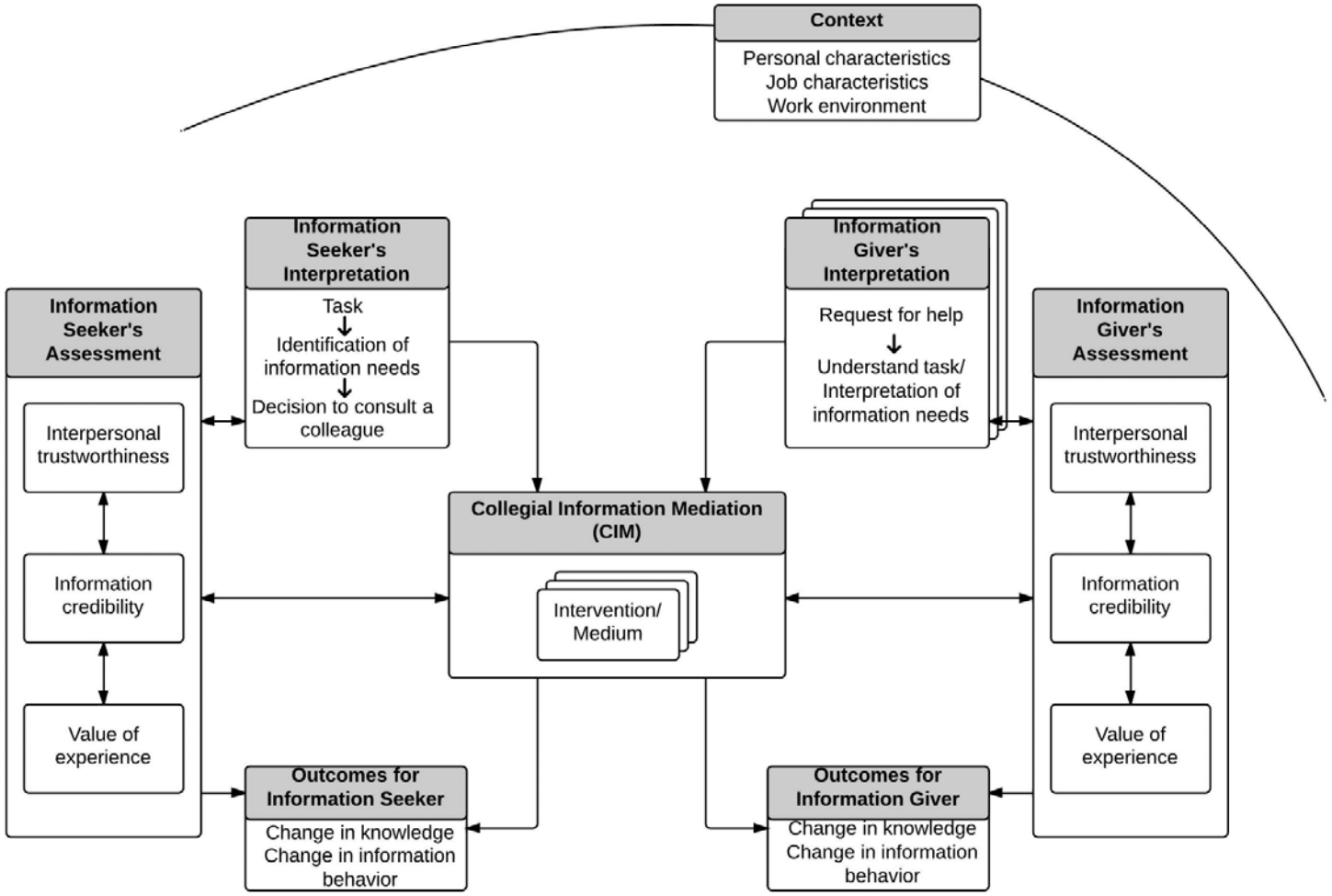


Figure 6: Collegial Information Mediation (CIM) Framework

2.5.1 Scope Conditions

Scope conditions are circumstances in which a theory is applicable (Cohen, 1989). The scope statements are important for establishing when a theory can be applied and where theories overlap or complete (Harris, 1997; Walker & Cohen, 1985). The first scope condition that bounds the predictions in the CIM framework are that it applies to interpersonal information seeking that involves human information sources. Bochner (1989) argued that the study of interpersonal processes minimally involves "at least two communicators intentionally orienting toward each other; as both subject and object; whose actions embody each other's perspectives both toward self and toward other" (p. 336). Therefore, the attention of this framework is on the interactive and reciprocal nature of information seeking processes, rather than on the unidirectional flow of information (e.g., system delivering files to the seeker).

The second scope condition is that information mediation is different from information exchange. Information exchange or sharing include a continuum of behavior that ranges from solicited, indirect, and unsolicited information-receiving and information-giving (e.g., Kramer, Callister, & Turban, 1995). However, as information mediation involves individuals who are actively interested in seeking and giving information as well as intentionally engage in the process, this CIM framework applies to situations of active pursuit of information. This scope condition is stated because the assessment of interpersonal trustworthiness, information credibility, and value of the experience may differ depending on whether the information was received or provided accidentally or purposely.

2.5.2 Overview of CIM Framework

As presented in Figure 6, the CIM framework portrays a holistic process of information mediation including interpretation, mediation, assessment, and outcome phases. It illustrates information mediation in the workplace as an interactive and iterative process between colleagues who interchangeably play the role of information seeker and information giver.

a. Context

The process is affected by contextual factors such as personal characteristics, work role, and organizational culture. In his general model of information behavior, Wilson (1996) identified those factors as intervening variables that influence information seeking behavior and mechanisms activating the behavior. Niedzwiedzka (2003) revised Wilson's model and proposed a new model of information behavior in which Wilson's intervening variables are compressed into personal, role-related, and environmental variables and viewed to constitute the context of behavior. By presenting the variables as a context, her new model emphasizes that those factors influence the process at any of its stages from identification of information needs to selection of information. Based on those theoretical propositions, the CIM framework considers personal characteristics, job characteristics, and work environment as important contextual factors that influence the process of collegial information mediation in the workplace. Personal characteristics encompass demographic factors, such as age, gender, and job tenure, and psychological factors, such as attitude and preference. Job characteristics include job requirements, limitations, and established pattern of behavior. Work environment factors include type of organization, organizational culture, and information technology.

b. Interpretation Phase

The process of information mediation is initiated by a seeker's interpretation of task, awareness of problem, and identification of information needs. Upon realizing an inability to fulfill a need by him- or herself, the seeker decides to turn to a colleague for help. By agreeing to help the seeker, the colleague enters into the information mediation process, serving the role of information giver. Through conversation, the giver develops an understanding of the task for which the seeker needs help, which may or may not be identical to that of the seeker. In this interpretation phase, the central to the CIM framework is the recognition of the dual perspectives of task characteristics. Task characteristics have been an important concern to information behavior researchers. Belkin, Brooks, and Oddy (1982) stated that information seeking is based on a worker's interpretation of a task or problem. Byström and Järvelin (1995) argued that the task complexity affects the type of information needed, the number and types of sources and channels used, and successfulness and effects of their use. While previous studies

investigated the seeker's perception of task characteristics and the seeker's behavior, there is insufficient analysis of those aspects of the information giver. The CIM framework proposes that the perceived task characteristics affect not only the seeker's but also the giver's choice of action and assessment of information.

c. Mediation Phase

Information mediation is the human intervention between information seeker and information. As noted in section 2.3.2, Kuhlthau (2004) identified five zones of intervention, the first of which involves no intervention or self-service information-seeking. The remaining four involve different levels of interventions: zone 2 involves librarians as "locator"; zone 3, as "identifier"; zone 4, as "advisor"; and zone 5 as "counselor." She viewed zone 5 as "process-oriented intervention" in which the guidance is not simply on the sources but also on the overall process, from the problem diagnosis to identification of solution, through a continuing interaction with an information seeker. She distinguished this from the zones 2 to 4 which are "source-oriented intervention." By adopting her notion of zone of intervention, the CIM framework proposes that information mediation involves different levels of intervention including *no intervention, one-time intervention,* and *multiple interventions over time*. Absence of intervention indicates the simple delivery of information without any guidance involved (e.g., sending a file by request). Intervention can occur not just once, but also multiple times over the course of the seeker's process of moving from uncertainty to certainty by consulting the same person multiple times or by consulting multiple people.

The CIM framework also proposes that information meditation can involve multiple communication media. This is based on findings from previous research on media multiplexity which has identified that people use multiple tools in combination to serve their information and knowledge needs (Haythornthwaite & Wellman, 1998; Yuan, Carboni, & Ehrlich, 2010). In particular, with the adoption of social media in the workplace, it becomes more important to study how employees combine existing media with the new generation of media to accomplish their knowledge sharing needs (Yuan et al., 2013). The CIM framework recognizes the nature and effect of media multiplexity in the context of information mediation.

d. Assessment Phase

The assessment phase consists of three sets of perceptions: interpersonal trustworthiness, information credibility, and value of an experience. Throughout the information mediation process, the trust, credibility, and value perceptions interact with each other. Assessment occurs prior to and during or after the mediation and contributes to actors' decisions and outcomes.

Among the most important constructs emerging during the past few decades of research in organizational theory, psychology, management, and sociology is interpersonal trust. Trustworthiness is the "quality of the trusted party that makes the trustor willing to be vulnerable" (Levin & Cross, 2004, p. 1478). Trust is a crucial factor that determines organizational knowledge sharing as it increases the amount of information that can be exchanged (Tsai & Ghoshal, 1998). Trust also increases the likelihood that the recipients will accept information (Hovland, Lumsdaine, & Sheffield, 1949). Main factors influencing perceived trustworthiness include competence, benevolence, and integrity (Mayer et al., 1995). Together, these concepts represent the belief that the trustee is able, willing, and open to provide information. Trust is similar to the concept of efficacy, which has been extensively studied in social psychology and communication. Efficacy refers to individuals' perceptions of their ability or the ability of a target person to successfully perform a behavior (Bandura, 1997). Similar to the distinction between competence- and integrity-based trust, target efficacy consists of target ability and target honesty (Afifi & Weiner, 2004).

Assessment of trustworthiness leads to choice and decision-making behavior. In all choice-making situations, two types of judgments are involved: predictive and evaluative judgment (Hogarth, 1987). According to Hogarth, predictive judgment refers to what people expect to happen when making a choice, while evaluative judgment denotes the value assessment through which they convey preferences. In the process of information mediation, actors' predictive assessment of trustworthiness may or may not be identical to their evaluative assessment. In sum, the CIM framework proposes that trustworthiness is assessed both prior to and during or after mediation, by both the information seeker and the giver. Prior to the mediation, the seeker assesses the trustworthiness of other colleagues to make a decision about whom to consult. As a

result, mediation occurs, and during or after the mediation, the seeker makes an evaluative judgment of the trustworthiness of the giver. The same also applies to the giver's case. Prior to the mediation, the giver assesses the trustworthiness of the seeker based on which a decision about the amount and veracity of information to be given is made. During or after mediation, the giver's perception of the seeker's trustworthiness may be altered through interaction.

Credibility has been examined across a number of fields, including information science, communication, psychology, and marketing. Credibility refers to the persuasiveness of information or information sources (Hovland, Janis, & Kelley, 1953). Credibility assessment is "a cognitive process by which information is filtered and selected" (Liu, 2004, p. 1031). Tseng and Fogg (1999) distinguished credibility from trust by defining the former as believability of information and the latter as dependability of the object, person, system, and process through which the information is delivered. Persuasion occurs when not only the information giver is perceived to be trustworthy but also the information provided is perceived to be credible. The Elaboration Likelihood Model provides a general framework for the relationship between attitudinal changes and the perception of a message and the source of the message (Petty & Cacioppo, 1981, 1986). While previous research has contributed to our understanding of the seeker's perception and assessment of information credibility, recently a few researchers have begun to investigate the information giver's perception and assessment. St. Jean et al.'s study (2011) identified that content contributors actively develop strategies to establish and signal credibility of their information. The CIM framework proposes that the credibility of information is assessed by both the seeker and the giver in the process of information mediation. Once information is given, the seeker decides whether he or she is going to use the information based on his or her assessment of its credibility. In the giver's case, the credibility assessment is made prior to the mediation as well as during or after the mediation. Prior to the mediation, the giver makes a decision about what would be the most useful and credible guidance for the seeker. Through conversation with the seeker however, the giver's assessment of the credibility may be affected by the seeker's reaction or response.

Separate from interpersonal trustworthiness and information credibility, the CIM framework proposes that the value of the overall experience of information mediation is also assessed by the actors. Saracevic and Kantor (1997) distinguished between the value of information and value of information services. In economics, the value has been classified into value-in-exchange and value-in-use, which extends the former to the intrinsic dimension of value such as satisfaction and pleasure. Saracevic and Kantor argued that value-in-use is better reflected in the notion of value of information service, which they defined as "an assessment by users of the qualities of an interaction with the service and the worth or benefits of the results of interaction, as related to the reasons for using the service" (p. 540). Based on empirical study, they developed value taxonomies that include four main categories: cognitive, affective, accomplishments, and time values. Examples of positive values they identified are ambiguity reduction, change of viewpoint, feeling of comfort, facilitation of work, and time saved as a result of consulting. Examples of negative values included an increase in uncertainty, feelings of frustration and anxiety, and time wasted as a result of consulting. In the CIM framework, the value is operationalized as the benefit of interaction and worth of overall experience of information mediation. It proposes that the value is assessed during or after mediation, not only by the seeker but also by the giver.

e. Outcome Phase

As information mediation occurs through conversation, influence is not one-sided, but reciprocal. As a result, information mediation creates outcomes not only for seekers but also for givers. In the CIM framework, the outcome is operationalized as the assessment of the consequences and impact of information mediation process, with regard to different dimensions such as change in knowledge and change in attitude and behavior. This is similar to Bandura's (1997) notion of outcome expectancy except that his focus was on the anticipated consequences of performance. Different from his study, the primary interest of this study lies in identifying *perceived* outcomes resulting from the process of information mediation.

Chapter 3

Research Design

This chapter provides the overview of this study's research design, including research questions it aims to address and approaches adopted by the researcher. It then describes the research site, the methods used for participant recruitment, data collection, and data analysis.

3.1 Overview

The present study aims to investigate the dynamic and interactive process of information mediation in the workplace. The specific research questions are:

1. What are the tasks that lead people to consult their colleagues for information in the workplace and how do they decide whom to turn to?
2. What are the practices and challenges of collegial information mediation?
3. In the process of collegial information mediation, how do people perceive the interpersonal trustworthiness, credibility of information, and value of the overall experience?
4. What are the outcomes of collegial information mediation regarding people's knowledge and subsequent information behavior?

To effectively address those questions, it is necessary to capture naturalistic, in-the-moment experiences of both information seekers and givers, as well as to collect in-depth narratives of those experiences. To increase the breadth and depth of understanding of the phenomenon of information mediation, a combination of both quantitative and qualitative approaches is also imperative. This study, therefore, used a two-phase mixed methods approach including (1) a two-week long online diary study followed by (2) semi-structured interviews.

A mixed method design incorporates the strengths of both quantitative and qualitative data collection and analysis methods (Creswell, 2007). While the diaries enabled the collection of systematic, statistically analyzable data on the context and perceptions of the information mediation situations, the interviews allowed me to obtain richer and more complex information regarding how and why an individual acts or thinks a particular way. In addition, the use of a mixed method design enabled the data from one method to be clarified or illustrated by the results from the other method (Creswell, 2007). In this study, the weight is slightly more on the semi-structured interviews than on the diaries.

The diary method, which has been widely used in psychology (Bolger, Davis, & Rafaeli, 2003), has become popular in information behavior research (e.g., Byström & Järvelin, 1995; Rieh et al., 2010). Diaries allow researchers to capture "life as it is lived" (Bolger, Davis, & Rafaeli, 2003, p. 597). Further, they enable participants to record events, thoughts, feelings, and behaviors using their own words (Poppleton, Briner, & Kiefer, 2008). The use of the diary method enabled this study to capture a variety of information mediation episodes and to reveal how they occurred in situ. It also helped participants recall the memories of those details during the interviews.

Once the diaries were collected, I conducted semi-structured interviews to obtain more extensive narratives addressing my research questions. The strength of interviews include their flexibility in asking questions, flexibility in ordering questions, ability to obtain spontaneous answers, and ability to capture nonverbal cues (Bailey, 1994). In order to keep the interview flexible enough for further inquiry, a semi-structured interview format was chosen, which provided participants with the framework for a targeted discussion not limited to fixed specific items. In work environments in particular, semi-structured interviews have proven to be an effective method for studying workplace activities as input for system design (Beyer & Heltzbaltt, 1998; Paepcke, 1996).

As a part of the semi-structured interview, diagrammatic representations of participants' interpersonal relationships were collected using the bull's eye method (Kahn & Antonucci, 1980). The bull's eye measure consists of concentric circles surrounding the core self, where each circle represents an increased level of perceived closeness to the

core self. Participants are instructed to position the members in their social network around the bull's eye. The distances between the core self and the position at which network members are placed, as well as those between the members, are measured and interpreted as the level of perceived closeness. According to Aron, Aron, and Smollan (1992), the bull's eye measure enables participants to reveal information that is hard to articulate and to disclose their emotional connections to others. The use of this method benefited the study in two ways: (1) in completing the diagrammatic measures, participants were reminded of the content in the diaries they had submitted for at least a week prior to the interview; (2) it enabled the collection of additional data on relationships between participants and the individuals they included in the diaries.

An overview of the data collection instruments involved in this study is shown in Table 8.

Table 8: Overview of Data Collection Instruments

Data Collection Method	Approx. Time Spent	Description	Appendix
Background questionnaire	5 minutes	Collected basic demographic information including gender, age, job tenure, department, and work responsibilities.	Appendix C
Diaries	7 minutes (per diary) × total number of the diaries submitted	Participants were asked to complete information-seeking diaries for one week and information-giving diaries for the other week. The diaries consisted of open-ended, Likert-type, and multiple-choice questions to collect information about the context and practices of information mediation and participants' ratings of the credibility of information and value of the overall experience.	Appendix D & E
During the second week of the diary study, participants were recruited and scheduled for interviews			
Bull's eye method	5 minutes	Before starting a semi-structured interview, participants were asked to indicate their perceived closeness to all the individuals they included in both sets of the diaries.	Appendix H
Semi-structured interviews	90 minutes	Up to four diaries were selected to conduct interviews. Participants were asked open-ended questions on the detailed contexts and practices of information mediation, judgment of information credibility, judgment of the value of the overall experience, judgment of interpersonal trust, and influences and outcomes of the dyadic interaction.	Appendix I &J

3.2 Participants

3.2.1 Research Site

To appropriately examine the dynamics in information mediation, this study required a setting where employees frequently rely on one another for information to accomplish daily tasks. The site chosen for this study was the Research & Development (R&D) department of a large Midwestern manufacturing company. The company has annual sales of more than $12 billion and is involved in developing, manufacturing, and selling a range of food products. Its R&D department is structured into several divisions that are responsible for product development, quality control, statistics, packaging, and sensory evaluation, and consists of 500 employees featuring a population of engineers, scientists, and technicians working on a variety of R&D projects. This population is well suited for the study, as previous studies on information behavior have found that scientists and engineers tend to be highly motivated and heavy consumers of information (Fidel & Green, 2004; Hertzum & Pejtersen, 2000). Further, the department was chosen as a research site because, according to an initial interview with a divisional director, most of the company's projects are performed across multiple divisions, bringing together employees with diverse backgrounds and expertise. As their daily tasks are collaborative and interdependent in nature, the communication of information and knowledge between individual employees is essential and is encouraged organization-wide. The department has been investing in improving its strategies and technologies to better facilitate the sharing of tacit as well as codified knowledge and, therefore, actively supported this research.

3.2.2 Participant Recruitment

Participant recruitment took place twice as this study involves two phases of data collection: diary study and interviews. The recruitment and data collection procedure was as follows:

(1) On January 23 of 2012, an invitation to the diary study with information about the follow-up interview study (Appendix A) was sent out to the entire R&D department via corporate email.

(2) 86 individuals agreed to participate in the diary study and were sent an informed consent form for the diary study (Appendix B) and background questionnaire (Appendix C).

(3) Out of 86, 75 individuals submitted at least one information-seeking (Appendix D) or information-giving diary (Appendix E).

(4) At the beginning of the second week of the diary study (February 20), an invitation to participate in the interview study (Appendix F) was sent out via corporate email to 65 diary participants who (1) agreed to be contacted for a follow-up interview and (2) submitted at least two diaries.

(5) 45 individuals who agreed to participate in the interview study submitted their preferred interview dates.

(6) During the interview, an information consent from (Appendix G) was obtained before administering the bull's eye activity (Appendix H) and interview (Appendix I and J).

As indicated on the informed consent form, the diary participants were offered a $7.50 company store coupon if they submitted more than four diaries in total, at least two information-seeking and two information-giving diaries. Out of 75, 54 diary participants met the criteria and received the coupon via internal company mail. For participating in the interviews, they were offered a $14 company store coupon upon the completion of the interview.

All the interviews were conducted at a meeting room in the company. Located next to company's library, the room was convenient to access from participants' offices, but, at the same time, was separated from the office area so that no one could overhear the conversation.

3.3 Data Collection Methods

This study includes two data collection phases: (1) online diary study and (2) semi-structured interviews. In the first phase, the background questionnaire was administered before the diaries were collected with 75 participants for two weeks from February 6 to February 17. Both the background questionnaire and the diaries were

developed using Qualtrics survey software (http://www.qualtrics.com/). In the second phase, the interviews were conducted with 45 diary participants from February 21 to March 9. A bull's eye method was administered at the beginning of each interview.

3.3.1 Phase 1 – Online Diary Study

This phase of the study began with administration of the informed consent form (Appendix B) and background questionnaire (Appendix C). The informed consent form asked participants to consent to participate in the diary study and to be re-contacted for the follow-up interview study. It also notified participants that they would be offered a $7.50 company store coupon if they submitted at least two information-seeking and two information-giving diaries. Following the informed consent form, the background questionnaire was administered to collect basic personal information such as gender, age, job tenure in the company, department, and specific work responsibilities. Once participants submitted the informed consent form and background questionnaire, they were entered into the system and received e-mails with links to the online diaries for the next two weeks.

The online diary study was designed to capture events surrounding the information mediation, from the perspectives of both information seekers and information givers. With this aim, two sets of diaries were developed: (1) information-seeking diaries for recording activities and perceptions during which participants get guidance in seeking or using work-related information from their colleagues (Appendix D); and (2) information-giving diaries for recording activities and perceptions during which participants give guidance to their colleagues in seeking or using work-related information (Appendix E).

The diary method implemented in this study has aspects of both experience-sampling and event-sampling methods. The experience-sampling method involves signal-contingent recording of in situ thoughts and behaviors (Csikszentmihalyi & LeFevre, 1989). The event-sampling method involves reporting of an event (e.g., a social interaction lasting 10 minutes or more) followed by questions about the event to be immediately answered (Wheeler & Reis, 1991). In this study, participants were signaled twice daily to report information mediation events that occurred during the morning and

afternoon periods. This approach enabled the capturing of real-time data on the specific situations with which this study is concerned.

86 individuals who agreed to participate in the study were signaled via corporate email twice a day, at noon and 4PM, for two weeks, excluding weekends. Each participant was asked to record information-seeking diaries for one week and information-giving diaries for the other week. In order to control for any order effect, about half of the participants (*N*=42) started with information-seeking diaries, while the rest started with information-giving diaries (*N*=44). The timeline for the study is shown in Table 9.

Table 9: Timeline for Online Diary Study

	Mon		Tue		Wed		Thurs		Fri		Mon		Tue		Wed		Thurs		Fri	
	12 PM	4 PM	12 PM	4 PM	12 PM	4 PM	12 PM	4 PM	12 PM	4 PM	12 PM	4 PM	12 PM	4 PM	12 PM	4 PM	12 PM	4 PM	12 PM	4 PM
Group1	Information-seeking diaries										Information-giving diaries									
Group2	Information-giving diaries										Information-seeking diaries									

Both sets of diaries consisted of open-ended, Likert-type, and multiple-choice questions. The diaries first asked participants to think about situations during the past four hours in which they turned to their colleagues (or their colleagues turned to them) for work-related information or advice. The instruction provided examples of information mediation including, but not limited to, the situations in which they received (or provided) guidance in (1) thinking through a problem, (2) understanding previous projects, (3) deciding among different options, and (4) finding references to other sources of information. Participants were then asked to choose the situation that took the most time because it was anticipated that the longer the interaction, the more likely various interventions in each other's information seeking and use occur.

In the information-seeking diaries, participants were then asked to report characteristics of the task on which they needed help, urgency and complexity of the task, names of up to five people they turned to, method(s) they used to find and communicate with each person, time taken for the conversation with each person, reason(s) they chose each person, characteristics of the information received, action taken as a consequence of

receiving the information, credibility of the information received, and value of the information mediation. In the information-giving diaries, they were asked to report characteristics of the task on which they provided help, complexity of the task, name of the person they assisted, method used to communicate with the person, time taken for the conversation with the person, reason(s) why they were chosen, extent of the information they provided, credibility of the information they provided, and the value of the information mediation. In both diaries, task complexity was measured by asking participants to indicate how complicated they felt the task on which they received or provided information was on a scale of 1-7, with 1 being the least and 7 being the most complicated. Previously, researchers have studied task complexity in relation to uncertainty about or a priori determinability of task outcome and information requirement (Byström & Järvelin, 1995). Task urgency was measured on the 1-7 scale as well, but only in the information-seeking diaries. This is because the timeframe or priority of a task is known by the person who needs guidance but not by the one who provides guidance.

Table 10 shows the measures of information credibility and the value of information mediation that were used in the diary surveys.

Table 10: Measures of the Credibility of Information and Value of Information Mediation

Information-seeking diaries			Information-giving diaries		
Measures		Description	Measures		Description
Credibility of information received	Trustworthy	The extent to which they trusted the information	Credibility of information provided	Expert	Self-rating of their expertise in the topic on which they provided help
	Reliable	The extent to which they relied on the information		Trustworthy	The extent to which they trusted the information they provided
	Valuable	The extent to which they found the information valuable		Confident	The extent to which they felt confident that their information would be helpful
	Agreeable	The extent to which they agreed with the information		Satisfied (with information quality)	The extent to which they felt satisfied with the information they provided
				Accepted	The extent to which they think their information was accepted
Value of information mediation	Time well-spent	Level of the feeling of time well-spent after consulting the person	Value of information mediation	Time well-spent	Level of the feeling of time well-spent after the conversation

Certain	Level of the feeling of certain after consulting the person
Satisfied (with experience)	Level of the feeling of satisfied after consulting the person
Problem-solved	Level of the feeling of problem-solved after consulting the person
Learned new things	Level of the feeling of learned something new after consulting the person
Certain about what I knew	Level of the feeling of certain about what they knew after the conversation
Learned new things	Level of the feeling of learned something new after the conversation
Opinion changed	Level of the feeling of opinion changed after the conversation

In information-seeking diaries, four measures of information credibility were developed based on previous credibility literature (Hilligoss & Rieh, 2007; Rieh et al., 2010) and five measures of the value of information mediation were developed based on Saracevic and Kantor's (1997) taxonomies of values resulting from information services. Those taxonomies were developed in the context of library services, but they provide this study with fundamental insights that serve to distinguish between cognitive, affective, accomplishment, and time values. All measures were rated on a 1-7 scale.

3.3.2 Phase 2 – Semi-Structured Interviews

Once the diaries from the entire ten days were collected, semi-structured interviews were conducted with 45 diary study participants. For the interviews, I prepared two hard copies of each of the diaries submitted by each participant and gave one to the participant as a reference. I then briefly reviewed the diaries together with the participant to refresh his or her memory about each diary episode.

Before starting the interview, the bull's eye method (Kahn & Antonucci, 1980) was conducted to collect the diagrammatic representation of participants' relationship with each individual they included in both the information-seeking and information-giving diaries. The method was useful for getting participants warmed up for the interview as well as for collecting additional interpersonal relationship data. After listing the initials of the individuals they included in the diaries, I asked participants to place round stickers (18 mm in diameter) representing the initials onto three concentric circles (Appendix H). Inside the concentric circles was a smaller circle in the middle with the word *You* to represent the participant's core self. Participants were instructed that each of

the three circles represented a level of closeness, where the inner circle was for individuals to whom participants felt most close, the middle circle was for individuals that they felt not as close to but who were still important to them, and the outer circle was for individuals who were close enough and important enough to be on the participants' list. Participants were then instructed to position the initialed stickers according to the description of the three circles in a manner that was meaningful to them. The distance from the edge of each sticker to the core self was measured in millimeters – the smaller the distance from the core self, the closer the relationship was interpreted to be.

For each interview, a maximum of four diaries were selected based on the reported time taken for the conversation and word count of the description of the information received or provided in the diaries. It was anticipated that the longer the conversation and the more detailed the description, the easier it would be to recall the situation. The interview began with asking participants to recount the selected episodes and provide additional details about the context that prompted the information-seeking or information-giving situations.

For the interviews on information-seeking episodes, participants were then asked questions about each person from whom they received information. The questions were designed to elicit information about how and why they chose the person, how they are related to the person in the organizational hierarchy, how they perceived the trustworthiness of the person, and how they were influenced by the information given. The remainder of the interview asked participants to further explain the characteristics of the information given, activities and communication media involved in the information-seeking process, judgment of the credibility of the information given, and judgment of the value of the overall information-seeking experience. After finishing the interviews on all the selected information-seeking episodes, participants were asked to describe any difficulties they faced when receiving information in general.

For the interviews on information-giving episodes, participants were asked questions about each person to whom they provided information. Participants were asked to discuss how they understood that person's information needs, how they were related to the person in organizational hierarchy, how the person responded to the information they provided, and how they were influenced by the feedback from the person. The remainder

of the interview asked participants to further describe the characteristics of the information they provided, activities and communication media involved in the information-giving process, judgment of the credibility of the information they provided, and judgment of the value of the overall information-giving experience. After finishing the interviews on all the selected information-giving episodes, participants were asked to describe any difficulties they faced when providing information in general.

The interview session was concluded with a closing question that asked participants to describe whether their actions and expectations were similar or different depending on whether they were seeking or giving information.

3.3.3 Data Collected

Data gathered during the first phase of the study include the results from background questionnaire and diaries from 75 participants. After removing incomplete and inappropriate records, the data set consisted of a total of 450 diaries, 206 information-seeking and 244 information-giving diaries. About half of the participants started with information-seeking diaries (*N*=35), while the rest started with information-giving diaries (*N*=40). On average, each participant submitted a total of 6 diaries (*SD*=3.0), 2.8 information-seeking (*SD*=1.8) and 3.3 information-giving (*SD*=2.1) diaries.

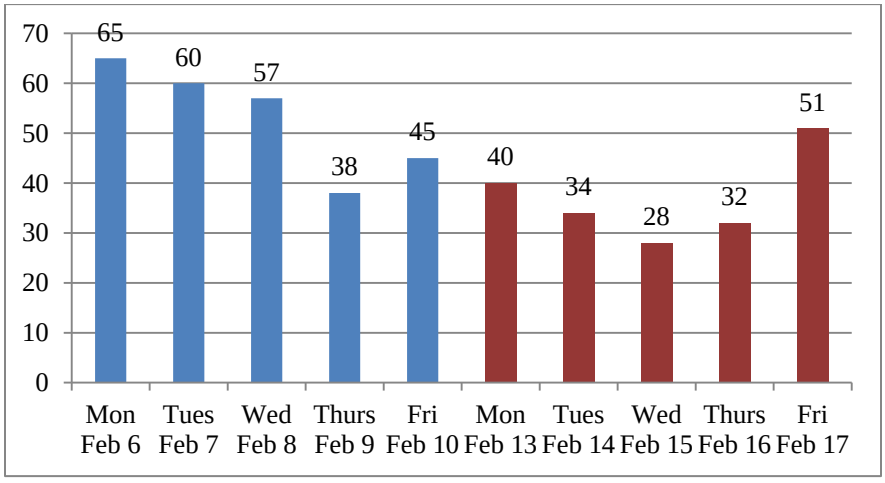


Figure 7: Number of Diaries Submitted by Date

Figure 7 shows the number of diaries that participants submitted by date. 60% (*N*=265) of the total diaries were submitted during the first week, while 40% (*N*= 185)

were submitted in the second week. The largest number of diaries was collected on the first three days and the last day.

The follow-up interviews with 45 participants lasted an average of 100 minutes, ranging between 45 and 217 minutes. One of the participants refused to be recorded on audio tape after she had given consent, so detailed notes were taken during the interview and written up immediately afterwards. The interviews resulted in 73 hours of taped interviews and over 1300 pages of transcripts. Another type of data gathered from this phase of the study included the results from the bull's eye method completed by all 45 participants.

3.4 Data Analysis Methods

All data from background questionnaires and diaries as well as the closeness measures from the bull's eye method were entered into Excel and transferred to a Statistical Package for Social Science (SPSS) program for quantitative analysis. Statistical analyses used in this study include descriptive, correlation, and regression analyses. For the regression analysis on the diary data, a linear mixed model (LMM) was used because the data has a nested structured. As the diaries were collected multiple times from the same individuals, the responses are nested within individual participants in both sets of diaries. In information-seeking diaries, the responses were not only nested within the participants but also within the tasks because participants were asked to report up to five people they turned to for a single task and answered the same set of questions for each person. To account for the possible dependencies of the responses, I used LMM with individual participants as a random effect for the information-giving diaries and with individual participants and tasks as a random effect for the information-seeking diaries.

Qualitative data in this study include the answers to the open-ended questions in the diaries and transcripts of audio recordings of the interviews. Content analysis was performed on the qualitative data using NVivo 10 qualitative coding software. Gbrich (2007) described content analysis as a "systematic coding and categorizing approach for exploring large amounts of textual information in order to ascertain the trends and patterns of words used, their frequency, their relationships and the structures and discourses of communication" (p.112).

The analysis of answers to the two open-ended questions in the diaries resulted in a coding scheme that consists of five main- and ten sub-types of tasks that lead to collegial information mediation and three main- and ten sub-types of the information mediation as shown in Table 11 and 12. Those task and information mediation types were then entered as categorical variables in the statistical analyses.

Table 11: Coding Categories for Task Types

Task type		
Type	**Subtypes**	**Examples**
Increase descriptive knowledge	Gain technical know-what	Understand the functionality of an ingredient
	Gain non-technical know-what	Enhance knowledge on the business part of the company
Increase procedural knowledge	Gain technical know-how	Develop a matrix of tests for a project
	Gain non-technical know-how	Understand how to build trust within a team
Assess value	Evaluate	Determine whether a presentation covered the right information
	Verify	Double check a test procedure the company uses
Determine actions	Decide	Select which sampling plan is best
	Solve	Encounter a problem with a piece of equipment during a test
	Plan	Set goals around a future team-building event
Obtain data		Need a statistical summary of data for a project

Table 12: Coding Categories for Information Mediation Types

Information mediation type		
Type	**Subtypes**	**Examples**
Knowledge addition	Aggregation	Collect raw data and summarize it
	Background knowledge	Go through the background of a previous testing
	Experience sharing	Share one's approach to a similar problem reflecting on past situations
	Explanation/demonstration	Walk through an example of building a new report
Value addition	Idea/opinion	Review and provide comments on a test analysis
	Suggestion	Provide a direction based on original scope of work
	Validation	Confirm the agenda for an upcoming meeting
	Solution	Identify options to prevent incident from occurring
Alternatives suggestion	Referral to documents/files	Supply documentation of a team’s future plan
	Referral to other people	Provide the name of a person and coach on how to bring up an issue

Analysis of interview transcripts was performed following the steps outlined by Creswell (2009): (1) preliminary exploration of the data by reading through transcripts and writing memos; (2) coding the data by segmenting and labeling the text; (3) using codes to develop themes by aggregating similar codes together; (4) connecting and

interrelating themes; and (5) constructing a narrative. A codebook was developed both deductively from the interview protocols and inductively as themes emerged from the data. The codebook was revised as data analysis proceeded and transcripts were re-coded accordingly. As shown in Table 13, the codebook has two sections that are almost identical to each other, one that is designed for information-seeking episodes and the other for information-giving episodes. It includes 18 codes and 35 subcodes that are organized under nine topics, including (1) task characteristics, (2) perceptions of information seeker or giver, (3) media used, (4) information mediation characteristics, (5) information credibility, (6) value of information mediation, (7) interpersonal trust, (8) outcomes of information mediation, and (9) challenges of information mediation.

Table 13: Codebook Used for the Analysis of Interview Data

	Code	Subcode	Sample Quotes
Information-seeking Episodes	Task Characteristics	Task type	What I needed to do was...I had laid out a plan and really wanted to discuss with her my plan and get again critique and feedback so I could improve the plan based on other people's review of it to try to see if there were things I had missed. (P42)
		Task urgency	Not urgent urgent in the sense that it had to be done immediately but before the guys left, we needed to know that these problems had been addressed. (P40)
		Task complexity	The reason it would be really considered a complex issue is because of the amount of politics that are involved in this one. (P03)
	Perception of Information Giver	Relation to information giver	He leads projects and I essentially work with him on a team. He's probably one step up from me. (P02)
		Reason for choosing information giver	We're peers. So I was very comfortable going to her. I had talked to her in the past about different things. (P15)
		Other characteristics of information giver	She's an extrovert like me so we just naturally from day one, we had a good conversation. (P22)
	Media Used	Media used for finding information giver	Usually I already know the person off the top of my head and so I don't have to look in the directory. (P27)
		Communication media	I love email, I really do because it provides a record and there are a lot of good things about it. But I do find that it's also not necessarily as high a priority for other people. (P05)
	Information Mediation Characteristics	Information mediation type	Really helped me be specific. So how to be specific, how to create a strategy that is succinct and short and is related to overall business strategy. (P15)
		Multiple interventions	[The first person I consulted] knew the people involved, understood the situation, whereas [the second person] didn't know the people involved but she would know how to deal with the situation. (P15)
	Information Credibility	Assessment of information credibility	I trusted what they were saying in terms of the other ramifications. (P18)
		Strategies to confirm information credibility	Especially if he's telling me the same thing everyone else told me. If he told me something that was way off, then I'd

			be like, “Ah,” and maybe I wouldn’t have listened to anything. (P27)
	Value of information mediation		Yes, [the time was well-spent, but didn't learn something completely new]. He gave me some suggestions on the samples to include. But he was supportive of what I had. (P24)
	Interpersonal Trust	Assessment of trustworthiness of information giver	Definitely [trusted the person]. I’ve worked with her on a lot of projects and she is always very good about being on top of things and getting back to you about things. (P18)
		Changes in the perception of information giver	It became even more positive in that I know I can trust her and go to her when I have a question about how to coordinate these type of efforts maybe. (P19)
	Outcomes of information mediation		We have decided on which profile, which prototype we want, the whole team has agreed to it. (P14)
	Challenges of information mediation		For me, the most difficult part is you have to in a lot of ways admit that, “I can’t do this by myself." (P19)
Information-giving Episodes	Task Characteristics	Task type	She had asked someone to do something for her, a contractor, and that’s kind of what they’re there for and then later on that person came back to her and said, “No, I have other things I have to do.” So she was wondering how to handle that situation. (P15)
		Task urgency	He’s still the kind of guy that wants to understand it but since he was under the gun to produce stuff [for a customer] and having the tool and understanding it later was an okay approach for him. (P17)
		Task complexity	I guess it’s just something I have done before and it’s not really complicated. (P02)
		Interpretation of task	They just merely wanted to know, “Can we? And if we can, what’s the level we need?” But I had to tell them...“But I don’t think we should.” But that’s not my call; that would be other senior people involved in the “should” question. (P17)
		Familiarity with task	The actual guideline I am relatively familiar with just because we look at it quite a bit. But the actual act of harmonizing an allergen that I’m not 100% familiar with at all. (P02)
	Perception of Information Seeker	Relation to information seeker	We had never met before and no, I don’t tend to be a member of projects. I tend to consult on them. (P32)
		Information seeker's understanding of task	Information seeker's understanding of task He wasn’t familiar with what was in our data and he wasn’t familiar with the types of questions or what the questions really meant but he’s a super user on the system. (P17)
		Other characteristics of information seeker	He’s new to this company and he’s less than a year so he was still waiting for something else to fall into his lap. (P14)
	Media Used	Communication media	I sent him the spreadsheet via email prior to the meeting so he could take a look at it. And then I went and talked to him about it face-to-face. (P09)
	Information Mediation Characteristics	Information mediation type	I helped support the decisions of what people were going to do with each supplier but what was needed was we were going to need to understand "Are we free to talk with them about things?" (P31)
		Multiple interventions	This was the second time. The first time she had ever come to me was before even these questionnaires started...And the first time was really completely different. I didn’t even

		realize she had been assigned to do this and she was asking like one off questions rather than the whole project, "Here is what I have to do." (P19)
Information Credibility	Assessment of information credibility	Very confident [with my advice] because we run across this all the time. (P06)
	Strategy to establish credibility	I did give her options and I'm not saying, "Oh, this is the only thing you can do. If you want to move forward with it, you can. But here is what you need to do to do that." (P18)
Value of information mediation		I felt as though it was a good use of time in that she was at a point in her career where she was hoping to these kinds of suggestions. (P21)
Interpersonal Trust	Assessment of trustworthiness of oneself	I believe [that the person trusted me]. Like I said, we've worked together before and she is aware of my background so from that standpoint, I would think so. (P39)
	Assessment of trustworthiness of information seeker	If I trust the person, I may be more direct in my advice. If I don't trust the person, I may qualify the advice. (P26)
Outcomes of information mediation		I got a little better perspective on the thinking process of a toxicologist, which is different than the way I think. (P31)
Challenges of information mediation		It's when they're doing something wrong or they're having a behavior issue and you have to actually talk to them about they need to improve. (P09)

Chapter 4

Results

This chapter consists of six main sections. The first section provides an overview of the individuals who participated in this study. In the second section through the fifth sections, findings are presented for each of the research questions of this study: (1) What are the tasks that lead people to consult their colleagues for information in the workplace and how do they decide whom to turn to? (2) What are the practices and challenges of collegial information mediation? (3) In the process of collegial information mediation, how do people perceive the interpersonal trustworthiness, credibility of information, and value of the overall process? and (4) What are the outcomes of collegial information mediation regarding people's knowledge and subsequent information behavior? The final section provides a summary of findings discussed in this chapter.

4.1 Characteristics of Participants

To examine the dynamics of information mediation between colleagues, this study recruited participants from among the employees of an R&D department of a large manufacturing company. In the knowledge management literature, research has been conducted widely in R&D departments, because those are where innovation takes place through the communication and novel combination of knowledge. The study included two phases, diary collection and interviews, for which 75 and 45 participants were recruited, respectively. In both phases, participants were well-distributed with regard to gender, age, job tenure, and job roles.

Table 14 shows the demographic information on the diary participants. The data was collected using the background questionnaire. Among 75 participants, 37 were male and 38 were female. They were spread out across age groups, with higher concentrations (79%) in the middle to older age groupings (35-44, 45-54, and 55-64). The mean duration of job tenure at the company was 10.9 years (*SD*=9.3). Their job roles were aggregated to

seven main categories: scientists (51%) including product developers, sensory scientists, and chemists; technicians (11%); managers (9%); project managers (9%); regulatory/legal specialists (8%); administrative/clerical workers (7%); and engineers (5%).

Table 14: Demographics of Diary Participants

Demographics	Category	Frequency (*N*=75)	%
Age	18-24	3	4
	25-34	12	16
	35-44	19	25
	45-54	23	31
	55-64	17	23
	65+	1	1
Gender	Female	38	51
	Male	37	49
Job role	Scientist	38	51
	Technician	8	11
	Manager	7	9
	Project Manager	7	9
	Regulatory/legal	6	8
	Administrative	5	7
	Engineer	4	5
Job tenure	<1year	6	8
	1~5 years	15	20
	5~10 years	20	27
	10~20 years	22	29
	20~30 years	8	11
	>30 years	4	5

Of those 75 diary participants, 45 individuals participated in the interview study. Table 15 shows the demographic information about each interview participant, including gender, age, job role, and job tenure in the company. Among 45 interview participants, 22 were male and 23 were female. The mean duration of job tenure at the company was 11.5 years (*SD*=9.5). They were distributed across age groups, with more than half of the participants (*N*=28; 62%) between the ages of 45 and 64. Job roles were also distributed across all seven categories, with nearly half of the participants (*N*=21; 47%) being scientists.

Table 15: Interview Participants' Demographics

#	Gender	Age	Job Role	Job Tenure (years)
P01	F	55-64	Administrative	29
P02	F	25-34	Scientist	2
P03	M	35-44	Administrative	1
P04	F	25-34	Scientist	3
P05	F	55-64	Project Manager	10
P06	F	25-34	Project Manager	6
P07	M	55-64	Scientist	28
P08	F	25-34	Technician	1.2
P09	F	55-64	Project Manager	18.5
P10	M	55-64	Manager	36
P11	F	25-34	Scientist	4
P12	M	18-24	Technician	1
P13	M	55-64	Engineer	14
P14	F	45-54	Scientist	8
P15	F	35-44	Manager	14.5
P16	F	45-54	Manager	32
P17	M	45-54	Regulatory/legal	12
P18	F	45-54	Project Manager	26.5
P19	F	35-44	Scientist	1.5
P20	F	55-64	Administrative	9
P21	M	55-64	Scientist	13
P22	F	35-44	Scientist	2
P23	M	25-34	Technician	0.3
P24	F	45-54	Scientist	9
P25	M	45-54	Scientist	4.5
P26	M	35-44	Regulatory/legal	2.5
P27	M	25-34	Scientist	3
P28	F	25-34	Engineer	7
P29	M	35-44	Scientist	6.5
P30	F	55-64	Scientist	27
P31	M	55-64	Scientist	17
P32	M	45-54	Scientist	11
P33	F	45-54	Administrative	18
P34	M	45-54	Manager	26
P35	M	45-54	Scientist	5
P36	F	55-64	Scientist	14
P37	M	55-64	Technician	24.8
P38	M	45-54	Project Manager	11
P39	F	35-44	Technician	5
P40	M	55-64	Engineer	11

P41	M	45-54	Scientist	14
P42	F	55-64	Scientist	11
P43	M	65+	Scientist	5
P44	M	45-54	Scientist	2
P45	F	45-54	Engineer	10

4.2 Tasks and Decisions Leading to Collegial Information Mediation

In this section, the results regarding the first research question of this study will be presented: What are the tasks that lead people to consult their colleagues for information in the workplace and how do they decide whom to consult? People enter into the process of collegial information mediation when they recognize that a task at hand requires seeking information through colleagues. Once they recognize the need to consult someone for information, they make decisions on whom to consult. The goal of this section is to understand the characteristics of tasks and decisions that lead to collegial information mediation.

4.2.1 Tasks Leading to Collegial Information Mediation

People's need to consult colleagues for information is inspired by their tasks at hand. To identify the types of tasks that lead to collegial information mediation, I analyzed the diary responses to the open-ended questions regarding the specific tasks regarding which participants needed or provided information.

Tasks can be divided into two layers – work tasks and information tasks that are embedded within a work task (Byström & Hansen, 2002; Vakkari, 2003; Freund, Toms, & Clarke, 2005). Work tasks are "separable parts of a person's duties towards his/her employer" and are usually defined by the work organization (Byström & Hansen, 2002, p.243). Information tasks refer to the cognitive activities that occur as individuals interact with information (Allen, 1996). As the purpose of this study is to identify information seeking and use activities that lead people to turn to their colleagues, the coding schemes for the diary data were developed with a focus on the information tasks (See Table 11 in 3.4 Data Analysis Methods).

4.2.1.1 Types of Tasks

To understand the context of collegial information mediation, I classified the tasks for which participants needed or provided information based on characteristics that seemed to appear consistently across a number of diary episodes.

It was found that participants turned to their colleagues when they needed help for the following types of tasks: (1) *increase descriptive knowledge* or know-what; (2) *increase procedural knowledge* or know-how; (3) *assess value*; (4) *determine actions*; and (5) *obtain data*. The first four task types were further categorized into subtypes. Descriptive and procedural knowledge were further categorized into technical and non-technical knowledge. Technical knowledge includes the knowledge of mechanical or scientific issues, while non-technical knowledge involves that of business, cultural, or managerial issues. Assessing value was classified into evaluating and verifying, while determining actions was categorized into deciding, solving, and planning. Table 16 shows the categories and prevalence of the different types of tasks along with examples. Out of 450 statements on tasks from both information–seeking and –giving diaries, 12 (3%) were excluded from coding due to insufficient detail.

Table 16: Task Types Reported in Information-Seeking and Information-Giving Diaries

Task type		Info Seeking (*N*=201)		Info Giving (*N*=237)		Example
		N	**%**	***N***	**%**	
Increase descriptive knowledge	Gain technical know-what	64	32	88	37	Understand the functionality of an ingredient
	Gain non-technical know-what	18	9	7	3	Enhance knowledge on the business part of the company
Increase procedural knowledge	Gain technical know-how	27	13	46	19	Develop a matrix of tests for a project
	Gain non-technical know-how	12	6	10	4	Understand how to build trust within a team
Assess value	Evaluate	8	4	6	3	Determine whether a presentation covered the right information
	Verify	8	4	5	2	Double check a test procedure the company uses
Determine actions	Decide	15	8	24	10	Select which sampling plan is best
	Solve	29	14	21	9	Encounter a problem with a piece of equipment during a test
	Plan	14	7	20	8	Set goals around a future team-building event
Obtain data		6	3	10	4	Request a statistical summary of data for a project

The results show that participants turned to their colleagues not only for obtaining knowledge but also for value judgments and decision-making. In both information-seeking and information-giving situations, the most frequent task subtype was *gain technical know-what* (32% and 37% respectively). However, when seeking information, participants reported that *solve* (14%) was the next most frequent task. When giving information, *decide* (10%) and *solve* (9%) were the next most frequent tasks following *gain technical know-how* (19%).

4.2.1.2 Complexity of Tasks

Task complexity refers to the degree of a priori determinability regarding the inputs to the task, procedure of the task, and the outcome of the task (Byström & Järverlin, 1995; Van de Ven & Ferry, 1980). It has been studied as an important factor that affects the sources, channels, and types of information sought (Byström & Järverlin, 1995). In this study, perceived task complexity was measured to identify its effect on the number of people consulted and communication media used, as well as its effect on perceived credibility of information and value of the overall information mediation process.

In both information-seeking and information-giving diaries, participants were asked to rate the complexity of the task for which they needed or provided information. This was rated on a 7-point Likert scale with 1 being "not at all complicated" and 7 being "very complicated." Table 17 shows the participants' ratings of the perceived complexity of each task type.

Table 17: Ratings of Task Complexity Reported in Information-Seeking and Information-Giving Diaries

Task Type		Task Complexity			
		Information Seeking		Information Giving	
		Mean	SD	Mean	SD
Increase descriptive knowledge	Gain technical know-what	3.8	1.6	4.5	1.7
	Gain non-technical know-what	3.3	1.5	4.0	1.2
Increase procedural knowledge	Gain technical know-how	4.0	1.4	4.1	1.6
	Gain non-technical know-how	3.6	2.0	4.2	1.4
Assess value	Evaluate	2.9	1.1	5.2	1.3
	Verify	4.0	2.1	3.8	1.9

Determine actions	Decide	3.9	1.3	3.6	1.7
	Solve	4.4	1.5	4.9	1.7
	Plan	3.8	1.5	4.1	1.4
Obtain data		3.5	1.9	3.9	1.4
Total		3.8	1.6	4.3	1.6

Overall, participants perceived the tasks as more complicated when they provided information (*M*=4.3, *SD*=1.6) than when they sought information (*M*=3.8, *SD*=1.6). When seeking information, they found *solve* (*M*=4.4, *SD*=1.5) to be the most complicated task subtype, while finding *evaluate* (*M*=2.9, *SD*=1.1) to be the least complicated. When providing information, however, they perceived *evaluate* (*M*=5.2, *SD*=1.3) to be the most complicated task and *decide* (*M*=3.6, *SD*=1.7) to be the least complicated. A possible explanation of this disparity in the perceived complexity of the evaluating task is that, when giving information, people feel a strong responsibility for determining values due to concern about the influence that it will have on the recipient's subsequent judgment. The high complexity rating may reflect people's perceived responsibility.

In the information-seeking diaries, participants were asked to report up to five people they turned to for the same task. To measure the correlation between the task complexity and number of people consulted, the Pearson correlation test was performed. The correlation was positive (Pearson correlation test; $r = 0.201$, $P < 0.001$), which indicates that the more complex a task was perceived to be, the more people were consulted.

4.2.1.3 Factors Affecting the Perceived Complexity of Tasks

During the interviews, participants were asked why they rated the complexity or difficulty of the tasks as they did in the diaries. In both information-seeking and information-giving situations, perceptions of task complexity had two parts: complexity of an overall work task and complexity of an information task. Interestingly, in the information-seeking situations, the task complexity was described more at the level of the work task but less at the level of information task, compared to the information-giving situations.

The characteristics of *work task* as related to complexity were categorized into three themes: (1) number of goals, interests, and inputs, (2) skills and experience required for the work task, and (3) uncertainty of goals and outcomes of the work task.

a. Number of Goals, Interests, and Inputs

First, many participants mentioned that they found the task at hand complicated due to the number of goals, interests, and inputs involved. The more competing or conflicting goals, interests, and inputs involved in a work task, the harder it is to move the task forward. P30 stated, "It is [complicated], because we have to roll this [program] out globally and get it aligned with people from other countries and everybody has different budgets, resources, even regulations." P32 said:

> From a mathematical point of view, it was trivial but it was interesting from this far just understanding…whose feelings will be hurt…if the study isn't done well…So it's complex in that point of view and there's a lot of especially internationally there's a lot of moving parts and there are people involved.

b. Skills and Experience Required for the Work Task

Some participants described the lack of skills and experience required for the work task as another characteristic of the work task pertinent to complexity. For example, P14 described the task complexity in relation to the skill requirement. She stated, "It was complicated because…I am not able to pick out those differences [in the same flavor] as much as a sensory person is able to." P29 perceived the task that the information seeker needed help with to be difficult because "What they're looking to try to do is not something we've done in this company before."

c. Uncertainty of Goals and Outcomes of the Work Task

A few participants pointed out that complexity derives from the uncertainty of goals and outcomes of a work task. When asked why she thought her task was difficult, P24 replied, "Because what we're going to actually get out of [this study] and do with it is not straightforward." Similarly, P36 replied, "[In the initial stage of a project,] there were more unknowns."

The task complexity or difficulty was evaluated not only at the level of work task, but also at the level of *information task*. The characteristics of information tasks as

related to complexity were classified into two categories: (1) breadth of information to be explored, and (2) level of judgment required.

d. Breadth of Information to Be Explored

Some participants reported that the more information that needed to be explored and processed in a task, the harder they found the task is to be. The process of integrating and synthesizing information from multiple sources requires a high cognitive load. P07 stated, "[A task can be complex] in the sense that I had to go and get information from various sources, distill them and then give it to him." Similarly, P22 rated the task for which she provided information to be complicated because it required her "to look at a few pieces of data [including tables and charts] to be able to understand her decision making process." P33 also pointed out that the task for which she provided advice was difficult because the seeker "wanted multiple reports to verify that data."

When seeking information, one participant reported the complexity of the task in relation to the breadth of information to be explored. When asked why she thought her task was difficult, P24 stated, "Because what you end up with [after an ideation session] is just a lot of post-its and you have to come up with themes and streams of ideas to take forward."

e. Level of Judgment Required

A few participants described task complexity in relation to the level of judgment involved in performing a task. Judgment requires not only the collection or integration of information, but also its evaluation and decision-forming. P12 reported that the task for which he provided advice was complicated because it required his "expert opinion" instead of providing factual information. P17 stated, "The rules are actually in the regulation book and they're fairly straight forward. The rule itself is easy to interpret and understand. The whether we should do it is the hard part." P36 also found a task to be complicated because "it's not like A, B, C, yeah…there's some judgment calls in terms of which competitors to include, how deep of information to collect, and when is enough and there's timing and how to balance it with her other priorities, too."

4.2.2 Decisions to Pursue Collegial Information Mediation

The previous section reported the characteristics of tasks that lead people to enter into collegial information mediation. Another element that forms the context of collegial information mediation is people's decision to consult someone for guidance. It is, therefore, worth investigating the nature of the decision process, including the preference for seeking information through people rather than system search, method used to find those people, and specific factors considered when choosing whom to consult.

4.2.2.1 Preference of Interpersonal Information Seeking

Once they had come to realize that they could not accomplish the task at hand by themselves or could do only with a great effort, participants decided to seek information through their colleagues. During the interviews, participants reported a number of reasons why they preferred to consult colleagues for information rather than searching for information from impersonal sources such as written documents or electronic databases (e.g., file sharing system, intranet, or internet). It was found that their preference for interpersonal information seeking was mostly due to their awareness of the power of conversation, which opens a great opportunity for the following: (1) entry point to information, (2) evaluative feedback, (3) joint meaning-making, (4) hands-on perspectives, (5) discovery of the unexpected, and (6) least effort.

a. Entry Point to Information

Several participants reported that they had to seek information directly from colleagues because the colleagues were the *only* entry point to the information. P09 pointed out that sometimes the information needed was only accessible in a document that was sitting on someone else's desktop. P29 explained that, as the company has to protect trade secrets and confidential information, not all relevant knowledge is codified or centrally available; therefore, the only access point to the knowledge is people. When asked why a colleague turned to him for information rather than searching for it online, P10 mentioned that, without directly talking to him, the colleague would not have been able to assess the information because it was all "contained within" emails in his inbox. Similarly, P21 replied, "It's not something that I think he could get [on a company

database]…It would probably be still one of those situations where he needs to kind of go through a gatekeeper to kind of help find that report."

b. Evaluative Feedback

A number of participants pointed out the benefit of interpersonal information seeking in relation to the immediate provision of evaluative feedback on the quality of the information and decision-making. P09 mentioned that what she needed help with was not how to find information, but how to evaluate whether the information was correct. She said, "I can look at all of the information but that still doesn't tell me that it's accurate." P30 pointed out that by looking online, she could find the information but not the answers to what should be done next. She wanted to "get another set of eyes on it." P32 similarly stated, "[What I wanted] was more, 'This is what I see. What do you see? This is a pattern I am seeing in the reports that we're getting from your area. Do you see the same pattern?'"

c. Joint Meaning-Making

A few participants reported that they preferred to seek information through colleagues because it allowed them to jointly give meaning to information. While impersonal sources can only convey information, interpersonal sources can process information through the mind and make meaning out of it. For example, P31 stated, "You can put things on a slide…but it's really hard to understand unless you talk it through." When asked if there were any written sources he could look up rather than turning to his colleagues, P40 replied, "The information is available but it's based on understanding rather than knowledge." He added, "You can read an encyclopedia and know all the words but to understand and interpret the overall picture that it's telling you is something different."

d. Hands-On Perspectives

Another benefit of interpersonal information seeking is obtaining practical, hands-on perspectives. When asked why she turned to a colleague even though she found a manual online, P14 replied, "Because sometimes when you write these processes down, you just write the final process. You do not write what you did and what went wrong." She further explained, "In an industry like this, we will talk to somebody, a face to face

conversation gives you a lot more information than trying to hunt for it." P21, who needed to learn how to run a machine, mentioned that the best way to gain information is to directly talk to colleagues who have used the machine. He analogized the task to learning how to drive a car and mentioned, "That's the kind of thing that you need experiential [learning] and somebody that can be your copilot."

e. Discovery of the Unexpected

One participant described the benefit of interpersonal information seeking in relation to the power of conversation that allows the discovery of unexpected information. When asked why she decided to turn to colleagues rather than searching impersonal sources, P29 replied, "I think there's something to the face to face conversations…You can start talking about one thing but it might turn into a story of something else that becomes more valuable than what you were originally looking to find."

f. Least Effort

Lastly, and not that surprisingly, the choice of interpersonal sources was also based on the principle of least effort. P11 stated, "I might be able to pull some information from there that could help me do my task. But it just was faster for me to go to him." Similarly, P44 mentioned that, even though the information could be found in his email, he preferred just to turn to a colleague. He said, "Oftentimes it comes in email and then you have to remember where'd you file the email…and then you have to wade through all that. So I mean it's easier just to turn to a person."

4.2.2.2 Methods Used in People-Finding

After deciding to consult someone for information, the next decision to be made is whom to consult. Finding the right person in an organization is crucial to the success of the information mediation practice. This section discusses common patterns of behavior and methods of accomplishing the people-finding task.

In the information-seeking diaries, participants were asked to choose all the methods they used to find people from whom they sought help. On average, they used 1.09 (*SD*=0.31) methods. By far, the most frequently used method was finding someone "based on previous knowledge of the person" (*N*=283, 86%). The next most frequent methods were finding someone "by asking colleagues who to contact" (*N*=37, 11%), "by

looking through previous documents or files" (*N*=7, 2%), and "through the company intranet site" (*N*=2, 1%). The low frequency of using the intranet site might be partially explained by its limited functionality. It provided only basic people-finding tools such as a directory and an organizational chart. At the time of this data collection, the company was in the process of preparing for the deployment of a new expert-finder and social networking platform.

During the interviews, participants further described their methods of finding people. Most participants reported that they decided whom to consult based on first-hand knowledge of people. They preferred to turn to someone whom they had worked with before and whose capabilities were known through the previous interaction. P24 stated, "I'm much more suspect until I know them." Similarly, P27 mentioned, "Usually I already know the person off the top of my head and so I don't have to look in the directory…If I don't know who that person is, I really probably don't know what kind of advice they can give me." While acknowledging the need for a functional people search system, P31 pointed out, "But it's all [experience with the] people and it's not really an electronic system." P37 explained that he tended to turn to someone whom he had worked with for a long time and whose capabilities he knew because he thought he "could get a straight answer and the right answer out of [them]."

When they did not have first-hand knowledge of people, some participants relied on word-of-mouth recommendations from experienced colleagues. Notably, this word-of-mouth method was mentioned mostly by those whose job tenure was shorter than five years. Those participants emphasized the importance of trusted colleagues' second-hand knowledge of people in the absence of their own first-hand knowledge. P02, who had worked there for just over two years, stated that when she did not know whom to turn to, she usually started with someone who she "trusted and [had] worked on a project with before," asking "who has the most experience [among your colleagues]?" P11, who had worked there for four years, similarly stated, "A lot of times I go word of mouth first." She pointed out that the culture of the organization supported finding people through word-of-mouth. She further explained how a chain of referral was put into place:

> Because our company is so close, if you ask a few people then they'll be able to point you to somebody that's very experienced in that area and so by the time you talk to that person, then they might refer you to a couple of people and so by the

> time you've gotten bounced around a few times, you pick on the information that you need.

Similarly, P39, who had worked for just over five years, stated, "As an organization, I think we're very relationship-based and there's a lot of times when you might not know somebody in particular but a friend of yours knows them." P45, whose tenure was just over five years, mentioned, "I'll usually ask somebody that I know that would know. I would say, 'I need this and he probably works with you' or something."

A few participants reported that they found someone to consult while they were reading through document sources. P26 mentioned that he sometimes, especially when working on a new technology, searched the company's research database by topics to retrieve relevant lab notebooks. P27 stated, "A lot of that stuff I learned or who to turn to on specific items also comes from presentations...If I ever have any questions in the future, I know who to go to." By reading through the notebooks, he identified someone who had worked on a similar area in the past and got an idea of who had worked on what and contacted that person as a starting point. P32 pointed out that he got an idea of who to consult from an email conversation which he happened to be copied on. He explained:

> I was copied on an email where someone made some comments on a project and I'm thinking, 'Okay, this person by nature of what they do and the kind of comments they made in this email, I know that I'm going to want to speak to them about my project at some point. I can tell he's thinking about the same thing…' So when the time is right, which is probably next month I will get a hold of him on the strength of what he had written about in this email that wasn't even addressed to me.

P39 similarly reported that she accidentally found someone to talk to while she was reading a PowerPoint deck prepared by that person.

When asked whether they had used any systems that enabled people-finding, a couple of participants mentioned an expert finding system that the company had implemented five years earlier. The system ranked people according to their self-assessed expertise, but it was not used anymore because no one had kept their information up to date. P29 stated, "[It was a] great idea, but…the second you put it down, it's obsolete. People change, expertise changes." P35 pointed out that currently no system captured the communities of practice in which informal learning and knowledge sharing occurs. He explained that the company had a large number of extra committees that were run by

volunteers, but none of them were kept track of. He said, “I didn’t even know that there necessarily was a committee that would have addressed this particular thing but I didn’t know who to turn to and so or even how to start.”

4.2.2.3 Factors Considered in People-Finding

A number of systems have been proposed to support people-finding in organizations. Those systems have focused primarily on finding *experts* by developing a database based either on individuals' self-report of their expertise or extracting the expertise information from email communications (Zhang & Ackerman, 2005), chat logs (Ehrlich, Lin, and Griffiths-Fisher, 2007), or intranet documents (Hawking, 2004).

The findings of this study, however, show that people consider many other factors than expertise when deciding whom to consult. Based on qualitative and quantitative analysis of the data, this section discusses those specific factors that affect people’s choice of whom to consult. The results from the qualitative analysis of the interview data will be reported first, followed by the quantitative analysis of the relationship between task type and social closeness.

During the interviews, participants were asked why they consulted certain people for information. The analysis shows that participants took into account not just one but multiple factors. The factors are categorized into the following seven themes: (1) expertise (or lack of expertise), (2) social closeness (3) perspectives and thinking styles, (4) physical closeness, (5) need to be “kept in the loop,” (6) hierarchical position, and (7) communication style.

a. Expertise (Or Lack of Expertise)

Most frequently, the person’s expertise was mentioned as the main factor, though not the sole one, to be considered in deciding whom to consult. The analysis revealed that expertise involves three dimensions, including subject matter expertise, system expertise, and communication skills. First, participants chose a person based on whether he or she had knowledge or experience in a subject area on which they sought information. When asked why he consulted a certain person, P25 replied that the person was an “in-house resident expert” on a particular ingredient and related product line. S15, who needed help in dealing with some communication issues between team members, reported that she

talked to not only a person within her department who knew the situation and members involved well, but also a person in an office of diversity and inclusion who had formal training and expertise in conflict management. Second, another dimension of expertise was related to the understanding of how to use a complex system. P25 explained that the person he turned to was a "super user" of the system that he had to enter data into and he expected that she could tell him what he needed to know as well as didn't need to know about the system. Thirdly, the other dimension of expertise was the ability to communicate and present information. P44, who needed help in writing a report, turned to his direct boss because "she is really good at distilling things down into the types of messaging that is very clear and has a more strategic sound…fits with what the business is looking for."

A couple of participants mentioned that the reason for choosing a certain person was the person's lack of expertise or experience. P36 wanted to talk to someone with less experience in a certain product than her to obtain "more diversity of thinking." When getting feedback on a new product he was working on, P27 preferred to talk to a colleague who had no or very little experience with the similar product. He mentioned that the people who had a lot of experience and knowledge about it might hinder the creative process of developing new products.

b. Social Closeness

The choice of whom to consult was also based on the closeness of social relationships. A number of participants reported the duration of relationship and frequency of interaction as an indicator of closeness. P23 explained that the reason he turned to a person was "not necessarily because he's more knowledgeable or less, but just you see him more often so you just think of him first off at the top of your head." P28 mentioned, "I've known her for a long time so she's just my instinctual choice to go talk to." P45 pointed out that she felt more comfortable consulting the colleagues with whom she had built relationships, especially when seeking technical information as compared to when seeking non-technical information. She mentioned:

> If I'm going to seek advice on the technical things, it's a lot easier to ask these [closer] people...because you don't want people to think, especially if they don't know you at all, that if you're asking something that anybody should know, they

might think, ‘Oh, man, you’re not very good,’ whereas these guys know and like, ‘Okay, so I forgot or whatever.’

A couple of participants described the social closeness in relation to the trust relationship. P22 said, “Because she and I are buddies…I trust her judgment.” P15 also mentioned that, “He I knew as someone who has committed to helping me through these kinds of things and I knew it would be confidential.”

c. Perspectives and Thinking Styles

Some participants mentioned that they chose a certain person because of his or her perspectives and thinking styles, which are one’s preferred methods of processing information and dealing with problems. For example, When asked why she turned to her mentor, P02 mentioned that, “She always has professional stature … I have never seen her lose her cool ever… More so than she’s my mentor, it’s because I know that she has professional bearing.” P34 was working on developing a policy on how to communicate confidential information within and outside of the organization. He mentioned that to make the policy applicable to the entire organization, it was important for him to talk to someone who “has a broader view [than his] and so looks across all of the different business units.” P42 explained her choice of whom to consult in relation to personality types and thinking styles. She said:

> I am an ISTJ and she is an ESTV… [I’m] introverted, sensing…And she’s an extravert and much more of a feeling…I am much more of a think things through and a refiner and she is much more of an innovator and big picture thinker…so I mean she’s a perfect person to have review anything I have just to try to give me that other point of view.

d. Physical Closeness

Some participants reported that physical accessibility was the main factor they considered when choosing whom to consult. For example, when asked why she turned to a certain person, P15 replied, “Proximity…Her desk was near mine and this is early on in my decision…I just wanted to run it past somebody.” P29 similar relied, “There’s a lot [of people I could’ve turned to]...I think just because sat next to him was easy enough.”

e. Needs to Be "Kept in the Loop"

Several participants reported that the main reason for choosing a certain person was to keep the person in the loop of what was going on. P30 pointed out, "I wanted to make sure I talked to her before I sent my recommendations to the team so she was aware of them ahead of time." P21 mentioned, "That's just to make sure that she understands the situation that we were under and how we should rate it so that at the end of the day, she's the one that will be taking it." Similarly, what P32 was looking for from the person he consulted was not necessarily new information, but support. He explained, "I turned to him because I wanted to make sure that he didn't not support it. You know what I mean? I wanted to make sure that as this went along, that he wouldn't be raising objections later on." P39 talked to her supervisor because the issue she was going to bring up at a meeting might "raise some eyebrows" and she expected that the supervisor could help her to elevate the issue.

f. Hierarchical Position

A few participants specifically took into account one's hierarchical closeness to them or hierarchy of who reports to whom when choosing whom to consult. When there were two people she could have turned to, P28 chose the one who was more of an equivalent peer over the person's boss. P38 pointed out that it was important to consider how potential information givers were related in terms of the organizational hierarchy. He explained:

> I suppose I could have gone to their supervisor but at the same time though, I don't usually like to do that if at all possible because then folks feel like, 'Oh, you went over my head and why are you doing that?' And it's, 'You need to get a hold of me.' And also the other thing, too, is in case they're messing up, you don't want to sit there and because then you feel like you're tattling on them. 'By the way, this person's not doing their stuff.'

g. Communication Style

A couple of participants based their choice of whom to consult on the compatibility of a person's communication style. Here, communication style refers to individuals' preferences in terms of how they express themselves and exchange information, ideas, and opinions. P15 pointed out that, when seeking advice, she usually consulted someone that she knew had a communication style that was similar to hers so

that she could easily adopt the advice. She said, "If I'm seeking advice from someone who's very different and approaches things very differently, then it won't be natural for me then to use that advice…Sometimes it can be more about style than it is about expertise." P19 mentioned that whether a person had a similar communication style or not affected her decision of whom to turn to. She explained:

> There are people that if I turn to them for advice, I know what they're going to do. They're going to not really help me walk through the process but they're going to say, 'Well, just do this. Just do that.' Or it's, 'Why didn't you think of that?' …so I'm a little more reluctant to go to them because I don't want to feel stupid. So yeah, I do think about that when I approach other people and I think about, 'How are they going to respond when I ask them this question?' And I tend to go with the people who I think are going to be understanding and help me walk through the process and not just give me a quick answer and, 'Bye.'

4.2.2.4 Relationship between Task Types and Social Closeness

In addition to identifying different factors considered when choosing the right person, this study was also interested in examining whether the characteristics of the task participants had at hand had any influence on their decision regarding whom to consult. In order to perform a quantitative analysis of the effect, I collected quantitative data on social closeness between the information seeker and giver during the interviews using the bull's eye method. Prior to the interviews, participants were asked to place stickers on a bull's eye based on their social closeness to each individual they included in the diaries. The distance between the sticker and the core self was measured in millimeters and was interpreted as the level of interpersonal closeness.

To test the relationship between the task characteristics and closeness between the seeker and giver, I compared the estimated marginal means of the distances associated with each task type using a linear mixed model. Table 18 shows the mean distances associated with each task type in information-seeking diaries. The smaller the distance, the closer the relationship was interpreted to be.

Table 18: Mean Distances Associated with Each Task Type in Information-Seeking Diaries

Task Type	Mean Distance	Std. Error
Increase descriptive knowledge	38.15	3.58
Increase procedural knowledge	51.22	4.94
Assess value	32.72	6.62
Determine actions	32.48	4.12
Obtain data	35.99	8.85

The Bonferroni post-hoc test was used to determine which task types were significantly different. The significant difference (p=.032) in the mean distances was found only between the task of *determine actions* (Estimated marginal mean=32.48, SE=4.12) and the task of *increase procedural knowledge* (Estimated marginal mean=51.48, *SE*=4.94). This indicates that participants were more willing to go to someone close to them when they needed help with the task of *determine actions* compared to when they needed help with the task of *increase procedural knowledge*.

The task of *assess value* (Estimated marginal mean=32.72, SE=6.62) had a mean distance as small as the task of *determine actions*; however, it was not significantly differently from other task types in the post-hoc test. This non-significance was due to both (1) the lack of power – the smaller sample size (55 cases, 8.5%) would lead to a larger standard error and (2) conservativeness of the Bonferroni method.

The relationships between closeness of relationship and task complexity as well as closeness and task urgency were also tested, but neither was statistically significant.

Overall, the results from the quantitative analysis show that for certain types of tasks people are more or less willing to consult someone close to them. When the purpose of information seeking was not so much to gain knowledge but was to be able to determine actions, which might have an impact upon their future events, participants preferred to choose someone close to them.

4.2.3 Summary: Tasks and Decisions Leading to Collegial Information Mediation

The findings in relation to the first part of this research question – tasks leading to collegial information mediation – reveal that participants turned to their colleagues not only to acquire knowledge but also for help in assessing value and determining actions. In addition to identifying a typology of tasks that constitute the context of information mediation, this study examined participants' perceptions of task complexity. Task complexity has been studied exclusively from the information seekers' perspectives, focusing on the complexity of *work task*. By investigating both information seekers' and givers' perspectives, this study identified different attributes that describe task complexity. When seeking information, participants illustrated task complexity exclusively at the level of *work task* (e.g., number of goals, interests, and inputs, skills and experiences required for the work task, uncertainty of goals and outcomes of the

work task); while in contrast, when giving information, they described complexity more at the level of *information task* (e.g., breadth of information to be explored and level of judgment required.) Quantitative analysis of their perceptions of task complexity provided more concrete examples of the contrasting perspectives between information seekers and givers. When seeking information, participants rated the *evaluation* task to be least complicated, whereas, when providing information, they rated it to be most complicated.

In regard to the second part of this research question – decisions to pursue collegial information mediation – participants attributed their preference for interpersonal information seeking over system search to the power of conversation to build a shared understanding of a situation and co-construct a solution. In terms of the method used to find people to consult, participants preferred to turn to someone of whom they had first-hand experience or at least second-hand knowledge from someone they trusted. Especially for less experienced employees, word-of-mouth recommendations from someone trustworthy formed a valuable source of second-hand knowledge about other employees. In deciding whom to turn to, they considered a number of factors, including not only expertise, but also closeness – both social and physical closeness – along with thinking style, the need to be kept in the loop, hierarchical position, and communication style.

Quantitative analysis of the relationship between task type and social closeness identified that particular types of tasks led participants to be more or less willing to consult someone close to them. Participants were more likely to choose someone close to them when they needed help putting knowledge into action through decision-making, planning, or problem-solving, compared to when they needed help simply with gaining knowledge.

4.3 Practices and Challenges of Collegial Information Mediation

In this section, results are presented regarding the second research question of this study: What are the practices and challenges of collegial information mediation? The goal of this section is to characterize the patterns of how collegial information mediation is exercised, use of communication media during the information mediation process, and difficulties and concerns experienced in the process.

4.3.1 Practices of Collegial Information Mediation

4.3.1.1 Joint Negotiation of Information Needs

Information mediation is initiated when an information seeker requests help from a colleague in fulfilling or satisfying her information need. In the process of information mediation, the seeker's information need is not static, but jointly negotiated and mutually formed through conversation. This section discusses the patterns of how information needs change or emerge in the conversational interaction between information seeker and information giver.

Most commonly, information needs become more focused and targeted throughout a conversation. When asked if they were able to fully understand what their colleagues were looking for, some participants replied that the questions asked by their colleagues did not precisely or completely reflect what they were ultimately seeking. P19 pointed out that it took several iterations of questioning to sharpen the focus of information mediation. Initially, what P19 was asked was a simple scientific question about a new ingredient. As the conversation evolved, she realized that her colleague asked the question not merely out of curiosity but to form a proposal for a specific project. She said:

> So this was actually the second time I had talked with her about it. And the first time was really completely different. I didn't even realize she had been assigned to do this [project] and she was asking like one off questions rather than the whole project…when we had this meeting, that was when I got, 'Okay, you've been asked to do this whole big thing.' And then walking through that and trying to figure out how to do that.

P32 pointed out that when asking him for statistical advice, people usually started a conversation by saying "I want to learn about this experimental design," instead of articulating exactly what they wanted to accomplish by running the experiment. In the course of communication, he assisted them to think about the specific goals of their studies so that the information mediation could become more purposeful. Similarly, P35 reported that when people asked, "can you give me such and such study design?" without providing enough context, he always tried to figure out why they requested that particular design. Through conversation, he assisted them to ask more specific and goal-oriented

questions. He said, “It is more a matter of [understanding] what they’re ultimately seeking as opposed to how they have asked a question.”

Sometimes information needs expanded during the process of information mediation. After answering an original question or request from their colleagues, some participants uncovered additional information needs that they thought required attention from the colleagues. For example, what P06 was originally asked for was to review a recipe and make sure it was set up properly. After providing the review, she started another conversation to verify if the colleague knew exactly “where he needed to go from there.” Through the conversation, it was identified that what the colleague needed was not only the review of the recipe, but also instruction on how to actually correct or manipulate the recipe in the system. P06 said, “Originally it was for the peer review…but she also got valuable information as far as those types of recipes should be set up.” When asked to teach a colleague how to query a database to answer questions from customers, P17 realized that the person also needed training in how to interpret questions. He stated “I trained him on the use of the tool. That was straight forward…but more importantly he should’ve known that we cannot just answer the question at the face value and need to talk to someone who can rephrase it.”

Occasionally, information needs were reconstructed through the negotiation process. P13 pointed out, “When people are asking advice, sometimes they’re not even asking the best questions. They may want X but actually need Y and not know it...So that’s where you can kind of help them." P17 reported a situation in which a colleague asked the “can we” question, while what really needed to be addressed was the “should we” question. P17 mentioned that:

> They just merely wanted to know, ‘Can we [add this new ingredient to an existing product]? And if we can, what’s the level we need?’ But I had to tell them, ‘We can. Here’s the level.’ And sort of a little bit, ‘But I don’t think we should.’… I did imply that if they’re considering this then we really needed to get the ‘should we’ question answered. That what I was telling them is, ‘Yes, you’re permitted to do this but it’s an area that I don’t think we want to go.’ …We need to somehow decide, ‘Is this something [the company] wants to do?’ And I don’t believe they pursued it. I think the numbers were too close and it didn’t move the dial very much for them.

4.3.1.2 Types of Collegial Information Mediation

To identify the types of information mediation, I analyzed the diary responses to the open-ended questions regarding the specific assistance or guidance participants received from or provided to their colleagues. It was found that information mediation is not only a knowledge-addition but also a valuation-addition practice. In the process of information mediation, information givers not transferred their knowledge or expertise, but also performed value judgments in order to help seekers select an appropriate action.

Table 19 shows the categories and prevalence of the different types of information mediation reported, along with examples from the data. Information mediation practices were categorized into three main types: (1) *knowledge addition*; (2) *value addition*; and (3) *alternatives suggestion*. Out of 546 statements from both information–seeking and –giving diaries, 37 (6.8%) statements were excluded from coding due to insufficient details.

Table 19: Information Mediation Types Reported in Information-Seeking and Information-Giving Diaries

Information mediation type		Info Seeking (*N*=272)		Info Giving (*N*=237)		Example
		N	**%**	***N***	**%**	
Alternatives Suggestion	Referral to documents/files	10	4	10	4	Supply documentation of a team's future plan
	Referral to other people	28	10	19	8	Provide the name of a person and coach on how to bring up an issue
Knowledge Addition	Aggregation	5	2	15	6	Collect raw data and summarize it
	Background knowledge	9	3	9	4	Go through the background of a previous testing
	Experience sharing	10	4	12	5	Share one's approach to a similar problem reflecting on past situations
	Explanation/ demonstration	52	19	50	21	Walk through an example of building a new report
Value Addition	Idea/opinion	72	27	58	25	Review and provide comments on a test analysis
	Suggestion	30	11	26	11	Provide a direction based on original scope of work
	Validation	20	7	4	2	Confirm the agenda for an upcoming meeting
	Solution	36	13	34	14	Identify options to prevent incident from occurring

Compared to the other information mediation types, value addition involved more of the information givers' judgment and personal opinion with an intention of influencing

its recipients. In both information-seeking and information-giving situations, the most frequent mediation type was value addition (58% and 52% respectively).

When comparing the prevalence of the mediation subtypes, results for the two sets of diaries were similar. In both information-seeking and information-giving diaries, the most frequently mentioned mediation subtype was *idea/opinion* (26.5% and 24.5% respectively) followed by *explanation/demonstration* (19.1% and 21.1%), *solution* (13.2% and 14.3%), and *suggestion* (11% and 11%).

In information-seeking diaries, participants were asked to report up to five people they turned to for each task. In 27.6% of the information-seeking episodes, they consulted two or more people to accomplish a task. To understand how information mediation evolved through the involvement of multiple people, I compared the prevalence of the subtypes of mediation provided by the first person they consulted to that provided by the second through fifth persons they consulted. Information mediation evolved in the following pattern: *knowledge addition* decreased from 31.5% to 18.7%, while *value addition* and *alternative suggestion* increased from 55.8% to 64% and from 12.7% to 17.3%, respectively.

In order to map out the relationship between types of task and mediation, I calculated the percentage of each mediation subtype employed within each task subtype. I used the combined data from both information-seeking and information-giving diaries to understand the overall pattern of which mediation subtypes corresponded to which task subtypes. Even when analyzed separately, the pattern was almost identical between the two sets of the diaries.

An interesting pattern was observed when I distinguished between the task of gaining technical knowledge and that of gaining non-technical knowledge. For gaining technical knowledge, *explanation/demonstration* (32.8%) and *idea/opinion* (25.9%) were more frequently reported than other mediation types. For gaining non-technical knowledge, *suggestion* (25%) was the most frequently reported mediation type, followed by *idea/opinion* (23.2%) and *referral to other people* (14.7%), while *referral to documents/files* was not reported at all.

4.3.1.3 Factors Affecting Extent and Types of Collegial Information Mediation

During the interviews, participants were asked, when giving information, what they took into account in deciding what information or advice would be helpful for its recipients. The analysis of their responses revealed that the extent and types of information mediation they provided were affected by the following factors: (1) level of expertise, (2) communication style, (3) hierarchical level, (4) willingness to learn, and (5) preferences as an information seeker.

a. Level of Expertise

A considerable number of participants mentioned that they considered the information seeker's level of expertise or experience when deciding the extent and type of information mediation. P33, for example, stated, "I knew that I needed to make it more detailed because he was new. That's why I chose to—it was like a PowerPoint presentation almost. It was long because it had step by step instructions." P34 stated that the seeker's level of knowledge did not necessarily have an effect on what he communicated with the person, but on how he communicated. He explained, "The fact that she is not experienced yet with the system…would affect how we communicate, to put it more simple terms that she would understand." Knowing that the seeker was not a "computer person per se," P35 tried to explain using more of an everyday style of language as opposed to computer terminology.

Some participants pointed out that it was important for novice colleagues to learn by doing or by teaching themselves. When asked what he took into account to advise his colleague, P37 replied, "I think taking into account that he had a limited experience and if he doesn't learn, he'll be back asking me or he'll be trying to find somebody else when he's perfectly capable of bringing this information up for himself." He further explained that, "that's why I didn't sit down at the computer and start manipulating the cursor to bring up what I knew he was looking for. I let him do it." With a similar motivation, P40 mentioned that sometimes he intentionally did not answer questions from novice colleagues. He explained:

> You've got to have that understanding and I know some of our younger folk are impatient and they want to move on to the next thing. But until you try and get that understanding into your own head, you're always going to have to ask questions. And I think in a sense that people expect to be given answers all the

> time. 'I've got a question and you're knowledgeable. Give me your answer.' 'No, I'm busy today. Go and think about it yourself'…I've learned that stuff through hard work and study and I want other people to go through that study process because that's the only way to get to understanding. And so I don't always just give answers. I sometimes say, 'Look, here is the background…When you've read through that, let's get together and talk about it.'

b. Communication Style

An information seeker's communication style was another factor that participants took into account when deciding what information or advice would be helpful for the seekers. Here, communication style refers to individuals' preferences in terms of how they express themselves and exchange information, ideas, and opinions. P15 said that the knowledge of the seeker's communication style affected the extent of information mediation. She stated, "She's very demure and a little bit shy. So I couldn't give her the advice of, 'Just go back and tell him to do it,' because that's not her style. So I had to look at her style…to give her the words to be able to say." She went on and described that, "I also know that her frustration really comes through if she's frustrated with somebody so she needs to have specific words to be able to say." When providing advice, P24 considered the way the seeker tended to respond to it. She explained, "I'm not thinking out loud in my advice because when I'm just thinking out loud, she takes that as direction...I needed to be clearer to her that I'm not suggesting that's what she do, because she'll run with it." P28 similarly stated that, "For the way she works, it's easier to give her like saying how you think that something should be laid out and writing it down and showing her and then she can come back with, 'Well, no, I think we need to try this' or, 'It's a good starting point.'"

c. Hierarchical Level

Some participants mentioned the information seeker's hierarchical level as an important factor that affected the extent and type of information mediation. P04 pointed out, "I would be more hesitant to give advice to someone on a higher level. I would just try to be respectful for the other people who have the higher position." P09, who was providing feedback to her boss, stated that she would not disagree with her. When asked if she would have acted differently if the seeker had not been her boss, she replied, "I would have given more input. I was treading lightly [because it was my boss]." P23

stated that whether the seeker was lower or higher than him in the organizational hierarchy affected how he delivered information. He said, "To someone what is lower down, I would tell them what to do or needs to be done…To someone higher up, it's going to be just more suggesting or saying 'based on my experience, this is what I've seen.'"

d. Willingness to Learn

The perception of an information seeker's willingness to learn also affected the extent and types of information mediation. P17 mentioned, "We have [this person] on one end who is interested in full knowledge and an academic pursuit of things and then we have other people who are very practical, 'Just tell me. Is 4% enough?'" He further explained, "So the [information] giving I try to tailor to the needs of the person asking." P32, who often provides statistical advice, stated, "Some people are going to want me to squiggle out the equations and show them graphs. Other people are, 'Just tell me what to do so I can get on with my job. Do this one yes or no?'" P40 explained that the extent to which seekers were willing to learn determined how much he would follow up with them. He explained:

> This guy is so enthusiastic about the subject he just talks. And I can see that he's engaged, he's involved and he wants to be part of the team and so I don't need to do any further digging. But if he had sat back with his arms folded and then sort of nodded now and again, I would have to keep digging and say, 'Is that okay? Does that work? And what do you think about the following?' And those are the type of questions I sometimes use. To [the person who is enthusiastic] for example, I'll say, 'In that book there's a section on this information. Have you looked at that?' And then he will probably go and look at the book and dig out that information.

e. Preferences as an Information Seeker

A few participants reported that their preferences as information seekers influenced the extent and types of information mediation. Their preferences in seeking information were carried over to or shaped their strategies in relation to the extent and types of information mediation. For example, when seeking information, P13 tended not to want to get more information than he needed. How he provided information reflected his own preference to receive only as much information as he asked for. He said, "When people are coming to me, I don't like go and give unsolicited advice...If it's just a yes or a

no question, you're not going to give them too much detail." When seeking advice, P15 usually sought it from someone that she knew has a communication style that was compatible with hers. As she acknowledged the importance of the compatibility of the communication style, when providing advice, she mentioned that she tried to match it to the seekers' style and what they were going to be comfortable with. P19 similarly stated that she tried to learn the best way to communicate with each person when providing information, because she preferred to talk to someone who understood her style. P22 explained that, "Advice-receiving, I try to see, 'okay, if I did this, how could it impact that later?' and so I try to think broader." She went on to say, "Advice-providing, I also definitely try to think of all the pieces of puzzle…and to see the bigger picture in things thinking 'if I giving this advice, how is it going to impact the situation?'"

4.3.2 Use of Communication Media

4.3.2.1 Types of Communication Media

In the diaries, participants were asked a multiple-choice question regarding the communication media through which they received or provided information. They were asked to check all the media types used in the process. Table 20 shows the types and frequencies of the communication media reported in both information-seeking and information-giving diaries. On average, participants used 1.3 types of communication media in the process of information mediation. The most frequently used medium was face-to-face communication (*N*= 415, 58.3%), followed by email (*N*=213, 29.9%), phone (*N*= 66, 9.3%), online conferencing tools such as WebEx and Skype (*N*=8, 1.1%) and instant messaging (*N*=6, 0.8%).

Table 20: Types of Communication Media Reported in Information-Seeking and Information-Giving Diaries

Communication Media Type	*N*	%
Face to Face	415	58.3
Email	213	29.9
Phone	66	9.3
Online Conferencing Tool (e.g., WebEx and Skype)	8	1.1
Instant Messaging	6	0.8
Fax	2	0.3
Others	2	0.3
Total	712	100.0

The six media types – face to face, email, phone, online conferencing tool, instant messaging, and fax – were used singly or in combination. Table 21 shows different sets of combinations of the media types reported in both information-seeking and information-giving diaries. The order of media types within each set of combinations is alphabetical.

Table 21: Combinations of Communication Media Types Reported in Information-Seeking and Information-Giving Diaries

Combinations of Communication Media Types	***N***	**%**
One Media Type	**395**	**72.6**
Face to Face	295	74.7
Email	78	19.7
Phone	21	5.3
Online Conferencing Tool	1	0.3
Two Media Types	**128**	**23.5**
Email + Face to Face	90	70.3
Email + Phone	22	17.2
Face to Face + Phone	8	6.3
Email + Instant Messaging	2	1.6
Email + Online Conferencing Tool	2	1.6
Face to Face + Fax	2	1.6
Face to Face + Instant Messaging	1	0.8
Instant Messaging + Phone	1	0.8
Three Media Types	**19**	**3.5**
Email + Face to Face + Phone	15	78.9
Email + Online Conferencing Tool + Phone	2	10.5
Email + Face to Face + Online Conferencing Tool	2	10.5
Four Media Types	**2**	**0.4**
Email + Face to Face + Instant Messaging + Phone	1	50.0
Email + Face to Face + Online Conferencing Tool + Phone	1	50.0

In most of the cases, participants used a single media type (*N*=395, 72.6%). The cases of using multiple media (*N*=149, 27%) included the combinations of two to four media types. It was found that the number of media used in the process of information mediation was related to the information seekers' perceived task complexity. The more complex a task was found to be, the more types of media were used to consult a colleague (Pearson correlation test; $r = 0.127$, $P < 0.001$).

A primary pattern in those combinations of multiple media was a mix of oral and written communication. The data from the interviews showed that it was usually the information seekers' choice that determined the types of communication media to be used. However, during the process of information mediation, the initial choice of media type sometimes got switched to another media type. For example, when a question was asked through email, some participants found communicating their ideas through writing inefficient and chose to have a face-to-face or phone conversation (e.g., P05, P06, and P12). On the other hand, some participants responded to a request that was made orally through email communication in order to make the response available for future reference (P09, P18, and P31).

4.3.2.2 Factors Affecting Choice of Which Communication Media to Use

As reported in the previous section, the choice of which communication media to use was made not just by seekers but also by givers. Instead of sticking with the media that were initially chosen by the seekers, there were cases when the givers responded to the seekers using different media from the initial choice. During the interviews, participants were asked why they chose certain communication media when seeking and giving information. The analysis of results revealed the specific factors that were taken into account by information seekers and givers in choosing which communication media to use. It was found that, for both the seekers and givers, the main factors considered were the characteristics of information to be communicated – equivocality and subtlety – and amount of interaction required. In addition to those factors, the seekers took into account the factors that were more related to the individual givers, such as their social closeness to the givers, the givers' preferences for media type, and the desired level of the giver's preparedness for information mediation. On the next page, Table 22 lists the set of factors.

Table 22: Factors Affecting Choice of Which Communication Media to Use

Information seekers	Information givers
Information equivocality	Information equivocality
Information subtlety	Information subtlety
Amount of interaction	Amount of interaction
Use for future reference	Use for future reference
Social closeness to info giver	

The factors that were considered by both the information seekers and information givers when choosing which communication media to use for initiating a conversation include: (1) information equivocality, (2) information subtlety, (3) amount of interaction, and (4) use for future reference.

a. Information Equivocality

Equivocality refers to possible multiple interpretations of the same thing (Daft & Macintosh, 1981; Weick, 1979). Many participants pointed out that they considered the equivocality of information when choosing which communication media to use. To prevent inaccurate interpretation of information, they relied on verbal communication such as face-to-face or phone conversations. P23 pointed out that "with typing or texting, there can be a lot of misinterpretation of what you're saying." P39 mentioned that she used emails only for "communicating hard data so that people don't get mixed messages." When she needed to show some images to her colleague for guidance, she decided to have a face-to-face conversation because "if he is just looking at images per se, he might not necessarily interpret it the same way." When seeking advice on how to understand a set of data, P43 chose to have an email conversation because he found his request fairly straightforward and made an assumption that "because he worked for these data, he would know what I mean probably."

When providing information, participants expressed the same concern about misinterpretation derived from the mismatch or loss of context. When asked what made it difficult to communicate through email, P12 replied:

> In an email when you're throwing out dates and times that you have to plan, a lot can get misconstrued in that. So I say, 'Two weeks.' 'Well, is that two weeks from today or is that two weeks from next week?' So there's a lot of that kind of confusing stuff that can get you in trouble with some of your projects. There's also roles and responsibilities where if I say, 'This person has this responsibility,' and maybe they don't necessarily have that exact responsibility, if we talk face-to-face, we can clear that up a lot faster than shooting emails back and forth.

P38 similarly stated, "Email I think a lot of times it gets misconstrued sometimes and it also comes across differently than how you actually intend it." P32 pointed out that the

issue of information equivocality became more salient when communicating with people in different time zones. He explained that when sending emails, the international time difference was an obstacle because "you'll send out something in the afternoon and when you come back in the morning, it's been churning around while they've been around and you come back and it's completely different." He analogized it to the game of telegraph where a message is whispered around from person to person and it changes as it passes through. He described another example of the problem of "whispering in circle" in using email conversations. When he provided his advice through email, it was circulated among multiple people and ended up generating multiple interpretations. He mentioned, "By the time the email comes back to you, so many people have seen it and say 'Oh, we have to do this. We have to do that.'" Regarding the use of knowledge repositories such as Sharepoint, P26 reported the similar concern about the loss of context in publically sharing information. He said, "There is some fear that, if I share my project work with you, you may say, 'Oh, that's really cool' and hand it off to someone else without the context." He continued, "And that third person may run with the idea and then find out there's some problem because it's early work and then I'll get in trouble because I let the new idea go too far."

b. Information Subtlety

The subtlety of information was another factor that affected participants' choice of which communication media to use. This is differentiated from information equivocality in that the subtlety is more related to a concern about losing nuance and tone than to a concern about multiple interpretations. In one of her information-seeking episodes, P15 chose to have a face-to-face meeting because she needed to give a pictorial explanation of the function of her group and found it challenging to communicate the details through email. P32 stated, "The less factual and the more conceptual, the more I want to have a verbal conversation and the more it's down to facts and information, I want it on paper." P38 preferred face-to-face conversation because "sometimes they'd tell you things that they can't tell you over the phone or email." Unlike other cases, P22 chose to have an email communication to better convey the subtlety of information. She already had an email thread with another person that basically illustrated her requests and therefore found it the easiest to forward the thread and communicate through email. She

further explained that it was important to communicate the details of the background history, which could be lost if she tried to explain them verbally.

When providing advice, a couple of participants pointed out that they chose a face-to-face conversation to better communicate the subtlety of attitude, especially the attitude of reassurance. P15 described a situation where a colleague consulted her for advice on how to deal with a people-management issue. When asked why she gave advice in person, she replied, "I think that she wanted to feel that there was someone there to support her." P35 similarly explained the reason he chose a face-to-face conversation when providing information. He stated, "Not necessarily knowing her particular personality or preferences, but I felt that probably a face-to-face meeting would be the best way to reassure her that I was interested in supporting her project."

c. Amount of Interaction

A few participants considered the expected amount of interaction required in the process of information mediation when choosing which communication media to use. When a large amount of interaction was expected, they chose verbal communication over written communication. When asked why he chose to have a face-to-face meeting, P17 replied, "Whatever answer she gives is going to lead to my next question. So it wasn't something that's easily answered in a single email or two. It definitely was a give and take discussion." P34 similarly stated that, "If there's going to be a lot of interaction and a lot of back and forth, I'd rather do that face to face than try to do it through email if it's possible or through a conversation on the phone."

When providing information, P06 responded through phone follow-up after his colleague initiated a conversation through email. When asked why he switched to a phone conversation, he replied, "Because there was some information kind of going back and forth [via email] and I talked to her on the phone...because there's a lot of questions and answers that have to be made."

d. Use for Future Reference

A number of participants chose written communication because they felt a need to document the interaction for future reference. When seeking information, P30 reported that she used email to "capture discussion and outcomes." Sometimes she even sent a

summary of what had been discussed and next steps to the colleague whom she consulted.

The need for documentation for future reference was considered not only by the seekers but also the givers. P09 stated that she chose to respond via email because she wanted to make sure "there is no unmet expectation." She added, "If something happens… everything's on paper." Even after providing answers during a face-to-face conversation, P19 sent her answers via email as well so that the seeker could use it for future reference. When asked why she emailed the same information, she responded, "I just know that he wants both? He wants to be able to actually have a tangible copy [so that] if he has to come back to it later, he'll remember what I said from the copy that I send him." Similarly, P31 chose to email his response because "when everybody's busy…it's always nice to go back to those notes and say, 'Oh, yeah, that's what we said.'" When asked why she preferred to use email for providing information, P33 said, "I like the paper trail tracking on the advice I give so that if they need to reference it, they can go back."

In addition to the reasons above, information seekers took into account the following factors: (1) social closeness to information giver, (2) information giver's preference, and (3) desired preparedness of information giver.

e. Social Closeness

Some participants reported that how close they were with the information giver affected their decision regarding which communication media to use. P08 described sending email first to set up a face-to-face meeting when seeking information from a person with whom she was not socially close, while when seeking information from a close colleague, she would not mind going talk to the person without prior notification. When asked how she made a choice to use an instant message, P12 replied, "IM is more interactive than email but it's less interactive than face-to-face communication…So I'm going to IM, if I knew the person well enough to maybe be able to get some of that without physically seeing them." P26 said that the main factor he took into account was "if I know the person." He further explained that in the case where he knew the person, he would send an email, while he would prefer to send a short email and follow up with a face-to-face meeting if he was not familiar with the person. P44 stated that he preferred a

phone conversation when seeking information from someone with whom he was not close. He stated,

> I think phone calls for me if I'm not familiar with them, it's easier because then you can quickly explain who you are and where you're coming from versus an email; that's harder. 'Okay, hey, here's my name. I work in this group, which—.' I mean in an email it feels like you have to write a paragraph to explain who you are and where you're coming from versus you can short cut that on the phone more readily.

A few participants indicated that they chose a face-to-face conversation for the development of a close relationship. P02 stated, "You can start losing certain relationships with people if you are only doing things by email and you're not doing them face to face." She further explained that she encouraged new employees to meet their colleagues face to face so that they could build a relationship. P04 similarly mentioned, "I prefer face-to-face because that's how you build the relationship. If you said it's a relationship-based company, you cannot build a relationship over the phone." P22 pointed out, "If you're talking to someone face to face, not only are you getting the knowledge but you're able to build your relationship with that person even more."

f. Information Giver's Media Preferences

When seeking information, some participants reported that they chose a communication medium that was preferred by the information giver. The knowledge of who prefers which communication media was developed through experience over time. When asked why he chose to have a face-to-face conversation with a colleague, P03 replied, "He stinks at communicating on email…If I send him an email that says, 'Something's going on,' 30 seconds after I press 'send,' he's standing next to me, because he doesn't want to type it back out." P09 similarly replied, "He's better face-to-face. He doesn't always answer email. So if you really want to get him, you've got to get him." P32 pointed out that, even though he prefers a face-to-face conversation, he emailed his request because "the colleague doesn't like face-to-face so I'll even email him even though he's a few desks away." When asked why she communicated via email, P42 replied, "She is an email person and she is not at her desk very frequently. So the best way to communicate with her is via email." She further explained, "[When seeking information,] I find that it's easier to try to flex my style than to flex other people's style."

g. Desired Preparedness of Information Giver

A couple of participants indicated that they chose which communication media to use based on how much they desire a colleague to be prepared to provide information. A common pattern in choosing communication media was to have written communication prior to verbal communication. P12 described, "I start with an email to explain myself and give them some time to understand what I'm going to be coming to them with questions about so they can start those wheels turning in their minds." P14, who needed feedback on her product, chose to have an email conversation because it gave her colleague enough time to review the product without being interrupted. She further explained that a face-to-face conversation has the potential to bias the information giver's feedback. When seeking advice on how to approach a new project, P32 sent a colleague some examples from recent projects prior to a meeting with an expectation that this would help the colleague to prepare for the meeting.

4.3.3 Challenges of Collegial Information Mediation

During the interviews, participants were asked to describe the most difficult aspect of seeking and giving information. The analysis of results revealed the challenges in collegial information mediation from the perspectives of both information seeker and giver. As shown in Table 23 on the next page, the challenges were categorized into four themes: challenges associated with (1) communication, (2) comprehension, (3) information seeker's attitude of acceptance, and (4) time.

Table 23: Challenges of Collegial Information Mediation

Information seeker	Challenges	Information giver
Communicating their needs effectively	**Communication**	Communicating information effectively
Fully understanding information given	**Comprehension**	Fully understanding seeker's need
Admitting needs for help Accepting contradictory information	**Attitude of acceptance**	Providing information in such a way that it would be accepted
Receiving information in a timely manner	**Time**	Time commitment

a. Communication

One of the challenges of collegial information mediation was associated with the communication of information. From the perspective of the information seekers, the

challenge was in correctly communicating their information needs. When asked to describe the most difficult part of seeking information, P23 replied, "There's making it clear what you're looking for so they can give you the best answer they can….Giving the most information you can to them on what you're looking for and what you're trained to do or what the problem is." P30 similarly replied, "[The challenge is] how you ask for it so that you can communicate clearly what's the situation and what you need advice for." P35 also pointed out that the challenge is "whether we're really communicating or not."

From the perspectives of information givers, the challenge was in clearly communicating information and ensuring that the seekers completely understood the information provided. P30 pointed out that the most difficult part in giving advice was in reaching "a common understanding." P31 also stated, "I don't always know for sure when I communicate out whether people understand it." P33 mentioned that it was most difficult to put information together so that she could deliver it in a way that the seekers understand and use it. P35 replied, "It is getting to a common point of communication…when you get the point of terms that we both understand, you definitely already have the battle almost solved." P36 stated, "The hardest thing is to understand if I'm really helping that person or distract them…though I always try to broach it in like 'I give you this information for you to consider and not that you have to do it.'"

b. Comprehension

Another challenge of information mediation was associated with comprehension. When seeking information, some participants reported difficulties in fully comprehending, remembering, and incorporating information into actions. P27 stated that getting information was not difficult but remembering and incorporating it into what he was doing was a challenge. P28 similarly replied, "Probably making sure that you don't miss something, especially if they're giving you a bunch of steps. Like to set up a new site, if you miss one of them, your site isn't going to be created."

From the perspective of the information givers, the challenge was in completely understanding the information seekers' needs. When asked to describe the challenges in providing information, P05 replied, "Getting to the heart of the matter and really understanding what it is that needs to be done." She further explained, "Sometimes I feel as though it takes several iterations of questioning to make sure I understand what they

are trying to ask me." P08 similarly replied, "It's not knowing what they want." When asked why she thinks people sometimes cannot articulate what they need, she said, "Because they're so familiar with the subject, they might forget that I am not working on that product all the time." P21 replied, "It is what they're asking for is…We have done related work but not the exact same work in the past so you have to figure out what parts of what you can tell him are relevant." P24 mentioned that the challenge is in "making sure that I understand the problem that I don't jump to giving advice when I don't know the whole story." She further explained, "Sometimes I get wild with the creative solutions and it turns out to be a solution for something different than the question that they needed the advice." P32 pointed out that sometimes the seekers didn't have as specific goals as they thought and figuring out the goal of seeking information was challenging.

In addition to the challenge in understanding seekers' needs, a couple of participants reported that the most challenging part of providing information was in understanding the seekers' level of knowledge. P29 stated that the difficulty was in understanding how much the seekers thought they knew and how much they really knew and to tailor his advice to that level of knowledge. He said, "People tend to know a lot more than they think they do but they don't have as much confidence as they maybe do." P34 also said, "[Challenge is] tailoring the communication to their level of understanding and…so you need to put it in simpler terms or not to go too fast or not get too technical or just keep it at the level that audience understands."

c. Attitude of Acceptance

The challenge of information mediation was also associated with the seekers' attitude of acceptance. From the perspective of the information seekers, the challenge was in accepting the fact that they needed help from others as well as in accepting information that was contradictory to their previous knowledge. First, when seeking information, some participants reported that the hardest part was in admitting the fact that they needed assistance from colleagues. This reflected the seeker's concern about their self-esteem in the process of information mediation. P19 mentioned, "The most difficult part is you have to in a lot ways admit that, 'I can't do this by myself. I don't know what I'm doing. I need help.'" She further explained that it especially was challenging in the field of science because there is a "push for independence – you're your own independent." P29

similarly stated, “It’s always hard to admit you don’t know something…It’s a humility thing.” P36 mentioned that admitting she had a problem she couldn’t handle on her own was the hardest part. She further explained, “I am supposed to be more senior, it’s hard to admit that I am not the expert on this.” P45 also said, “One thing that’s hard for me is, ‘Okay, I need to know that. I really don’t – They probably think I should.”

When seeking information, participants also pointed out that the most challenging part of information mediation was to accept information or advice that was contradictory to what they already had known or believed. To accept the contradictory information, it was necessary for the seekers to admit that they were wrong, which might jeopardize their self-esteem. When asked what the most difficult part of seeking information was, P22 replied, “Receiving advice sometimes is difficult because I’ve got to hear things I don’t want to hear.” P24 similarly replied, “It is letting go of an idea I think is really good.” P32 said, “It is when you get advice that you know is true but you wish it wasn’t.” P34 also mentioned that the difficult part was when the advice was good but he didn’t want to act on it. P43 said, “Only time it gets difficult is when the ego gets involved. I think sometimes you have to accept advice from somebody maybe you don’t like or think is a pompous person but they have really good advice.”

From the perspective of information givers, the challenge was in providing information in such a way that it would be accepted by the seekers. Especially when their advice was contradictory to what the seekers previously had known or believed, participants were very careful to make sure that they communicated the advice without hurting the seekers’ self-esteem. When asked to describe the most challenging aspect of providing information, P09 replied, “It’s when they’re doing something wrong or they’re having a behavior issue and you have to actually talk to them about they need to improve.” P17 similarly replied, “It’s often bad news and saying no.” P22 also mentioned that the hardest part was to say “we probably can’t be able to do it.” She further explained that providing opposing information was difficult because she could come across as inflexible. She said, “I am very direct…but I am trying to change that myself…You don’t want to get the perception that you’re difficult to work with.” P23 stated that the most difficult part was to give advice in a respectful way. He said, “It’s giving advice and not so much telling them what do…[It’s more] suggesting, ‘This is what you need to do for your own

benefit, for our benefit,' and not giving harsh directions." P45 similarly pointed out that the challenge was in "trying to figure out how to help them get it without like making them feel like they should know it."

d. Time

The challenge of collegial information mediation was also associated with the issue of time. When seeking information, a couple of participants noted that the biggest challenge was to get help in a timely manner. P02 stated, "The main point of difficulty is the timeliness with which you can find good advice." P09 also mentioned that the most challenging part was to find time with people to get advice from them.

When providing information, a few participants reported that the hardest part was the time commitment. When asked to describe the biggest challenge in giving information, P01 stated, "Not getting time get my own work done…I am constantly being pulled…Like this morning, I have not sat down once and it's just like I never have time to actually do my work." P16 replied, "Just finding the time in the day to get comprehensive information back to [the seekers] because it's a lot of work in getting the information assembled." P19 pointed out that giving advice takes a lot of time and investment and she even felt that her own work could start to suffer. To save his time, P29 stated that he sometimes intentionally did not provide answers right away. For example, when using instant messaging, he sometimes got too many messages to handle. To cope with the overload of questions, he developed a strategy: "well-intended ignorance." He said, "If you ignore them for a little bit, they think through it, 'Oh, I know this.' Or you get an email a day and a half later that says, 'Oh, don't worry about that. I know what to do.'" In addition to the time initially required in providing information, the employees were concerned about the time that may be required in the future for further interaction and collaboration. For example, P26 mentioned, "There's a fear of too much collaboration enables too much collaboration." He added that, this fear prevents some employees to publicly share their knowledge through knowledge repositories or social media.

4.3.4 Summary: Practices and Challenges of Collegial Information Mediation

The findings in relation to the practices of collegial information mediation revealed that, through the conversational process, information needs that the seekers initially held were jointly negotiated and mutually formed. Three different patterns of change in the information needs were identified: it became targeted, expanded, or was reconstructed. The implication for system design of this finding is to provide an effective method for the process of joint negotiation of information needs. Specifically, the system should allow users to easily reframe problems and capture how their understanding of a problem has evolved.

Regarding the typology of information mediation, it was found that mediation between colleagues in the workplace is not only a knowledge addition, but also a value addition practice. The results of this study showed that, in the context of everyday work, value addition is most prevalent type of information mediation, followed by knowledge addition and alternative suggestions. Along with the typology of tasks leading to information mediation discussed in the previous section, this typology of information mediation contributes to a clearer conceptualization of informal information mediation.

This study also examined the factors that affect the extent and type of information mediation. Participants reported that the information mediation they provided was influenced by seekers' characteristics, such as their level of expertise, communication style, hierarchical level, and willingness to learn. In addition, participants mentioned that they took into account their own preferences when seeking information. Their preferred way of seeking information was carried over to and shaped their strategies regarding extent and type of information mediation.

In terms of the communication media used in the process of information mediation, face-to-face conversation was the most preferred medium even though other electronic communication media were available. In the cases when multiple media were used, a common pattern was a mix of oral (e.g., face-to-face, phone, online conferencing tool) and written communication (e.g., email, instant messaging, and fax). Participants reported that it was the information seekers' choice that determined which communication media were used, but the initial choice was switched to another type of media either by the seekers or the givers. Looking at the specific factors that affected the

decision regarding which communication media to use, participants mentioned that, both when seeking or providing information, they took into account the characteristics of information that needed to be shared, such as its equivocality and subtlety, amount of interaction, and the need to record the conversation for future reference. In addition to those factors, participants reported that when seeking information, their choice of communication media was affected by the characteristics of the givers, such as their social closeness, preference regarding communication media, and preparedness for the information-providing activity.

The findings in relation to the challenges of collegial information mediation revealed that participants had difficulties with regard to communication, comprehension, information seeker's attitude of acceptance, and time. From the seekers' perspective, the challenge was in effectively communicating their needs to the giver (communication), fully understanding the information given by the giver (comprehension), admitting their need for help from others and accepting information that was contradictory to their previous knowledge or belief (attitude of acceptance), and getting information in a timely manner (time). From the givers' perspectives, the challenge was in effectively communicating information and ensuring that the seeker correctly understood it (communication), fully understanding the seekers' request (comprehension), providing information in such a way that it would be accepted by the seekers (attitude of acceptance), and committing time to provide information (time). The challenges identified provide a framework for the discussion of how to encourage and support collegial information mediation. The specific implications will be examined in the following chapter.

4.4 Interpersonal Trust, Information Credibility, and Value

This section presents the results of the third research question of this study: In the process of collegial information mediation, how do people perceive the interpersonal trustworthiness, credibility of information, and value of the overall experience? Previous studies on trust tend to focus exclusively on the perspectives of information seekers, while paying relatively little attention to the perspectives of information givers. However, interpersonal trustworthiness and credibility of information are assessed not only by those who receive information but also by those who provide it. In addition, the worth of the

overall experience of information mediation is evaluated by not just by the information seekers but by the givers. This section examines these dual perspectives to gain a more complete understanding of trust perceptions and evaluations in the process of information mediation.

4.4.1 Interpersonal Trust

4.4.1.1 Dimensions of Interpersonal Trust

During the interviews, participants were asked to describe how and why they trusted the person whom they sought or provided the information from/to. The following three dimensions of interpersonal trust emerged as a result of the analysis (See Figure 8 on the next page). First, participants described their trust in relation to the *factors* affecting their trusting belief. This dimension includes two types of trust - *benevolence* trust and *competence* trust. Benevolence trust is the perception that the trustee is honest and would not harm the trustor even if the opportunity were available; competence trust is the perception that the trustee is knowledgeable and possesses expertise in a certain area (Levin, Cross, Abrams, & Lesser, 2004; Mayer et al., 1995). Second, participants also characterized their trust in terms of the *bases* on which their judgment of trustworthiness was formed. This dimension involves five types of trust – *experience-*, *position-*, *membership-*, *reputation-*, and *disposition*-based trust. This categorization is similar to that introduced by Kramer (1999) in his review of the trust literature in which he identified six bases of trust including dispositional trust, history-based trust, third parties as conduits of trust, category-based trust, role-based trust, and rule-based. The findings of the present study revealed that trust was developed based on previous experience and interactions with the trustee (experience-based), role and work tenure in the company (position-based), shared membership in the same department or the company as a whole (membership-based), word-of-mouth information about the quality of the trustee (reputation-based), and natural tendency to trust other people (disposition-based). Third, participants reported that their judgment of trustworthiness involves two different *targets*: *trust of others* and *trust of self*. The analysis reveals how those dimensions are interrelated and contribute to trust perception in the process of information mediation.

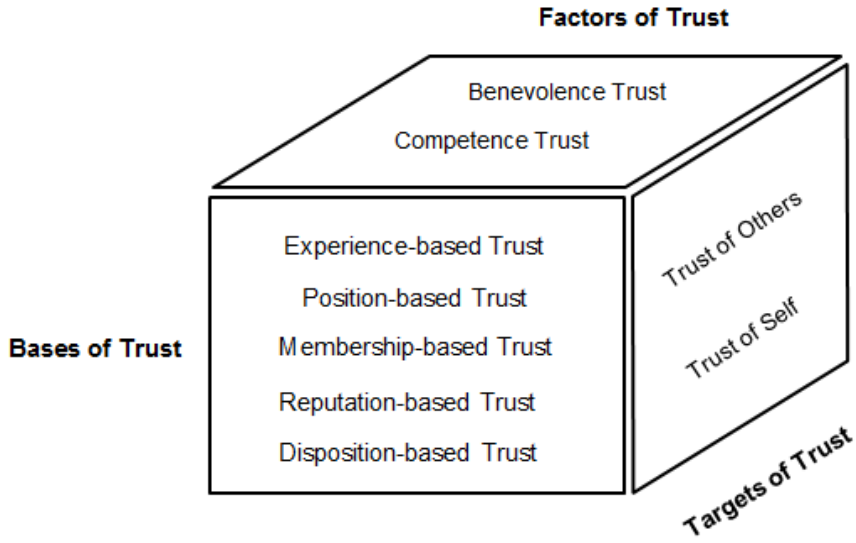


Figure 8: Dimensions of Interpersonal Trust

a. Information Seekers' Judgment of Trustworthiness

In the case of information seeking, participants described their judgment of an information giver's trustworthiness in terms the two dimensions, two factors and five bases of trust.

Regarding the factors of trust, participants made a clear distinction between the judgment of competence and benevolence trust. The elements of competence trust included the information giver's expertness, knowledge, and ability, while those of benevolence trust included the information giver's goodwill, honesty, consistency, and openness.

Several participants reported that when seeking information, benevolence trust was more important than competence trust. For example, P17 stated, "I would trust them with the narrow confines of them giving an expert opinion about something but I think trustworthiness is a bigger attribute than expertise in a subject." P28 similarly stated, "Just because they're an expert doesn't mean that they're reliable and trustworthy...So they can be super smart but that doesn't always mean they'll send you in the right direction." P23 mentioned that someone could still be trustworthy even though he or she was not an expert yet. He stated, "They could be fairly new and still be trustworthy and reliable if they're always there when you ask them a question and provide you some type

of help and it works." P38 also mentioned, "You don't have to be an expert but you can be very trustworthy."

Analysis of how participants weighed benevolence over competence revealed three categories of situations in which the information giver was perceived to be an expert but not trustworthy: When the giver was (1) an expert but not forthcoming, (2) an expert but a shirker, and (3) an expert but a gossiper. First, a couple of participants found it to be difficult to trust the experts who were not forthcoming with information. P09 stated, "You can know a lot but also you could hold things back and that doesn't necessarily mean you're trustworthy." P21 mentioned that there were some people who did not share details with him because they wanted to "remain the sole expert." For P14, it was those strong-headed experts whom she found difficult to trust. She pointed out, "Everything can be done in more than one way, but some people are strong that, 'No, you cannot do it that way. This is the only way.' They are being biased." Second, it was reported that one could be competent to provide information but a shirker. For example, P35 reported that somebody could be an expert, but, at the same time, might "craft his responses so as to minimize the amount of work that he has to do." Lastly, it was found that someone who was an expert but a gossiper could not be trusted. P22 stated that being an expert does not necessarily indicate being reliable because "you can have someone who has strong expertise but they could be big gossipers."

Some participants pointed out that, depending on the type of information being sought, trust could be based solely on the information givers' competence, not necessarily requiring their benevolence. There was a tendency when consulting someone for technical or factual information, compared to when asking for an opinion on cultural or managerial issues, for participants to view competence as a more important factor than benevolence in judging the givers' trustworthiness. When asked if both competence and benevolence were required to trust someone, P23 responded, "It's easier if there's both but it's possible to trust if they're not trustworthy." He further explained, "I can give you examples of people that I have trusted technically but I can't trust personally…I would never want to trust my security with them but if I need them to provide some technical input, that's fine." P30 similarly stated that the information giver did not have to be personally trustworthy in "technical communications," while relational trustworthiness

was important when seeking information regarding "HR or political issues." P42 pointed out that benevolence trust was important when seeking an opinion while it was not required when seeking factual information. She said, "A fact is something that is pretty much universal. But opinion it's not; opinion is based upon every person's particular personality and particular viewpoint. [It is] more about trust." P44, who is a scientist, reported that, in accomplishing daily work in his field, he cared more about "technical credibility" than "personal credibility." He added, "I'm working in a technical field…I don't necessarily have to know you personally…to trust the information."

In terms of the bases of trust, participants illustrated their trust perception in the following five categories: experience-, position-, membership-, reputation-, and disposition-based trust.

First, a number of participants reported that their trust was based on personal experience or work history with the information giver. They reported that experience-based trust was important in judging competence and benevolence, but more so in judging benevolence as it usually this kind of trust is derived from interactions over time. P03 believed that the information giver had no ulterior motives because "since I have joined here she has become probably one of my most trusted confidants. I take almost everything to her." P15 put her trust in her mentor because they had developed a confidential relationship as mentor and mentee. P24 stated that she could trust the information giver because, during the interaction, "he's so direct, I don't think he has any hidden agendas…it's my intuition." P27 also pointed out that, based on previous work history, he knew that the information giver was trustworthy. He stated, "He's one of those guys that if he doesn't know, he doesn't know. He would say, 'I don't know'…A lot of people will make it sound like they do know and they really don't and then they're trying to impress you, I guess." P36 explained, "[I know he's a very unassuming guy and...I knew he had no ulterior motives. I knew he was very assuming positive intent and...He won't say anything just to fill a void." P43 said, "He's a nice guy. I mean because we do work together a lot. We do have a lot of camaraderie." Confidence in an information giver's competence was also developed through work experience. P21 said, "Every time I have asked him about this thing, he's pretty knowledgeable." P23 similarly stated, "I have worked with him in the past...There's a lot of other people but he's the

most qualified I felt out there...My past experience working with him and he's always been helpful." P28 trusted the information giver because they had worked together in the past and "he hasn't given me bad information in the past so I can't imagine him doing it now."

Some participants reported that their trust was derived from individuals' positions such as their work role and tenure in the company, rather than from personal relationships with the individuals. It was found that those attributes were used more often as a predictor of the competence of the information givers than as a predictor of their benevolence. When asked what led to the belief that the information giver was trustworthy, P01 responded, "She'd be about the best person to ask for that since she's the system administrator on that system." P19 believed that the information giver had enough expertise because "she's a director and, as a director, does have to coordinate activities outside of her direct reports." P04 mentioned that the information giver's work tenure and seniority in the company was an important attribute on which her trust was based. She stated, "If somebody has a lot of time that they spent in the company and they are still around, that means that whatever they do is correct. Whatever they do is trustworthy because obviously they are moving up...so why you wouldn't trust them? "

In some cases, it was the shared department or company membership that participants based their trust on. Analysis shows that participants tended to attribute not only competence but also benevolence to other in-group members. P14 stated that being in the same department provided a basis of for trust. She said, "That's my first time I am working with [the person]...But we all know that the project management department would know the things or would at least guide you to the right people." Shared membership within the same company also was a predictor of trust. P04 explained that he trusted everyone in the company by default because they shared the understanding that "it is a relationship based company." He said, "Because you cannot do one project on your own. You need people from different departments so that's probably why [we trust one another]." P29 similarly stated, "Most of the people that we go to in this building are trustworthy and experts." He further explained, "It's probably more familiarity than anything. So, 'Yeah, I haven't worked with this person so I don't really know. I don't have a reason not to trust them but I just don't know them.'" P32 also said, "I don't feel

like this is the kind of company where people are trying to trip you up." Comparing his experience in other companies, P43 mentioned, "It's different in some of the other companies I've worked for is that's implicit that people are supposed to be trustworthy and that's part of the whole idea."

A few participants reported that their trust was based on the reputation of the information giver. They found the third-party's judgment to be valuable information especially in creating competence trust rather than benevolence trust because they thought the development of the latter usually required personal interaction. P17 stated, "You can learn somebody's an expert by somebody else that you trust saying they're an expert." He further described, "[However] I think trustworthiness is harder. That almost takes an interaction with the person." P23 similarly mentioned that his trust was based on "word of mouth from other people that have worked with him and their opinion of him and experience with him." P35 noted, "She's well respected and has a good reputation and I have never heard anything bad about her so my default would be to trust whatever she said."

A couple of participants reported that their judgment of trustworthiness derived from their general disposition to trust other people. P26 explained his general belief in his colleagues. He said, "The trust part I feel like in many cases especially if it's a coworker relationship, that unless I have some data to show me that there should be a lack of trust or a reduced trust, that I'll usually start with trust...So it's like it's yours to lose." P43 described his tendency to trust others. He said, "Maybe I do trust too much sometimes an advice...As I said, not look into it deep enough because it just sounds so good or something." Knowing his own tendency, he tried to "watch" himself and be more analytical about the information given.

b. Information Givers' Judgment of Trustworthiness

When giving information, participants described their trust perception in the third dimension, targets of trust, in addition to factors and bases of trust (see Figure 8). The two different targets of judgment were trust of others and trust of self. The trust of others involves the judgment of whether the individual to whom they provide information is trustworthy or not. The trust of self involves the judgment of whether oneself is trustworthy as an information giver.

A number of participants reported that, when giving information, they took into account the trustworthiness of the information seeker. The judgment was based on the seekers' benevolence, but rarely on their competence. They explained that the perceived trustworthiness affected their willingness to take risks, which ultimately influenced the extent and type of information mediation. P04 stated,

> With the people you are close to maybe you are more relaxed talking to them and you feel like you can say anything without being judged, I guess? But that's why people giving you more advice when they are closer to you but with the people that are not as close, maybe they are trying to be more constrained like, 'Oh, my God, did I say it right?' It doesn't matter if you have a lot of experience or not having a lot of experience. I think people unconsciously are doing that.

P26 similarly mentioned that how much he trusted the seeker determined how much risk he was willing to take in giving information. He stated, "If I trust the person, I may be more direct in my advice. If I don't trust the person, I may qualify the advice." He further explained, "If I trust you, I may just come out and give you a more complete opinion of what I'm thinking and feeling and about a situation and as opposed to if it's not someone that I trust." P40 also agreed that the trustworthiness of the seeker affected the extent of information mediation, but it differed depending on the nature of the issue. When asked how trust affected how much information she would share, she replied, "If it's technical, not so much. If it's something more just like a career related something, maybe so."

Regarding the trust of self, an interesting tendency was observed. The more senior and experienced in the company participants were, the more likely they associated trustworthiness of themselves with their competence. When asked where their confidence in their advice came from, those participants who had worked there for over 25 years replied that it mainly derived from their ability and expertness. For example, P16, who had tenure of over 32 years, replied, "I think [my advice] was pretty trustworthy, just based on my experience and my in-house expertise." P18, who had tenure of about 27 years, mentioned, "She knows I have been here a while and do understand the different areas." P34, who had worked there for over 26 years, said, "I feel [my advice was trusted]…he knew what my skills were." P37 similarly stated that his authority came from his product knowledge accumulated over 25 years of work experience.

Compared to those experienced participants, those who had tenure of less than seven years in the company were more likely to emphasize the bases on which their own

trustworthiness could be established, associating it specifically with their position or membership. When asked why she thought her advice was trusted by the information seeker, P22, who had tenure of about two years, replied, “Mostly because of my role, but she and I have developed our relationship over the last year through face-to-face communication, on the phone communication, email.” P26, who had worked for just over two years, similarly stated that the trust of self was derived from his position in the regulatory/legal department. P27, whose tenure was just over three years, also stated that his authority came from his role. He stated, “I’m designated as a person [for this particular product] within our group and when any sort of work comes up, usually I’m the one that has to go do it.” In terms of membership-based trust, P06, whose tenure was about six years, pointed out that her authority came from membership in her group. She stated, “As far as like trustworthiness, people in the organization really value and are confident in our group’s ability to provide that kind of information and advice and so I think from that perspective, they’re confident with it.” P29, who had worked there for just over six years, similarly stated that the information seeker trusted his advice because of his membership in the office. He said, “From [here], the headquarters, people just expect you know it. So I think we’re by default seen as trusted sources.”

4.4.1.2 Evolution of Interpersonal Trust

In the information-seeking cases, it was found that trust evolved through the experience of information mediation. According to Hogarth (1987), all choice-making behavior reflects two types of judgment, prediction and evaluation: predictive judgment refers to what people expect to happen when making a choice, while evaluative judgment denotes the value assessment through which they convey preferences. In the process of information mediation, information seekers made a predictive judgment that led them to a decision about whom to turn to for information. As a result of the judgment, the information mediation occurred, and when information was given, they made an evaluative judgment. The evolution of trust was derived from the gap between the information seeker’s expectation and experience regarding the trustworthiness of the information giver. During the interviews, it was found that the evolution took different directions, positive or negative, depending on the trust perception prior or subsequent to the information mediation.

a. Positive Changes in Trust Perception

Positive changes in trust perception were observed frequently when expectations regarding the giver's trustworthiness were unclear, due to a lack of experience with the giver, or low. The information mediation process increased participants' confidence in the giver's trustworthiness, in terms of either benevolence or competence.

With regard to the giver's benevolence, participants tended not to have clear expectations due to a lack of work history with the giver, but their trust increased during the mediation process. They attributed the positive changes to (1) the manner in which the giver provided information, or (2) the formation of an emotional bond.

The confidence in the giver's *benevolence* increased when a request was answered in a timely and non-judgmental manner. When asked how her perception of the giver changed after conversation, P14 replied, "I went without knowing anything about her. But she responded – I knew she was not in the office – immediately to me to make me feel comfortable... So that made me feel nice that she was reliable." P44 mentioned that he was able to trust the givers more, because "they were so willing to share and not judgmental like, 'Hey, you don't know how to do this?'"

When they felt that they had started building an emotional bond with the giver, participants reported that they would trust the giver more than before. P28 described a situation when the giver had to "confirm everything" with someone else to answer her questions because the giver was "new to the role." Even though she felt the giver did not have enough expertise in the area in which she needed help, she stated, "I'd say trust her more [than before] because we're starting to build more of a working relationship." Similarly, P38 stated, "After actually having that discussion then I think that starts to build a relationship so in the future when you go talk about something, at least you have that past experience."

With regard to the giver's *competence*, positive changes tended to occur when their expectations were low based on their assumptions, but the mediation process proved that their expectations were wrong. For example, P40 reported that he did not have high expectations for the giver because "He's in his 30s...He is quite a youngster" compared to him. After conversation, however, he found that his assumption was incorrect and his

confidence in the giver's competence increased. He said, “[His advice] broadened my perspective of what I might be facing...He showed wisdom that I hadn't expected.”

b. Negative Changes in Trust Perception

Negative changes in trust perception were reported when participants’ expectations for the giver’s competence were rather clear, but the interaction with the giver failed to meet their expectations. They attributed the negative changes to (1) the giver’s inability to provide information without others’ help, or (2) inconsistency between information offered by the giver and by other sources.

It was found that their confidence in the giver’s competence decreased when participants became aware that the giver had to consult other people to answer their request. For example, P08 reported that she found the information giver was not as competent as she expected because the giver had to “get information to give me information.” She added, “So some of it she wrote down and she was going to ask people about that stuff.” Similarly, P33 pointed out that her perception of whether the information giver was reliable changed negatively because the giver asked her about the solution he was providing. She said, “I expected more expertise and when I didn’t get [information], I was a little disappointed and I walked away feeling like, ‘Maybe they really don’t know what they’re doing.’” She further explained, “They were telling me, ‘This is how we would resolve,’ but they were kind of questioning whether it was really the best way to resolve it. So...it really drove the lack of confidence in what they were giving me.”

Participants’ confidence in the giver’s competence decreased when they noticed an inconsistency between the information provided by the giver and that from other sources. For example, P26 stated that, after the conversation, he felt that the giver was still “trustworthy” but became unsure about whether the giver was a “reliable” source in regard to the particular area because of the discrepancy between what the giver provided and what others told him. He explained, “I had answers from other people that were different from the answer that I got from his.”

4.4.2 Information Credibility and Value

While the previous section focused on *trust in people* – how participants perceived the trustworthiness of each other, this section examines *trust in information* – how they perceived the credibility of information received or provided – and *value of experience* – how they perceived the value of the overall experience of information mediation.

4.4.2.1 Judgment of Information Credibility

One of the objectives of this study was to identify specific strategies for credibility judgment of information in the process of information mediation. Here, credibility is people's judgment of whether the information they receive from or provide to others is believable or not. During the interviews, participants were asked to describe how they assessed and confirmed the credibility of information they received, as well as how they established the credibility of information they provided.

a. Information Seekers' Strategies for Assessing Credibility

When seeking information, one of the challenges of collegial information mediation was in assessing the credibility of information received. For example, P18 stated that distinguishing whether the information she received was credible or not was the most difficult aspect of seeking information. She further explained that instead of taking information at face value, she asked questions to find out whether the giver had done "the due diligence behind it." She said, "I usually ask 'tell me why that is or what goes into that to get you to that.' And then a lot of times you'll kind of discover that maybe they need to do a little bit more work." P33 stated that assessing whether the giver was "comfortable with the information [that he was providing]" was the most challenging. P34 also noted that assessing whether "he is giving me the right advice and the best advice" was the biggest challenge.

To deal with the concern about information credibility, information seekers employed a number of strategies. The strategies were categorized into the four themes: (1) confirmation from other sources, (2) internal sense-making, (3) authority of first-hand knowledge, and (4) acceptance without belief.

First, some participants reported assessing the credibility of information based on whether the information was consistent with what other sources, either documents or people sources, said. P16 stated that she was able to trust the information she received regarding food safety because the information giver "cited the books that make up the standard and clearly pointed out for me." In assessing the credibility of information, P18 relied on external validation by other colleagues. She said, "She needed to check with a lot of people so I know that she did that and [that] they felt comfortable about the decision. So yeah, I did trust what she was saying." In the case of P25, due to the inconsistency between the information he received from the information giver and what he heard from other sources, he could not put his trust in the information. When asked why he was not able to completely rely on the information received, he replied, "It just wasn't connecting with...what I spoke with the other three." Similarly, P26 explained a situation when he could not trust the information. He said, "I had answers from other people that were different from the answer that I got from [the information giver's] answer." P27 also emphasized the importance of external validation in assessing information credibility. He stated, "If they tell me something and I can read it somewhere else and it says the same thing, I will probably trust them. If they have the same opinion as everyone else does, then I'll probably trust them."

A few participants assessed the credibility of information through their internal sense-making process. P13 stated that the internal sense-making process was important especially when the information was received from someone whom he had no previous relationship with. He explained, "If somebody I have never met tells me, 'Try this, that or the other thing,' I'll think about, 'Does this make sense based on what I already know. Is it worth pursuing?'" Similarly, P29 expressed confidence in his sense-making ability. He explained that, during the conversation, he was able to distinguish between which suggestions were worth following and which ones were not. P38 pointed out that he usually relied more on his internal sense-making than on the level of expertness of the information giver when assessing information credibility. He explained, "[When seeking information], I run it through my own filter about, 'Does this make sense what they're saying?' Someone could be an expert on something and could be right but for me, if it doesn't add up, I'm not going to act on it." P43 also reported that one of the key criteria

he used for assessing credibility was to see "if it makes sense." Especially when seeking technical information, he made sure that he could understand it "not just the surface," but if it makes "[not just] common sense but technical sense" and it "resonates" with him. To perform the "internal validation," he sometimes took specific steps. He further illustrated, "I try to maybe do some calculations or turn things around just to see if it's [correct]. If I look at the data in another way, can I still get the same answer?"

To assess information credibility, some participants examined whether the information was based on the information giver's first-hand knowledge. The authority of first-hand knowledge enabled them to put their trust in the information. P16 pointed out that she trusted the information because the information givers "got their credibility behind them from past experiences." P23, who was seeking advice on how to deal with a sensitive ingredient, was able to trust the guidance because the information giver gave him pointers on how to remedy this problem "based on his past experiences." P26 stated that, even though he did not know the information giver very well, he relied on the authority of the giver's first-hand knowledge. He said, "He referred to some of his past experience personally, technically in that area. So he had kind of reinforced his technical credibility with me." P44 explained that he could trust the advice on how to use a system to order ingredients because he knew that the information giver was "doing it all the time" and she "showed me" how it worked.

Occasionally, participants reported that they accepted information without trusting it. P04 stated that there were times that she acted upon advice even though she did not agree with it. She distinguished between merely accepting advice and trusting it. She said, "If you are accepting that advice it's just, 'Okay, I'm just going to use this advice for now but I'm not sure if it's going to work'...But then if you are trusting it, it means that, 'I am sure this is going to work.'" P09 pointed out that she sometimes had to follow advice which she did not agree with because she was "told to do it" and "it's just part of the job." P18 similarly stated, "Sometimes you may not trust somebody but because of where they are, you have to do what you're told to do." P19 provided a specific example of the acceptance of advice without belief. She, as a scientist, encountered a number of situations when a group of scientists had differences of opinion. She said, "[In those situations,] I don't agree with the way we're approaching science on

a certain thing. But we've decided as a team that we're going to go forward in this manner and so while I may not agree, I am aligned with how we are as a team."

b. Information Givers' Strategies for Establishing Credibility

When providing information, the issue of information credibility was also regarded as one of the challenges of collegial information mediation. From the perspective of the information givers, the challenge was in establishing the credibility of the information they were providing. P02 stated, "The toughest part with giving advice is that you can't ever say what the exact right answer is." P07 similarly mentioned, "The most difficult part is to ensure the accuracy of the information." He further explained, "I may be aware of things that I am asked to talk about but I haven't necessarily verified them…I can relate something that I've heard to somebody no knowing that perhaps what I am relating isn't exactly true." P11 said, "The most difficult part is figuring out that what advice to give if you're not sure, if you question how reliable it is." P12 noted, "It's probably being responsible for the information that you give and not giving falsified information or not giving uniformed information that you think is right." P18 pointed out, "the challenge is making sure that you're giving the right information and complete." P28 also expressed concern about information credibility and said, "I don't want to tell someone to go do something, or 'This is the way I would do it' and then find out that, 'No, that's not how it should be done.'"

To deal with the concern about information credibility, information givers employed a number of strategies. The strategies were categorized into the four themes: (1) characterizing as an option, (2) honest self-qualification, (3) citing other sources, and (4) showing first-hand knowledge.

Some participants pointed out that for signaling the credibility of information it was important to characterize it as an option instead of as a mandate. When asked to describe how she made sure that the information she provided was perceived to be credible, P04 replied that she made it clear that what she was providing was "just a suggestion." She further explained, "I'm there for giving her what I think about what she should do but it's not something that she has to do." P18 said there was no reason for the information seeker not to trust her information because she gave her "options" instead of saying, "This is the only thing you can do." Rather, she clearly stated to the seeker, "If

you want to move forward with it, you can. But here is what you need to do to do that." Similarly, P19 thought that the seeker perceived her information to be credible because she was not necessarily trying to tell her, "This is what you have to do." She further noted, "I was more trying to get her to think, 'Oh, that makes sense that that's what I would do next.' So I think she thought it was trustworthy partly because it came from herself and she just had to have somebody help her think through it." P21 said, "[I was trusted] because I didn't overextend in terms of saying, 'Oh, I had the answer.' I told him I had some things that were maybe hints for him to keep moving but not the answer itself." P39 mentioned that it was important to give information in a way that it was not necessarily telling them what to do and was not an order. She pointed out that most of the employees were intelligent enough to make their own decisions based on the information provided. This strategy of characterizing advice as an option proved to be effective. In his information-seeking interview, P40 stated that he was able to trust the advice received from a colleague, because "his advice was sufficiently open." The colleague told him, "I'm not going to tell you 'you can't do it.' But you've got your options lined out for you and so it's up to you." P40 said, "that is the kind of advice I like to get."

A number of participants reported honesty and transparency as their strategy to establish information credibility. They emphasized that it was important to honestly characterize their qualifications and knowledge when providing information. P14 pointed out that "human beings get a tendency of assuming that we know things…and want to feel that we know something." She mentioned that, acknowledging this tendency, she tried to be honest about what she knew. When providing advice on a task that she was not familiar with, she told the information seeker, "I am doing it for the first time. [But] what I did, I will give it to you." P32 said, "If I not certain about something, I don't tend to give advice one it…I try to be very careful about the things that I know and the things I don't." According to him, when he was not completely confident in the advice, he made it clear that it was just an opinion. He mentioned, "I say 'I would do this,' and use a conditional tense." P38 similarly stated that when providing information, he tried "not to come off as like overbearing or as like a know-it-all." Rather, he told the information seekers "here's what I would do," emphasizing that what he was providing was his opinion. He said sometimes he even solicited the seekers' opinion as well because "they

might think of a better way." P39 stated that she was confident that her advice was perceived to be credible because she honestly qualified her knowledge. She said her knowledge was "very surface-oriented" and was "not truly in-depth" because it was based on conversations she had had during a couple of occasions with other people. She further noted, "So I didn't want to steer her and tell her, 'This is what you have to use'...So that was why I sort of said, 'Well, check with a couple of other people and they might have more information than what I can give you.'"

Citing other sources for external validation was another credibility-establishing strategy. P02 said she was confident that her information was perceived to be credible because she had a manual to "back up." P12 stated that she always found information from another source to support her information. She said, "Maybe it's in a file I have or on our intra-websites or…going to someone that's maybe has been in a similar situation." P17 replied that his advice was trustworthy because "it was right out of the FDA regulations…and there wasn't any real grey area in interpreting it." P27 similarly stated that he always made sure "if it's something that is documented somewhere" and "look it up" to "reference it." When asked if he thought his information was perceived to be credible, P40 replied, "It was written down so I believe it was 100% absorbed." He also added, "But whether the learning that went with it was also absorbed, I don't know." While it was important to show the consistency between the information provided and information from other sources, P19 pointed out that it was also crucial to give a consistent message to everyone in the organization. In describing her way of signaling credibility, she said, "I tell him something that I've told other people...It's just good for him to hear that he's getting the same message from everywhere and it makes it more trustworthy."

A few participants reported that showing first-hand knowledge was their strategy to establish information credibility. When asked why he thought his advice was trusted by the information seeker, P12 replied, "[Because of] past experience. I was drawing a lot on what I had seen in the plant and what I knew worked and didn't work." P24 similarly stated that she was confident in her advice because she was able to give "concrete examples" based on her personal experience. P27 pointed out, "I always try to relate [my advice] to my experience…then try to [explain] why it's going to work…because of these

reasons." P39 reported that it was important to show her first-hand knowledge not only of a work task but also of a person when providing advice. She mentioned,

> [You have to] give them the explanation as to, 'This is why you should be doing it this way because either I have had the experience in the past that didn't quite work out' or, 'I know for a fact that this is the way this person operates and you want to make sure that you keep them happy.'

c. Interpersonal Trust and Effort Taken for Judgment of Information Credibility

While describing different strategies for judgment of information credibility, participants reported that how much effort they would put into the credibility judgment, either in assessing or establishing the credibility, was strongly influenced by how much they trusted a person.

When seeking information, interpersonal trust affected their effort in assessing the credibility of information received. A number of participants reported that if the advice came from someone they already trusted, they usually accepted it without putting further effort into assessing or confirming the credibility of the information. P16 stated, "If you know they're an expert, then they should be an expert and you shouldn't have to dig to find more information." She added, "So pretty much [I] take their information as face value for the first start." P23 said that he "really trusted his advice" without any doubts because other people speak highly of him." P27 similarly reported, "If there's someone out there that is highly regarded as…someone that knows what they're talking about, then I don't really research anything." P32 stated, "By trust, it would seem to me that I would take the advice without evidence and that's ted up in the person." He further stated, "If this is the vice president of blah-blah, I'm going to trust their advice because they're the vice president of blah-blah…without knowing anything about the person."

Some participants mentioned that the way they responded to advice that was contradictory to their beliefs differed depending on how much they trusted the information giver. P24 pointed out that the trustworthiness of the information giver affected how soon she would let go of her original idea. She said, "If I don't trust them, first I'd be mad and then I would get over it. But if I trust them, at least I wouldn't have to go through that 'I'm mad' process as much." Similarly, P26 said, "If I trust someone and they give me a contradictory advice, I'll try to understand why they're giving me a

contradictory advice and take that into account more." He further explained, "If I don't trust the person, I may judge their advice on some assumption I have and ask them some questions to test those assumptions, and then probably make a decision to either continue testing assumptions or if they fail the next test, move on." P34 mentioned that, even though "it may be unpleasant to do," he usually wanted to act upon advice if he believed the person gave him the right advice.

In the case of information-giving, a couple of participants mentioned that interpersonal trust influenced their effort in establishing the credibility of the information they provide. P32 explained that compared to when a trust relationship had already been built between him and an information seeker, in the absence of trust in a relationship he tended to defend his opinion and provide more support to his argument. He stated:

> [When there is no trust built,] I would say, 'Well, I believe this because of A, B, C and D' and be very explicit about those steps, while with [the person with whom trust has been built,] I might just say, 'This is what's going on.' And then if she really wanted to prove in, she could but I wouldn't necessarily have volunteered because the relationship's already there.

P42 differentiated between giving factual information and giving opinions and pointed out that the latter was much more difficult. She stated that if she trusted the seeker, she did not feel the need to signal the credibility of her opinion, whereas she was more careful about giving her opinion to those with whom she had not developed a relationship yet.

4.4.2.2 Judgment of Value of Information Mediation

This section discusses how participants perceived the value of the overall experience of collegial information mediation. Here, the value is people's judgment of the quality of interpersonal interactions and benefits of the results of the interactions during the process of information mediation between colleagues. During the interviews, participants were asked to describe how they perceived the value of information mediation when they received or provided information.

a. Information Seekers' Perceived Value of Information Mediation

When seeking information, it was found that participants assessed the value of information mediation in terms of the level of information needs met after receiving

information. The episodes they reported were categorized into three levels – the cases in which they felt they received less than, as much as, and more than they asked for.

Some participants felt they did not receive enough of what they asked for in the absence of a specific direction toward a solution, or a solution itself. P15, who needed advice on how to build trust within her group, consulted two colleagues. After consulting the second person, she reported that her information needs were not satisfied. She said, "What I got from her was a couple of ideas and then reinforcement again that I needed to deal with this [issue]. I was hoping for a little bit more of a direct, 'This is what you need to do.'" P25, who needed to get advice about how to remove some inconsistencies in his data, did not feel his needs had been met because the information giver was not able to add new knowledge to the problem. After talking to the person, he had to consult another four people to come to a solution. P33 mentioned that she was not satisfied with her interaction with the giver because she received just "half of the information" needed. She further explained that she had to re-contact him to explain that she needed more and clearer information that was "put together in a better format." P35 stated that he was a bit disappointed after a conversation because "there wasn't really much in terms of 'action items' that came out of it."

Participants felt their information needs had been met mostly when they received a direct answer to a question. However, even in the absence of a direct solution, some participants found the experience of information mediation valuable if they were given at least some direction toward a solution. The conversation was still perceived to be valuable as far as it guided them to move onto the next stage of information seeking, even though it did not offer a final answer. P09 said she felt her needs had been met because after the conversation, she was able to make "a list of tasks" that she was going to do next. P23 reported that he was satisfied with the conversation because the information giver did not solve the problem "right then" but was able to "eliminate some of the common problems" and direct him to a person who would be able to fix the problem. He said, "He didn't give me a direct answer…but eventually we get to a resolution on it." P28 similarly stated that she found her experience of information mediation valuable because even though she did not receive a direct answer, she "learned how I could go get it." P30

mentioned, “I think [it was valuable]. We’ve got some more work to do definitely and we have to meet with him again. But, we’ve got enough to get started.”

When they were given additional insights, tips, or alternative approaches to the problem at hand, participants felt their information needs had been ‘more than’ satisfied. P01 stated that she “got more out of it than just an answer.” She further explained, “It’s an experience. Any experience you can gain…you can apply it to the next issue that might come around.” P04, who consulted a chemist to get help in preparing ingredients, reported that she gained not just knowledge of what but also knowledge of why. She knew that the balance between two ingredients needed to be met in a system, but “did not know why it has to be balanced” until she talked to the colleague. P15, who needed advice in dealing with a conflict between team members said, “What I really wanted was just to see if she had any advice on how to deal with it and to really reinforce, ‘Was I doing the right thing?’” She added, “She did that but then what I walked away with, on top of that, was knowing that there is an exercise that I can do with my team around this book that I didn’t know about before.” P23 felt his needs were more than satisfied because the colleague gave him “a few suggestions of things to try so if one didn’t work, I could go to the next or next or try all of them at once so he definitely gave me a few options.” P29 similarly reported that he received information “probably a little bit more” because the colleague provided “little tips and tricks that he knows…and kind of things to look out for.” P42, who asked for feedback on planning an upcoming event, said “I didn’t specifically ask about [using a ballot system] but she definitely had some suggestions about that that were actually quite valuable.”

b. Information Givers’ Perceived Value of Information Mediation

To understand information givers’ perception of the value of information mediation, participants were asked if they thought their information-providing experience was rewarding.

In most of the cases, participants reported that the fact that they were asked for help by a colleague was itself rewarding because it allowed them to feel *self-efficacy*. P01 stated, “It’s nice to know that people come to you as the expert and want to ask your opinion. Is that rewarding? I guess so.” P17 pointed out that a specific conversation with a senior colleague was rewarding because “usually he wants us to confirm what he thinks

he already knows." He added, "I think that this was the first he specifically asked me a question where I thought he truly was asking." P23 mentioned that information-giving experience "makes yourself feel useful." P27 stated that the value of the experience came from learning about his own ability. He said, "I learned something about myself because I was able to put all of these pieces together that I hadn't thought about before and I kind of reaffirmed whatever I thought about even later on after he had left." P31 pointed out that the information-providing activity gave him a feeling of "productivity," while P32 said, "[Through providing information,] you're extending your influence."

Their value perception was enhanced in the presence of cues that the information seekers trusted and acted upon the advice they provided. Participants described how the positive feedback from the seekers during or even after the conversation boosted their feeling of self-efficacy. P01 stated, "[When the seekers say], 'Yeah, that's a good decision' or, 'Yep, I agree,' it does make you feel like of like, 'Whew. Maybe I am—do know what I'm talking about.'" When asked why she felt that her advice-giving experience was rewarding, P04 replied, "Because she took the suggestions and I think it's the same day that she brought it up [to her team]...She told me that, 'This is what the team decided, too.'" P12 reported that knowing that his recommendation was chosen from among the other options made him feel that his experience was valuable. He said, "Having someone else reaffirm [my idea] made me feel like I was coming to know my role and how projects would proceed." P19 said, "I think the rewarding part was getting the confirmation that it was what he needed and that it was timely." P26 reported that she knew the seeker acted upon her advice, which included a referral to other colleagues, because she was copied on the emails regarding the "follow-up actions of referring this individual." P38 similarly stated that he felt his information-providing experience was valuable because he was told by the seeker "oh, that's a good idea. I should do that" and found out that his guidance was influencing the seeker's next steps. P43 said that he felt that his advice was trusted because the seeker "went off and utilized it to make a decision."

On the other hand, some participants reported situations when they felt that their information-providing experience was not particularly rewarding. First, it was found that when their advice was not able to clearly influence the seeker's decision-making, they

thought the experience was "not that valuable." P09 described a situation when her boss asked her to provide some input on a presentation regarding the team's future strategy. However, to her, the presentation seemed to be a "pretty done stuff" even though the boss called it "a draft." When asked if her experience was rewarding, she replied, "Not really that much…Because I think she already knew what she wanted it be and it was more of courtesy of asking me if I wanted to give input." She added, "I don't know if that was the intention but that's what I felt." P32 reported that her experience was "nothing that special." She further explained, "I didn't feel like, 'Okay, great, this is going to [influence her decision].' It's much more exciting to have, 'Here things are going to change and get moving,' but she wasn't really in a position to do that."

Second, a couple of participants pointed out that when they felt their information-giving activity was a part of their job they did not feel the experience was particularly valuable. P31 stated, "This one was more part of my job and it didn't feel all that special." He added, "When you actually solve something, those are more special. This one wasn't so much a solving; it was more communicating." Similarly, P44 said, "It wasn't highly rewarding. I mean it was just part of the job."

4.4.2.3 Factors Affecting Credibility and Value Perceptions

To examine which factors affect the perceived credibility of information and the perceived value of information mediation in both information-seeking and -providing situations, I analyzed the diary data with a linear mixed model followed by Bonferroni post hoc tests.

a. Effect of Gender, Tenure, Task Characteristics, Information Mediation Type, and Number of Communication Media Used

For the information-seeking diaries (206 entries), I analyzed the effect of eight different factors on credibility and value perceptions. The factors included individual characteristics such as gender and work tenure; task characteristics such as task type, task urgency, and task complexity; information mediation type; and number of communication media used in seeking information. For the cases in which multiple colleagues were consulted about the same task, the order in which information was received was also included. Table 24 shows the significance levels of the effects for each

of those factors on nine credibility and value measures, controlling for the other covariates in the model (see Appendix K for the estimates of the effects).

Table 24: Information-Seeking Episodes: Significance Levels of the Effects for Seven Factors on Credibility and Value Measures

		Gender	Tenure	Task type	Task urgency	Task complexity	Num. of media	Mediation type
Credibility of information received	Trustworthy			**	*			
	Reliable				*		**	
	Valuable			**				
	Agreeable			**	*	*	*	
Value of information mediation	Time well-spent			**				*
	Certain			**	**	**		
	Satisfied			**		**		
	Problem-solved			*	**	**		
	Learned new things							

*P<0.05, **P<0.01

Overall, the perceived credibility of the information received and the perceived value of information mediation were influenced almost exclusively by the nature of tasks - task type, task urgency, and task complexity – and also by the number of communication media used in seeking information. On the other hand, individual characteristics such as gender and tenure as well as the order in which the information was received had no significant effect on credibility and value perceptions.

We now look more closely at the effect of the nature of the task on credibility and value perceptions. First, task type was a significant predictor of several perceptions, including *trustworthy* (p=0.007), *valuable* (p=0.009), *agreeable* (p=0.003), *time well-spent* (p=0.004), *certain* (p=0.002), *satisfied* (p=0.003), and *problem-solved* (p=0.035). I performed post-hoc tests to determine for which task types the workers found the information less credible or information mediation less valuable. Across all measures except *problem-solved*, *verify* was the only task type that was significantly different from at least one other task type at the 0.05 level. This indicates that, when information was received on the task of verifying, workers tended to find the information less trustworthy, valuable, and agreeable, and felt the time less well-spent, less certain, and less satisfying compared to when information was received on other tasks. For *problem-solved*, there

were no significant differences found among different task types after adjusting for multiple comparisons. The lowest Bonferroni adjusted p-value (p= 0.285) was found between *gain non-technical know-what* (estimated marginal mean=6.02, *SE*=0.40) and *solve* (estimated marginal mean=4.61, *SE*=0.32).

Second, analysis reveals that task urgency had a significant effect on *trustworthy* (p=0.034), *reliable* (p=0.016), *agreeable* (p=0.041), *certain* (p=0.008), and *problem-solved* (p=0.001). The coefficient estimates show the positive association between task urgency and these five credibility and value measures. The largest coefficient estimate (0.27) was observed in the effect on *problem-solved,* which indicates that the perceived level of task urgency led to the greatest positive change in the average for the feeling of problem-solved after receiving information.

Thirdly, task complexity had a significant effect on *agreeable* (p=0.018), *certain* (p=0.003), *satisfied* (p=0.004), and *problem-solved* (p=0.000). The coefficient estimates show a negative association between task complexity and these four credibility and value measures. The absolute largest coefficient estimate (-0.46) was observed in the effect on *problem-solved,* which indicates that the perceived level of task complexity leads to the greatest negative change in the average for the feeling of problem-solved after receiving information.

Fourth, the number of communication media had a significant effect on *reliable* (p=0.004) and *agreeable* (p=0.011). The coefficient estimates show the positive association between the number of communication media used and these two credibility measures. This indicates that the more communication media were used in seeking information, the more likely it was that the information received was perceived to be reliable (coefficient estimate=0.29) and agreeable (coefficient estimate= 0.26).

Lastly, information mediation type, such as whether the advice added knowledge, added value, or suggested alternatives, had a significant effect only *on time well-spent* (p=0.046). Post-hoc testing, however, showed that there are no significant differences between different types of information mediation at the 0.05 level, after adjusting for multiple comparisons. The lowest Bonferroni adjusted p-value (p=0.068) was found between *validation* (estimated marginal mean=7.08, *SE*=0.24) and *referral to other people* (estimated marginal mean=6.14, *SE*=0.21).

For the information-giving diaries (244 entries), I analyzed the effects of six different factors on the credibility and value perceptions. The factors included individual characteristics such as gender and work tenure; task characteristics such as task type and task complexity; information mediation type; and number of communication media used in giving information. Table 25 shows the significance levels of the effects for each of those factors on nine credibility and value measures, controlling for the other covariates in the model (see Appendix L for the estimates of the effects).

Table 25: Information-Giving Episodes: Significance Levels of the Effects of Six Factors on Credibility and Value Measures

		Gender	Tenure	Task type	Task complexity	Num. of media	Mediation type
Credibility of information provided	Expert		**				
	Trustworthy		*				
	Confident				*		*
	Satisfied		*	**	**		
	Accepted				**		
Value of information mediation	Time well-spent			**			
	Certain about what I knew						
	Learned new things				**	**	
	Opinion changed				*	*	

*P<0.05, **P<0.01

When providing information, the participants' perceived credibility of the information they provided and their perceived value of information mediation were influenced by tenure, task type, task complexity, number of communication media they used, and information mediation type.

We now look more closely at the effect of each of those factors. First, job tenure was a significant predictor of the perception of *expert* (p=0.002), *trustworthy* (p=0.034), and *satisfied* (p=0.046). For the perception of *expert*, post-hoc tests revealed that those who had worked there for less than a year rated their expertise in the topic on which they provided advice significantly lower (estimated marginal mean=4.79, *SE*=0.39) than those who had worked there for more than 10 but less than 20 years (estimated marginal mean=6.02, *SE*=0.18), those who had worked there for more than 20 but less than 30 years (estimated marginal mean=6.49, *SE*=0.25), and those who had worked there for more than 30 years (estimated marginal mean=6.47, *SE*=0.38) at the 0.05 level. For the

perception of *trustworthy*, post-hoc tests revealed that those who had worked there for less than a year trusted the advice they provided significantly less (estimated marginal mean=5.44, *SE*=0.31) than those who had worked there for more than 30 years (estimated marginal mean=6.75, *SE*=0.33) at the 0.05 level. For the perception of *satisfied*, *p*ost-hoc testing showed that there are no significant differences between different tenure categories at the 0.05 level, after adjusting for multiple comparisons. The lowest Bonferroni adjusted p-value (p=0.138) was found between those who had worked there for less than a year (estimated marginal mean=5.49, *SE*=0.30) and those who had worked there for more than 20 but less than 30 years (estimated marginal mean=6.42, *SE*=0.20).

Second, task type was another significant predictor of the perception of *satisfied* (p=0.01) and *time well-spent* (p=0.008). I performed post-hoc tests to examine for which task types the workers found their advice less satisfying and the information mediation less time well spent. Interestingly, for both measures, *evaluate* was the only task type that was significantly different from at least one other task type at the 0.05 level. This indicates that the workers tended to be less satisfied with the advice they provided and found the time less well spent when they provided advice on the task of evaluating than when they provided advice on other tasks.

Third, task complexity had a significant effect on *confident* (p=0.014), *satisfied* (p=0.007), *accepted* (p=0.002), *learned new things* (p=0.000), and *opinion changed* (p=0.05). Coefficient estimates show a mix of positive and negative associations between task complexity and those credibility and value measures. Task complexity was positively related to *learned new things* (0.45) and *opinion changed* (0.14), but was negatively related to *confident* (-0.09), *satisfied* (-0.09), and *accepted* (-0.13). This indicates that perceived task complexity led to the greatest positive change in the average for the feeling of learned new things after providing information, while it led to the greatest negative change in the average for the perception of how well their information was accepted.

Next, the number of communication media used when providing information had a significant effect on *learned new things* (p=0.002) and *opinion changed* (p=0.013). The coefficient estimates show the positive association between the number of communication media used and these two value measures. This indicates that the more

communication media used in giving information, the more likely it was that the information givers felt they learned new things (coefficient estimate=0.71) and their opinion changed (coefficient estimate= 0.50).

Lastly, the information mediation type had a significant effect on the perception of *confident* (p=0.035). Post-hoc testing, however, showed that there are no significant differences between different advice types at the 0.05 level, after adjusting for multiple comparisons. The lowest Bonferroni adjusted p-value (p=0.176) was found between *explanation/demonstration* (estimated marginal mean=6.48, *SE*=0.17) and *experience sharing* (estimated marginal mean=5.67, *SE*=0.27).

b. Social Closeness

Before starting the interviews, the social closeness between individual participants and the colleagues whom they received or provided the information from/to were measured using the bull's eye method (Kahn & Antonucci, 1980). On the bull's eye diagram, participants placed the initialed stickers to represent their closeness to each individual and the distance from each sticker to the core self was measured in millimeters.

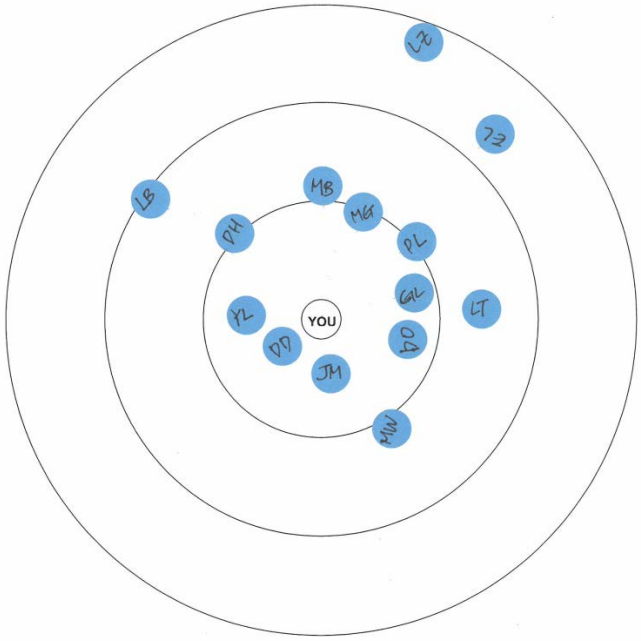


Figure 9: Example of Bull's Eye Diagram

Figure 9 shows an example of the bull's eye diagram. The smaller the distance from the core self, the closer the relationship was interpreted to be. In both information–seeking (132 entries) and –giving (179 entries) diaries, I analyzed the effect of social

closeness on credibility and value perceptions while controlling for other covariates in the model, including gender, tenure, task type, task urgency, task complexity, information mediation type, and number of communication media used. When seeking information, social closeness had a significant effect on the perception of *certain* (coefficient estimates=-0.14, p=0.001) and *satisfied* (coefficient estimates=-0.01, p=0.046). This indicates that the closer they felt to the information giver, the more certain participants felt after receiving information and the more satisfied with the overall information mediation experience. When providing information, however, there was no significant effect of social closeness on any of the credibility or value perceptions.

c. Hierarchical Level

During the interviews, participants were asked to describe how the position of the person whom they received or provided information from/to was related to them in terms of the organizational hierarchy. In both information–seeking (100 entries) and –providing (88 entries) diaries, I analyzed the effect of the hierarchical level on credibility and value perceptions while controlling for other covariates in the model, including gender, tenure, task type, task urgency, task complexity, information mediation type, number of communication media used, and social closeness.

When seeking information, the hierarchical level had a significant effect on participants' perceptions of *trustworthy* (p=0.007), *reliable* (p=0.032), *agreeable* (p=0.008), *time well-spent* (p=0.003), *certain* (p=0.049), *satisfied* (p=0.005), *problem-solved* (p=0.017), and *learned new things* (p=0.027). I performed post-hoc tests to determine which hierarchical categories were significantly different. Across all three measures, the mean associated with the same or lower level category was significantly lower than the means associated with the higher-level categories at the 0.05 level. This indicates that when information was received from the colleagues who were equivalent to or lower than them in the organizational hierarchy, participants found the information less trustworthy, reliable, and agreeable and felt that their time less well-spent and felt less certain, satisfied, problem-solved, and learned new things, compared to when it was received from colleagues who were above them in the hierarchy. When providing information, there was no significant effect of the hierarchical level on any of credibility or value perceptions.

d. Summary: Factors Affecting Credibility and Value Perceptions

Table 26 on the next page shows the significance levels of the effects for all factors reported above (See Appendix K and L for the estimates of the effects).

Overall, the results of the analysis indicate that participants perceived the credibility of information shared in the process of information mediation and the value of the process differently depending on whether they sought or provided information. When seeking information, their credibility and value perceptions were strongly influenced by task characteristics, such as task type, task urgency, and task complexity, and hierarchical level of the information giver. Social closeness with the giver had an influence on their value perception, but no influence was observed on their credibility perception. When providing information, their credibility and value perceptions were not as strongly influenced by task type as when seeking information. On the other hand, work tenure was found to be a significant factor for their credibility perception when providing information.

A particularly interesting finding was for which task types participants tended to perceive information as less credible or place a lower value on the information mediation. When seeking information, they found information related to the task of verifying significantly less trustworthy, valuable, and agreeable, and felt less certain and satisfied, and that the time was less well-spent. A possible explanation is that the need for verification arises from discrepancies between their previously existing knowledge and information at hand. Consequently, even after consulting colleagues for information, they may have lingering uncertainty that makes them trust the information less and find the process less beneficial. On the other hand, when providing information, they found the information they provided on the task of evaluation significantly less satisfying and felt the time was less well-spent. In the section 4.2.1.2, Complexity of Task, it was found that the participants perceived the task of evaluation as most complicated when providing information, but as least complicated when seeking information. This indicates that the complexity of value judgment has a negative effect on self-perception of success in assisting colleagues.

Table 26: Significance Levels of the Effects for All Factors on Credibility and Value Measures

			Gender	Tenure	Task type	Task urgency	Task complexity	Num. of Media	Mediation type	Social closeness†	Hierarchical level††
Information-seeking	Credibility	Trustworthy			**	*					**
		Reliable				*		**			*
		Valuable			**						
		Agreeable			**	*	*	*			**
	Value	Time well-spent			**				*		**
		Certain			**	**	**			**	*
		Satisfied			**		**			*	**
		Problem-solved			*	**	**				*
		Learned new things									*
Information-giving	Credibility	Expert		**							
		Trustworthy		*							
		Confident					*		*		
		Satisfied		*	**		**				
		Accepted					**				
	Value	Time well-spent			**						
		Certain									
		Learned new things					**	**			
		Opinion changed					*	*			

*P<0.05, **P<0.01

† Results from the data set of 132 information–seeking and 179 information–providing diary entries

†† Results from the data set of 100 information–seeking and 88 information–providing diary entries

Another interesting finding was that perceived task complexity produced some positive values when information was being provided. That is, the more complicated participants perceived a task to be, the more likely they felt that they learned new things after providing information. This is contradictory to information-seeking situations, in which perceived task complexity was negatively associated with the feeling that the problem had been solved. With regard to task urgency, it was found that the perceived level of task urgency was positively associated with the feeling of problem-solved, which indicates the significant effect of time pressure on judgment of the information-seeking experience.

It was found that the number of communication media used or, media multiplexity, had a significant effect on credibility and value perceptions. This study shows that the more media were used, the more agreeable and reliable the information seekers found the information to be, and the more learning and changes in opinion the information givers experienced. A possible explanation is that with a larger number of media, actors may exchange a greater amount of information, exerting greater influences on each other.

Lastly, social closeness and hierarchical level were found to have a significant effect in the information-seeking cases, but not in the information-providing cases. Interestingly, social closeness did not necessarily affect their credibility judgment of information, but exerted a positive effect on their value judgment of the overall information mediation experience.

4.4.2.4 Relationship between Credibility and Value Perceptions

To examine how perception of the credibility of information influences perception of the value of information mediation, I analyzed the relationship between individual credibility and value measures in the diaries. The same linear mixed model as in the previous section was used to control for the possible dependencies of repeated measures data. Prior to analysis, all ratings were standardized to aid in interpretation. Table 27 shows the standardized coefficient estimates between credibility and value measures in information-seeking diaries.

Table 27: Information-Seeking Episodes: Standardized Coefficient Estimates between Credibility and Value Measures

		Credibility of information received			
		Trustworthy	Reliable	Valuable	Agreeable
Value of information mediation	Time well-spent	0.61**	0.50**	0.62**	0.56**
	Certain	0.46**	0.45**	0.50**	0.45**
	Satisfied	0.55**	0.48**	0.57**	0.58**
	Problem-solved	0.28**	0.22**	0.32**	0.30**
	Learned new things	0.36**	0.30**	0.46**	0.37**

Note: *P<0.05, **P<0.01

Looking at the impact of credibility perception on value perception, all four credibility measures significantly impacted all five value measures. When we compared the magnitude of those standardized coefficient estimates, credibility measures had a slightly bigger impact on *time well-spent* and *satisfied* than on the rest of the value measures. The credibility measure that had the greatest impact on the perception of *satisfied* was *agreeable* (standardized coefficient estimates: 0.58, p=0.000). This suggests that when the workers received advice, their feeling of satisfaction was more strongly influenced by how much they agreed with the advice than by how much they trusted, relied on, or valued the advice. This reflects people's preference for hearing points of view in agreement with what they already understand or believe.

Table 28 shows the standardized coefficient estimates between credibility and value measures in information-giving diaries.

Table 28: Information-Giving Episodes: Standardized Coefficient Estimates between Credibility and Value Measures

		Credibility of information provided				
		Expert	Trustworthy	Confident	Satisfied	Accepted
Value of information mediation	Time well-spent	0.12	0.32**	0.34**	0.31**	0.54**
	Certain about what I knew	0.47**	0.47**	0.44**	0.50**	0.28**
	Learned new things	-0.04	-0.02	0.05	0.03	0.13
	Opinion changed	-0.1	-0.06	0.02	-0.02	0.00

Note: *P<0.05, **P<0.01

Looking at the impact of credibility perception on value perception, none of the credibility measures significantly impacted *learned new things* or *opinion changed.* However, the credibility measures had a significant impact on *time well-spent* and *certain about what I knew*, except that self-perceived *expertise* had no significant impact on the feeling of *time well-spent* after providing advice. The credibility measure that had the

greatest impact on the perception of *time well-spent* was *accepted* (standardized coefficient estimates: 0.54, p=0.000). This finding indicates that when providing information, participants' feeling of time well-spent is more strongly influenced by their perception of how well their information was accepted than how much they trusted, felt confident about, or were satisfied with their information. This indicates that participants found the information-providing experience more rewarding in the presence of positive feedback or reaction to their advice.

4.4.3 Summary: Interpersonal Trust, Information Credibility, and Value

The findings in relation to interpersonal trust revealed that in the process of information mediation, participants' assessment of trustworthiness involved three dimensions: factors, bases, and targets of trust. When seeking information, participants distinguished between the factors of trust – information giver's benevolence and competence – and weighed one factor over the other, depending on the type of help they needed. When asking for technical or factual information, compared to when asking for personal opinions on cultural or managerial issues, some participants were more concerned about whether the giver had enough knowledge to provide information than about whether the giver had goodwill toward them. On the other hand, a number of participants emphasized the importance of benevolence trust, providing specific examples that one could be an expert but not forthcoming with what one knew, an expert but a shirker, or an expert but a gossiper.

Looking at the intersection of the factors and bases of trust, participants' benevolence trust was derived most frequently from their previous work experience with the giver. Shared membership in a department or a company also served as a basis for benevolence trust. On the other hand, competence trust was derived from more diverse bases, in addition to previous experience and membership, including the giver's position, such as job role and work tenure, and reputation by a third party.

When giving information, participants' assessment of trustworthiness involved another dimension, targets of trust – trust of others and trust of self – in addition to factors and bases of trust. Regarding the trustworthiness of the seeker, their judgment was about the seeker's benevolence, whether the seeker acted in a non-threatening or non-judgmental manner. Some participants reported that their willingness to take risks when

providing information was determined by the level of trust in the seeker. With regard to the findings about their trust of self, an interesting difference was observed between the experienced and less experienced employees. The more experienced the participants in the company, the more likely they associated their own trustworthiness with their competence and expertise, whereas the less experienced the participants, the more likely they attributed their own trustworthiness to their position or membership in a department.

In addition to the dimensions of trust, this study identified that participants' trust of the information giver evolved through the process of information mediation. Positive changes in trust perception occurred when expectations for the giver's benevolence were unclear, but they felt that their requests were answered in a timely or non-judgmental manner, and that an emotional bond was created with the giver. Positive changes occurred also when the assumed competence of the giver was low, but this assumption proved to be wrong through the mediation process. Negative changes in trust perception were reported when expectations for the giver's competence were rather clear, but the seeker noticed that the giver had to consult other people to provide information or found an inconsistency between what the giver said and what other sources said.

The findings regarding information credibility identified a set of strategies participants employed for assessing the credibility of information they received and that they employed for establishing the credibility of information they provided. When seeking information, they assessed whether the information received was consistent with what other sources – either documents or people – said, whether it made sense based on their own knowledge, or whether it was based on the giver's first-hand knowledge. However, the decision of whether they would act upon the information given was not always dependent on whether they could trust the information. Occasionally, they had to follow what they were told even though they could not believe in it because they were not in a position to make a decision. When providing information, participants tried to establish the credibility of information by characterizing their information as an option rather than a mandate, honestly presenting their own qualifications, citing other supporting sources, or drawing upon their first-hand knowledge.

Looking at the intersection of interpersonal trust and information credibility, this study found that the extent to which participants trusted a person affected the amount of

effort they would put into assessing or establishing information credibility. When seeking information, participants reported that they would not put further effort to ensure the credibility of information if it was given by someone they trusted. In the case when the information they received was contradictory to their knowledge, however, they said that they would put more effort toward understanding the information and taking it into account if it was provided by someone they trusted. In information-providing cases, participants reported that they would put more or less effort into establishing credibility of their opinions depending on the extent to which they trusted the recipient.

The findings in relation to the value of information mediation revealed that not only the quality of information but also the benefit of the overall interaction during the information mediation was evaluated both by the seekers and givers. When seeking information, participants assessed the value of information mediation in terms of the level of information needs met after receiving information. Specially, they found the information mediation experience valuable as far as it provided them with a direction toward a solution, even when it did not completely solve their problem. When giving information, they found the information mediation experience valuable in the presence of positive feedback from the seeker that their information had an influence on the seeker's action. The sense of exerting influence and persuasion was a primary factor that determined their value perception.

Quantitative analysis that examined the factors that affected participants' credibility and value perceptions revealed that the effects of the factors differed depending on whether they sought or provided information. When seeking information, their credibility and value perceptions were strongly influenced by the task type. For example, when seeking information for verification, they found the information provided less credible and the experience less valuable. The hierarchical level of the giver also exerted a strong effect on both their credibility and value perceptions: when information was received by someone higher than them in the organizational hierarchy, compared to someone equivalent to or lower than them, they found the information more credible and their experience more valuable. It was also found that, while the number of communication media used was found to have a positive effect only on their credibility perception, the social closeness with the giver was found to have a positive effect only on

their value perceptions. When providing information, credibility and value perceptions were not as strongly influenced by the task type as when seeking information. On the other hand, work tenure was positively associated with their credibility perception. When seeking information, the number of communication media used was positively associated with credibility perception, whereas, when providing information, its positive association was found only with value perception. The analysis of the relationship between credibility and value perceptions identified that, when seeking information, satisfaction with the overall experience was most strongly associated with how agreeable the information was rather than how trustworthy or reliable it was. When providing information, how rewarding they found their experience was more strongly affected by how well they perceived their information to be accepted by the seeker than by how confident they were in the quality of their information.

4.5 Outcomes of Collegial Information Mediation

This section discusses the results of the last research question of this study: What are the outcomes of collegial information mediation regarding people's knowledge and subsequent information behavior? Previous literature has emphasized the importance of effective communication and knowledge sharing in organizations (Nonaka & Takeuchi, 1995, Hendriks, 1999,). However, what is lacking in the literature is an understanding of the consequences or impacts of those activities. This study, therefore, investigates the specific benefits of collegial information mediation, from the perspectives of both information seekers and givers, with an aim of providing evidence as to whether it actually benefits organizational works and whether it is worth investing in.

4.5.1 Information Seekers' Perceived Outcomes of Information Mediation

During the interviews, participants were asked to describe how they felt the information received from the colleagues had influenced their actions or perspectives. The analysis of results identified four categories of outcomes of information mediation on seekers' knowledge and behaviors.

4.5.1.1 Immediate Outcomes

From information seekers' perspective, the immediate outcomes of the information mediation included (1) making informed choices and (2) proceeding with more confidence.

a. Making Informed Choices

First, the most direct impact of the information mediation on the seekers was in that it enabled them to make more informed choices between options. For example, P09 was looking for the best way to keep track of information about ingredient suppliers. After talking to a colleague who had more experience in that area, she was able to develop a list of tasks and allocate resources in a more informed manner. She mentioned that the information from the colleague "clearly influenced" her "in terms of deciding what those next steps were going to be." P11, who was uncertain about how to generate formulas to be run in a system, reported that a conversation with an experienced colleague influenced her actions "to a large extent" because she "basically used his information to put together the formula." P21, who was brainstorming for an upcoming event, went to a colleague to get feedback as to whether his idea was feasible or futile. When asked how much the feedback impacted his decision, he replied, "to a large degree it did." He further illustrated that his team decided not to eliminate the idea because the colleague approved that "this will work." He added, "He was able to keep us going on." For designing an experiment, P35 had more than one idea for sampling. He reported that his conversation with a colleague "heavily influenced" his decision, because he decided to go with "one particular plan versus another."

b. Proceeding with More Confidence

In addition to impacting choice-making, information mediation enabled seekers to move forward with what they had decided with more confidence. When asked if her decision making was affected by what she heard from a colleague, P05 replied, "I feel more confident because she is someone that's much more knowledgeable about it that what we're doing is correct." P15, who identified the need for resolution of conflict in her team, reported that the benefit of the information mediation was in getting affirmation of her decisions from someone she respected. She mentioned that the conversation was

"very impactful and definitely influential" because she "walked out, 'Okay, now someone agrees with me so I know that I need to do this.'" P17, who consulted a colleague to get help in understanding guidelines for a product, explained that, as a result of the conversation, he was able to "go back to the team in a more self- assured manner." Similarly, P25 stated that the information mediation was influential in that it confirmed what he was thinking and empowered him to move forward with his plan. After discussing safety concerns and requirements of an ingredient, P30 felt that the conversation provided him with more confidence about what he thought the company had to decide. He said, "I was taking a bit of a conservative approach, but he thought he would, too." P39, who found some discrepancies in her data, was uncertain about whether she had to bring up the issue with her team or not. After talking to colleagues, she felt confirmed and decided to take a next step to resolve the issue. She stated, "It influenced me in that I knew that there were other people that believed the same thing and that it hadn't been something that had necessarily been tackled before. So from that standpoint, I wasn't like resurrecting something that was completely beating a dead horse."

4.5.1.2 Long-Term Outcomes

Some participants reported that information mediation did not have an immediate impact on their actions, but rather exerted a long-term impact, including (1) broadening perspectives for future actions, and (2) improving information-seeking strategies.

a. Broadening Perspectives for Future Actions

P17, who needed help from a colleague to complete a document, stated that the conversation "did not change what the document says." He added, "But, it enabled me to be a better representative for what the document's trying to achieve…I learned some of the stuff that went on behind the scenes." P19, who did not have a lot of management experience, consulted her boss to get advice on how to get better control of different conversations with different people who were not in her area. The conversation did not have any immediate consequences. However, she said, "It's going to benefit me actually in the long run because this is my first time to do this type of management of things that are going on external to my group." She added, "it was very influential in talking to her

and seeing that she really sees this as something that could be a big stepping stone for me for the future." P40 similarly stated that a conversation with his boss did not have any direct impact regarding his decision on whether to get an issue up to upper management. He said, "[Instead] It broadened my perspective of what I might be facing [if I pursued that direction], and so it was good advice."

b. Improving Information-Seeking Strategies

One participant suggested that information mediation would have an impact on her information-seeking strategy in a long-run. After receiving incomplete and delayed information from a colleague, P33 learned that she needed to improve her information-seeking skills to get "clearer information" in a timely manner. She said, "I learned that I need to be clearer with more defined timeline when asking this from other people…I was a little too laid back with urgency of it. I need to learn to phrase my questions so that they sound more urgent."

4.5.2 Information Givers' Perceived Outcomes of Information Mediation

Interviews on the information-giving cases revealed that the direction of influence was not just from information givers to information seekers, but reciprocal, as information mediation occurs through conversation. It was found that, from the givers' perspectives, the information mediation had outcomes for their knowledge as well as for their information-giving skills.

4.5.2.1 Reciprocal Influence

During the interviews, participants provided evidence of reciprocal influence in the process of information mediation. P07 stated that, in general, when someone asks him for advice, it opens an opportunity for him to learn something new as well. He said, "If the individual asks me for the information and gives me some background information on something I am not familiar with, obviously I am learning something, whether it's [immediately] very useful to me or not, it doesn't matter." P13 similarly reported, "When we're giving advice to each other, sometimes we're just kind of talking through ideas or talking through approaches and just sharing. It's not all give or take. Sometimes it's both." P15 pointed out that she usually feels more influenced "in more complex

situations." She said, "In more complex situations, I think I very often learn from how other people either have dealt with something or would like to deal with something." When asked to describe the examples of the complex situations, she replied, "If there's conflict within the group where higher emotions are involved or if [a situation] is really interfering with someone's ability to get their job done, it may require more than a simple answer." She added, "Then, [there will be] more back-and-forth [conversation] where I might actually pick something up." P32 mentioned that, for him, information-giving "never is a one-way conversation" and he felt that he was influenced by what the seeker was looking for. P44 pointed out that the reciprocal influence was more pronounced in "person-to-person interactions" rather than one-shot unidirectional electronic communication. He said, "When people ask questions I think is when I am probably most influenced because they're maybe asking a question I didn't think of because everyone brings a different perspective." He added, "If someone was asking a business related question, maybe it's more strategic than what my purview is and my particular role. That can definitely influence—maybe you have the thought of, 'Oh, I didn't think about it that way.'"

4.5.2.2 Outcomes for Improving Knowledge

From information givers' perspectives, the outcomes of information mediation involved improvement in their knowledge, including (1) making better sense of work contexts, (2) reinforcing existing knowledge, (3) reflecting on previously held assumptions, and (4) acquiring new methods.

a. Making Better Sense of Work Contexts

A number of participants described the outcomes of information mediation in relation to their improved understanding of work contexts, such as organizational capabilities, nature of work projects, and work technology.

When asked to describe the outcomes of information mediation for their knowledge, a number of participants reported gaining better understanding of the capabilities, responsibilities, and skill sets of other employees or departments. For example, P01 stated, "Any time that you can sit in a room with the folks from marketing...I think you learn from every one of those experiences. What they can, what

they can't do." P17 mentioned that, after providing information, he learned about the colleague's "skill set." He added, "I could tell by the questions he asked that he was computer savvy…So I learned more about his capabilities and his interests." During the conversation, P27 found out that the plant was now equipped with the capability to produce new products where they had previously been limited on technology. P30 stated that she gained knowledge of a newly organized team that was going to be in charge of a certain task that was deeply related to her daily task. She said, "It was very informative to see who was involved in [the team] and what their objectives are, because I needed to work with a couple other departments and to understand so I don't do anything that might be confusing to what they're trying to accomplish."

A few participants reported that they gained better understanding of the nature and progress of other projects going on in the company. P07 stated that the information seekers gave him background information on the research that their team was working on and the possible outcomes out of it. He said the interaction had a positive outcome because he learned about an ingredient he "had not heard of before." P08 mentioned that she became more knowledgeable about a project that another team was working on. She pointed out, "That [knowledge] made me feel a lot more confident in terms of I know what I need to do next." Similarly, P12 mentioned that a positive outcome of the information mediation was in that he learned about the direction and progress of a project. P24 explained that she learned more about a project meeting that was held by other teams. She stated, "I didn't know the details of that meeting and what was said and what was proposed." P31 reported that he learned more about other plants and the level of toxicity that some of them had. He said, "It was interesting for me because it's not my area."

One participant reported that she ended up learning about a new technology that a department planned to implement. P15 stated, "He was telling me more about the one piece of software that we were really talking about going for and he was telling me a little bit more about its capabilities." She found it to be useful because it might affect her future work task.

b. Reinforcing Existing Knowledge

A few participants reported that the outcome of information mediation was that their existing knowledge was confirmed and solidified through the conversation. For example, P06 stated that her knowledge of how to search a database system was "confirmed" while providing information. She said, "I kind of assumed that [the system] worked the same way [as other similar systems] but I had never really tried it. So when I did that, I confirmed what I kind of already expected was the case." P14 reported that whenever someone consulted her for information, it solidified what she had known. She said, "It just makes it stronger in my head when I repeat things or say things for my own benefit. It's better for me. I don't forget the protocols and how to do this." Similarly, P19 pointed out, "When you have to teach somebody to do something, it makes you realize, 'Oh, I really understand this.'" She added, "It solidified what I knew and made me certain of, 'Okay, this is the approach I take and it works and now I'm teaching someone else how to take that approach.'"

c. Reflecting on Previously Held Assumptions

Some participants pointed out that the information mediation process enabled them to reflect on and re-examine previously held assumptions. P17 reported that the information mediation experience changed his assumption regarding the capability of contractors in the company. He said, "What changed was that I felt we now had a more trained contractor and a more fluent contractor. So I guess my perception of the quality of output might have changed." P42 reported another situation when, during the process of information mediation, she ended up spotting a mistake in her research she had not noticed before. She said a colleague first came to her to ask why she made certain recommendations based on the research without knowing that there was a discrepancy. It was she herself who discovered the discrepancy while she was answering questions. She stated, "The one rewarding thing was having someone point out to me something that I had missed. So that was in reality a very good thing because I was able to go back and make an adjustment to the research that I didn't notice."

d. Acquiring New Methods

A couple of participants noted that they acquired new methods or techniques as a result of an information mediation experience. P31, who was consulted by a toxicologist, mentioned that he learned different ways to categorize toxic materials as a result of information mediation. He explained:

> I got a little better perspective on the thinking process of a toxicologist, which is different than the way I think. So it was useful to hear in the discussion, 'Well, this is how they categorize it. I look at this and this to put it in a spot.' And, 'Oh, okay, I learned something out of that.' And not just facts but the thinking pattern.

P42 described a situation where she learned different testing methods while providing advice to a colleague. She mentioned, "She was telling me about her approach and…she had taken a couple of the questions and looked at them in a different way, which was interesting to me because I hadn't thought of looking at it in that particular perspective."

4.5.2.3 Outcomes for Enhancing Information-Giving Skills

In addition to improving knowledge, it was found that information mediation enhanced participants' information-giving skills. The specific skills they gained included (1) delving below the surface, (2) tailoring to individual preferences, and (3) promoting learning.

a. Delving Below the Surface

A number of participants reported that as a result of information mediation experience, they learned the importance of delving further into what exactly a seeker needed to know. P18 reported an information-giving episode in which she took what the seeker said "at face value" and did not delve further to understand the context of his information needs. Consequently, she ended up wasting time by answering the same question twice because the first answer she gave was not complete. She illustrated, "[If I delved into it more] maybe there's some history they had where there was something odd or maybe prior to our processes being better or something, maybe they said, "'Oh, that happened. Let's check it first.'" She added, "[Now] I feel more confident that I would be able to provide better advice next time because I wouldn't take that at face value and

say, ‘Let’s just go from where we’re at and move forward,’ which would have cut out a lot of time that we’ve been around and around.” Similarly, P22 stated,

> What I learned was that it’s easy to get caught up in a data table but sometimes you need to go beyond to really understand what is going to help make the best decision. As you dig deeper, then you can be able to find other pieces of information to support the direction of going one way.

P35 mentioned that information mediation “reinforced the fact that you have to be cautious about what people are asking for.” He further explained, “Because they may be using different terminology than what you’re used to or they may misunderstand the technology to the extent that they’re asking for something that is maybe way more complicated or under-achieving what they really mean.” P36 stated that after her information-giving experience, she learned the importance of “probing for feedback” to the seekers.

b. Tailoring to Individual Preferences

Some participants pointed out that the information mediation experience enabled them to learn about the seeker’s preferences, expectations, and communication styles, which they could utilize for future information-giving activities. After providing advice, P09 learned the seeker’s preferences in terms of how he wanted information to be presented. She found out that the seeker was “detail-oriented person.” When asked if she felt that how she would go about providing information had changed after conversation, she replied, “Definitely. I would go in with a lot more detail and I would have it written down somewhere. I would change my behavior dramatically when working with him.” P14 stated that after giving information, she learned “the knack of how to approach the person and say it in the right manner.” Instead of telling someone, “Hey, you are wrong in doing that,” she said she would tell “but [your way] is one of the routes. You can always do it this route also.” After her information-giving experience, P42 learned more about the seeker’s preference in terms of communication media. She stated:

> She set up the meeting via email and was very focused on the paper and the written word. So I definitely get the feeling that she tends to be more of a written person type of communication so I think in the future that’s how I would try to approach it.

c. Promoting Learning

A couple of participants mentioned that information mediation had outcomes for how they would better serve as a guide to learning. For P19, the outcome was learning how to "approach people when they need help." She pointed out, "It worked better to get people to think on their own of what they need to do." She further explained that she had learned to say "Well, if you were explaining to someone, what would you explain to them next or how?" to try to get the seekers to think of the answer, instead of saying "Okay, next you need to do this." After providing suggestions on some classes that the company offered to the seeker, who was an intern, P21 felt that he would change how he would advise others on the topic. He stated, "If another intern came to me with the same questions, I might go a little more in depth beyond just the [class] catalog…I'd probably try to give them something that was a little more flexible in terms of self-taught like something they could teach themselves."

4.5.3 Summary: Outcomes of Collegial Information Mediation

Table 29 summarizes this study's findings regarding the fourth question; that is, the outcomes of collegial information mediation for the actors regarding their knowledge and subsequent information behavior.

Table 29: Outcomes of Collegial Information Mediation for Information Seekers and Givers

Information Seeker	Information Giver
Immediate outcomes	Outcomes for knowledge
• Making informed choices • Proceeding with more confidence	• Making better sense of work context • Reinforcing existing knowledge • Reflecting on previously held assumptions • Acquiring new methods
Long-Term outcomes	Outcomes for information-giving skills
• Broadening perspectives for future actions • Improving information-seeking strategy	• Delving below the surface • Tailoring to individual preferences • Promoting learning

Findings revealed that collegial information mediation had outcomes not only for information seekers but also for information givers. The outcomes for the seekers were categorized into immediate and long-term outcomes. Immediate outcomes included making informed choices and proceeding with more confidence. Long-term outcomes included broadening perspectives for future actions and improving information-seeking

strategies. For the information givers, the outcomes of information mediation were more long-term rather than immediate in nature, including outcomes for improving knowledge and enhancing information-giving skills. Regarding the outcomes for knowledge, information mediation enabled them to make better sense of work contexts, reinforce their existing knowledge, reflect on previously held assumptions, and acquire new methods. It also allowed them to gain skills for delving into what exactly a seeker needs to know, tailor information to seekers' preferences, and promote learning.

Chapter 5

Discussion

This study investigated collegial information mediation in the workplace using a dual-perspective approach to understand the perspective of both the information seeker and the information giver. Overall, the findings provide support for the initially proposed conceptual model in Chapter 2, which shows dual perspectives of the entire process of collegial information mediation, including the interpretation, intervention, assessment, and outcome phases. In this chapter, therefore, major findings from each of the four phases are presented. Regarding the interpretation phase, this study resulted in the identification of the typology and characteristics of tasks that lead to information mediation and the factors affecting the decision of whom to consult. In the mediation phase, it identified the typology and characteristics of information mediation and the factors affecting media choice during the mediation. In the assessment phase, it identified the factors affecting perceptions of interpersonal trustworthiness, information credibility, and value of the experience, and interplay between these perceptions. With regard to the outcome phase, it identified the typology of reciprocal outcomes that result from the information mediation process. These findings represent important contributions to information behavior theory, system design, and practitioners and managers. Following a recapitulation of central findings, the limitations of this study will be discussed.

5.1 Recapitulation of Findings

5.1.1 Interpretation Phase

5.1.1.1 Disparity in Perceived Task Characteristics between the Dual Roles

The collegial information mediation process is initiated by an information seeker's interpretation of the task at hand, which leads to the recognition of the need for consulting a colleague for information. When the seeker starts explaining the task for

which he or she needs help, the colleague develops an understanding of the task which may not be identical to that of the seeker. While previous studies on task characteristics have focused exclusively on the information seeker's perspectives (Belkin, Brooks, & Oddy, 1982; Byström & Järvelin, 1995; Ingwersen, 1992), a novel aspect of this study is the identification of both the seeker's and giver's perception of task characteristics. This dual-perspective approach resulted in the identification of a typology of tasks that lead to information mediation and related perceptions of task complexity.

A task typology identified in this study indicates that employees turned to their colleagues not just for obtaining knowledge but also for assessing value and determining action. The frequency measure showed that about 30% of the information mediation episodes were associated with tasks that required value judgment (e.g., evaluating and verifying) and decision-making (e.g., deciding, solving, and planning). In knowledge management research, a central question has been how tacit or implicit knowledge can be captured and shared with others (McInerney & Koening, 2011; Nonaka &Takeuchi, 1995). The empirical findings from this study, however, suggest that the focus of knowledge management initiatives in organizations needs to extend beyond knowledge transfer to support more diverse processes such as cooperative value assessment and decision-making.

The dual-perspective approach also enabled this study to identify different perceptions of task complexity depending on the role one plays. This contributes to the literature on task complexity, which has focused exclusively on the information seeker's perspective, in two ways:

First, it was found that, depending on the role, the task complexity was perceived on two levels – complexity of *work task* and complexity of *information task*. When seeking information, employees in this study described task complexity more at the level of *work task*, while when providing information, they perceived complexity more at the level of *information task*. These findings add to our knowledge of task complexity, which has been studied mostly at the level of *work task* (e.g., Campbell, 1998; March & Simon, 1958; Van de Ven & Ferry, 1980). In this study, one of the characteristics of the *information task* that was pertinent to complexity was the breadth of information to be explored. The more information that needed to be collected and processed in a task, the

higher the cognitive load, and, therefore, the greater the task difficulty. Another characteristic related to the complexity was the level of judgment involved in the task. When the task required a judgment call regarding a given problem or situation, employees found the task challenging.

Second, a disparity between the information seeker and information giver was also found in the perceived complexity of different task types. Interestingly, the widest disparity was found in the task of *evaluation.* When seeking information, employees in the study perceived the *evaluation* task to be least complicated, whereas when providing information, they perceived it to be most complicated. A possible speculation is that people feel strong responsibility in providing evaluative information because it may directly affect the recipient's subsequent decision-making. The pressure from that responsibility may lead them to find the task both demanding and difficult. Task complexity has been an important research subject in information need and seeking studies (Vakkari, 1998). The disparities identified in this study suggest that future research needs to go beyond investigating the information seeker's perspective and to further explore the information giver's perception of a task, perceived ability to perform a task, and strategies for dealing with the complexity of a task.

5.1.1.2 Beyond Expertise: Factors Considered in Determining Who to Consult

Another important finding from the interpretation phase is the identification of key factors that influence employees' decisions regarding whom to consult for information. While previous studies and system development efforts have focused on finding who has the most *expertise* in a problem domain (Ehrlich, Lin, & Griffiths-Fisher, 2007; Hawking, 2004; Maybury, D'Amore, & House, 2000; Zhang & Ackerman, 2005), this study shows that this is not always the case. When help was needed with creative tasks, such as developing a new product, employees intentionally looked for someone who had no or very little expertise. This was based on the concern that someone who had previous experience or expertise may already have formed an attitude toward an issue which might result in hindering a creative and flexible thinking process.

Social closeness, which entails emotional closeness (Korchmaros & Kenny, 2001) and enjoyment of a relationship (Lee, Mancini, & Maxwell, 1990), was also identified as one of the criteria that the employees in this study used in deciding whom to consult.

They reported the importance of social closeness in relation not only to the existence of shared understandings but also to the sense of security and trust. The importance of social networks is not completely new idea and social network theory has been applied to analyze information behavior and collaboration (e.g., Ackerman, 1994; Allen, 1977; Chin, Myers, & Hoyt, 2002; Nardi, Whittaker, & Schwarz, 2002). While knowledge management studies have typically asked who goes to whom for advice on general work-related matters, some researchers have started investigating how different kinds of networks arise depending on information needs (e.g., Cross, Borgatti, & Parker, 2001). This study adds to our knowledge of the relationship between social distance and information seeking behavior by examining the relationship between the importance of social closeness and task type. When seeking help with the task of *determining actions*, such as making decisions, solving a problem, or planning for the future, employees chose to consult someone close to them; whereas, they considered the social closeness not as important when seeking help simply for *gaining knowledge*. This finding is deeply related to Krackhardt's (1992) argument that even though it has been neglected since Granovetter's (1973) theory on the strength of weak ties, the role of strong ties is still important. According to Krackhardt, in the case of major changes that might affect power relations or routines involved in decision-making processes, strong ties would be required; whereas, if changes were merely dependent on new information, weak ties would be important.

In addition to the above two factors - *expertise* and *social closeness*, this study presents other more nuanced factors that influenced the decision of whom to consult. Employees preferred to turn to someone whose *thinking style*, the pattern of how one processes information and deals with problems, or, *communication style*, the pattern of how one expresses him or herself and exchanges information, matches theirs. Their decision was also made based on a motivation to *keep someone in the loop* during a decision-making process, or consideration of the *hierarchy of who reports to whom* to avoid any problems of going over someone's head.

Overall, this study emphasizes that people-finding or expert-finding in the workplace is a dynamic and nuanced process which involves a number of socially-sensitive factors. This resonates with McDonald's (2003) argument about the dilemma in

adopting social networks in the design of groupware. He described the trade-off between recommending someone who has expertise or someone whom the user feels more comfortable talking to. The findings of this study add to the discussion of that dilemma by identifying additional factors that need to be considered in system design.

5.1.2 Mediation Phase

5.1.2.1 Collegial Information Mediation as Problem-Negotiation and Value-Addition Process

The findings from the mediation phase provide evidence that the effectiveness of collegial information mediation is crucial to the success of an organization as it is a process through which employees informally negotiate problems and add values to each other's decision-making.

In this study, the concept of information mediation illuminated how information seeking in the workplace becomes a cooperative process in which information needs are jointly negotiated through informal conversation. It was found that the negotiation process follows three patterns: information needs became *targeted, expanded,* or *reconstructed.* As Taylor (1967) identified in the context of formal information mediation, the first pattern, in which information needs become focused and sharpened, is not completely new. However, the other two patterns, the expansion and the reconstruction of a problem, are relatively unique to the process of collegial information mediation. In addition to narrowing a focus, the mediation phase uncovered relevant new problems that an information seeker could not have identified by him- or herself, or even completely reconstructed the interpretation of the problem when an information seeker was not asking the right question. From the perspective of organizational learning, more learning occurs when more varied interpretations of information have been developed and when the nature of the various interpretations held by others is efficiently understood across the organizational unit (Huber, 1996). It is, therefore, important for organizations to foster and support employees' active participation in informal problem-negotiation not only within a department but across an entire organization.

Through the lens of the concept of information mediation, this study also identified that interpersonal information seeking in the workplace is not simply an information-location or knowledge-addition process, but a *value-addition* process. This

finding resonates with Taylor's (1982, 1986) notion of a "value-added process" in the information lifecycle, a process through which data is processed and becomes productive knowledge, and ultimately influences actions and decisions. While Taylor used the term *value-added* to denote the evolution of data to knowledge, this study view value-addition as a separate, higher level process that is distinguished from information-location and knowledge-addition. Compared to mere information-location and knowledge-addition, the value-addition involves more of the giver's judgment and personal opinion, often with intent to influence its recipient's decision-making. Examples included providing an opinion, a suggestion, validation, or a solution. A surprising finding of this study was that the most prevalent type of intervention was value-addition, followed by knowledge-addition and alternative-suggestion. This is different from studies in the context of formal information mediation, in which the information giver has expertise in how to search a system, but not necessarily domain expertise that enables him or her to make judgments and present personal opinions. As mentioned in the previous section, this suggests that organizations need to establish strategies and systems to foster users' value-addition practices in addition to knowledge-addition practices.

5.1.2.2 Media Multiplexity: An Interactive Process of Combining Multiple Media Capabilities

In the mediation phase, important findings were also observed regarding the issue of media choice.

First, it was confirmed that focusing on people's choice of one communication medium for a given task or characteristics of message is insufficient because people use multiple communication media during the process of information mediation. More recently, researchers have started paying more attention to how people rely on a range of communication technologies or media multiplexity, to fulfill their information needs (Haythornthwaite & Wellman, 1998; Yuan, Carboni, & Ehrlich, 2010). In this study, a main pattern of the combinations of multiple media was a mix of oral (e.g., face-to-face, phone, and online conferencing tools) and written communication (e.g., email, instant messaging, and fax). It was usually the information seeker's choice that determined the type of media to be used, but during the process of conversation, the initial choice of media type was switched to another media type either by the seeker or the giver. This

suggests that in future research, media choice behavior in organizations needs to be viewed as a dynamic, unfolding process that entails interplay between the actors involved.

By examining both the seeker's and giver's perspectives on the use of multiple media, this study also expanded the body of knowledge associated with factors affecting media choice. While previous studies have focused on message or task characteristics (Daft, Lengel, & Trevion, 1987; Kraut, Galegher, Fish, & Chalfonete, 1992), this study identified additional factors that employees consider. First, they took into account the social closeness to a message recipient when deciding which media to use. This resonates with the finding of Watson-Manheim and Bélanger (2007), who identified the effect of interpersonal trust on media choice repertoires. Second, it was found that employees consider the recipient's preference for media rather than following their own preference. The knowledge of who prefers which media was developed over time and utilized to determine the choice of media. Third, the extent to which one desired the recipient to be prepared for providing information also affected the media choice. These novel findings provide an insight that, in organizations, the employees' media choice processes are affected not only by situational factors, but also by interpersonal factors such as social closeness and sensitivity to message recipients' conditions.

5.1.3 Assessment Phase

The findings of this study add to our knowledge of how people perceive the interpersonal trustworthiness, information credibility, and value-in-experience, and how those perceptions interact with each other, when seeking or providing information in the workplace.

5.1.3.1 Underlying Dimensions and Evolution of Interpersonal Trust between Employees

The dual-perspective approach allowed this study to identify a complete picture of the dynamics of interpersonal trust in a work organization. While trust has been studied exclusively from the information seeker's perspective, focusing either on the factors (e.g., Casciaro & Lobo, 2005; Levin & Cross, 2004; Mayer et al.., 1995) or bases of trust (e.g., Elangovan & Shapiro, 1998; Kramer, 1999), this study extends the previous research by

adding targets of trust as an additional dimension and investigating the relationship among those dimensions.

When seeking information, employees described their trust perceptions in terms of the factors and bases of trust. With regard to trust factors, the results of this study support the notion that people are faced with a choice between benevolence- and competence-trust. Previous studies (Casciaro & Lobo, 2005; Levin & Cross, 2004) claimed the importance of benevolence-trust in interpersonal information seeking. For example, Casciaro and Lobo (2005) found that employees usually prefer a "loveable fool" over a "competent jerk." However, this study showed that this is not always the case; rather, the choice is dependent on the type of information they receive. When receiving factual information about technical issues, the assessment of whether one was competent mattered more than that of whether one was likable, in contrast to when receiving opinions on cultural or managerial issues. Regarding the relationship between factors and bases of trust, an interesting finding was that the assessment of one's competence is associated with more diverse bases than that of one's benevolence. Expectations of benevolence were derived exclusively from previous experience or shared membership with a trustee, whereas expectations of competence were derived from a trustee's position or reputation by a third party, in addition to the two aforementioned factors.

When giving information, trust perception involved another dimension, targets of trust, trust of others and trust of self. Regarding the trust of others, employees in this study consciously or unconsciously judged the trustworthiness of the information seeker. Their willingness to take risks when providing information depended on the level of trust they had in the seekers. This supports Andrews and Delahaye's (2000) framework of scientists' knowledge process, in which they identified the trustworthiness of knowledge recipients as a main component or "psychosocial filter" in sharing knowledge. Another novel aspect of this study is the perception of trust of self. It was observed that the more experienced employees were in the company, the more likely it was that they associated their trustworthiness with the nature of their expertise, whereas, the less experienced the employees, the more likely they associated their trustworthiness with peripheral cues such as their position or membership in a department.

In addition to the trust dimensions, this study contributes to the understanding of the evolution of trust. The findings of this study supported Hogarth's (1987) idea of predictive and evaluative judgment. Employees made these two types of judgments about an information giver's trustworthiness, prior to and following information mediation. Depending on the gap between the prediction and the evaluation, their trust spiraled either upwards or downwards. While a number of researchers have noted ways in which trust can be developed or eroded over time (e.g., Butler, 1983; Jones & Geroge, 1998), this study shed additional light on the nature of that evolution by distinguishing between the change in benevolence-trust and that in competence-trust. The analysis of cases where employees consult someone with whom they have not yet formed a trust relationship revealed the following: Employees tended not to have any specific expectation regarding the benevolence of the information giver, while they tended to have some level of expectation of the giver's competence based on his or her position or reputation. As a result, their trust in benevolence usually increased, regardless of whether the information given was useful or not. On the other hand, their trust in the giver's competence changed either in a negative or a positive direction. The negative change occurred mostly in two situations: when they found out that the giver had to consult other people to provide information, and when the information given was inconsistent with that provided by other sources.

5.1.3.2 Practices of Assessing and Establishing Information Credibility in the Workplace

To credibility research, the contribution of this study is the identification of individual and situational factors that affect both a seeker's and a giver's judgment of credibility in the context of organizational work, going beyond the focus on everyday life information seeking.

One of the main factors that influenced both the seeker's and giver's judgment of information credibility was the task type. In information-seeking cases, when information was sought for the task of *verification*, they found the information received less trustworthy compared to when it was sought for other tasks. On the other hand, in the information-providing cases, when information was provided for the task of *evaluation*, they found the information provided less satisfactory. Traditionally, credibility research

has focused exclusively on the factors related to the characteristics of source, message, and channel (Pornpitakpan, 2004). The findings of this study suggest that, in addition to those factors, it is important to investigate the perceived task characteristics as a critical factor that impacts judgments of the credibility of information.

Another interesting finding was the effect of media multiplexity on credibility perceptions. When seeking information, the more media they used, the more likely the employees found the information received to be reliable and agreeable. When providing information, however, no effect was observed on their judgment of the credibility of their own information. These findings extend our understanding of the actual influences of the use of multiple media (e.g., Yuan, Carboni, & Ehrlich, 2010). To my knowledge, this is the first attempt to specifically examine the effect of media multiplexity on actors' assessment of information credibility.

Credibility research has seen the recent addition of investigations that aim to identify an information giver's credibility establishing practices, specifically those of the content contributors in the context of user-generated content (UGC) (e.g., Flanagin & Metzger, 2008; Francke & Sundin, 2010; St. Jean et al., 2011). The findings from this study revealed that, in the context of organizational work, employees also develop specific strategies for establishing and signaling the credibility of information they provide. Four main strategies identified in this study are as follows: characterizing their information as an option rather than a mandate, honestly presenting their own qualifications, citing other supporting sources, and drawing upon first-hand knowledge. These have an important implication for the design of intra-organizational information sharing system: the information giver's credibility establishing and signaling practices, not only the seeker's credibility assessing practices, need to be supported to improve the effectiveness of collegial information mediation.

5.1.3.3 Value-in-Experience of Information Mediation

The results from this study also strongly support the view that it is not just information that is evaluated; actors participating in information mediation also evaluate the value of their overall experience and interpersonal interaction during the mediation process. Traditionally, library and information science researchers have developed different measures to evaluate information services. For example, Saracevic and Kentor

(1997) developed taxonomies of service values including cognitive, affective, accomplishment, and time values. Quantitative analysis from this study revealed that employees' evaluation of the overall experience of information mediation is distinguished from their evaluation of information credibility. In information-seeking cases, a difference was noticed in the effect of two factors –their social closeness to the information giver and the number of media they used. Their value perception was influenced by the social closeness, while their credibility perception was not. Conversely, their credibility perception was influenced by the number of media used, while their value perception was not. In information-giving cases, a difference was noticed in the effect of perceived task complexity. While complexity increased the perceived value of the experience, it decreased confidence in the credibility of information. Overall, these findings suggest that, as the employees informally provide information services to each other, it is important to understand that their evaluations are performed not only at the level of information, but also at the level of overall experience during the mediation process.

5.1.3.4 Interplay between Trust, Credibility, and Value Perceptions

Looking at the intersection of interpersonal trust and information credibility, findings from this study demonstrate that the level of trust in the other party affects the amount of effort one puts into assessing or establishing the credibility of information. In information-providing cases, employees in this study said that they would put more or less effort into establishing the credibility of their opinion, depending on the extent to which they trust the recipient. In information-seeking cases, they reported that they would not put in further effort to confirm the credibility of information if it was provided by someone they trusted. When the information received was contradictory to their knowledge or belief, contrarily, they mentioned that they would put more thought into why the person provided that information and more effort toward confirming its credibility, if it was provided by someone they trusted. This resonates with a notion from attributional sophistication psychology literature (e.g., Fein, 1996; Pittman, 1993), which suggests that suspicion of a target's motives triggers sophisticated attributional thinking of why the target behaved as he or she did. The findings from this study extend that notion by suggesting that people ask *why* questions, even though they trust a target

without any suspicion about ulterior motives, if the information given is contradictory to their viewpoint.

This study also attempts to identify how perception of the credibility of information affects perception of the value of an overall experience of information mediation, from the perspectives of both those seeking and those providing information. An interesting finding was that, when seeking information, employees' satisfaction with the experience was most strongly dependent on the extent to which they agreed with the information, rather than on its reliability or trustworthiness. On the other hand, when providing information, their perception of time well spent was most strongly dependent on the extent to which their information was accepted by its recipient. This indicates that employees found their information-giving experience more rewarding in the presence of positive feedback or reaction to their information, which supports Lin's (2007) research about motivational forces in organizational knowledge sharing. According to Lin, intrinsic motivations such as reciprocal benefits, self-efficacy, and enjoyment in helping others is more crucial in sharing information than external organizational rewards. The findings from this study have an important implication for management. To increase knowledge sharing between employees, it is essential to provide employees with effective ways to explicitly show their appreciation to each other.

5.1.4 Outcome Phase

Another contribution of this study is the identification of a range of specific outcomes of collegial information mediation. While there has been extensive research investigating motivational forces affecting employees' information sharing (e.g., Bock et al., 2005; Cyr & Choo, 2010; Lin, 2007) and organizational benefits of knowledge sharing (e.g., Janz & Prasarnphanich, 2003; Kamasak & Bulutlar, 2010), this study focused on the actual impacts of sharing from the perspectives of individuals. An important finding of this study was that information mediation produced outcomes not only for the information seeker, but also for the information giver. This resonates with the fact that many employees in this study reported the existence of reciprocal influence between the seeker and giver, and that this influence was further pronounced in person-to-person interactions rather than one-shot unidirectional electronic communication. I believe that this study provides a starting point for the development of outcome measures

for information and knowledge sharing in organizations, which will be useful for both practitioners, especially managers, and researchers.

5.2 Limitations of the Study

This study has several limitations. It was conducted at a single organization, an R&D department of a large manufacturing company, and this poses potential limitations with respect to the generalizability of the results obtained. The department's organizational structure is more complex and lacks the close-knit social network among the employees that would be typical for smaller companies. Consequently, the findings of this study may have more resonance and usefulness to other large manufacturing or consumer goods companies than other forms of organizations. As an attempt to maintain awareness of this limitation, I frequently asked participants who had experience at other companies to relate their experiences at the research site of this study to those other organizations. This approach was useful; for instance, in strengthening the argument about the challenges of information mediation, as other companies that are equipped with more sophisticated workplace social software still experience similar difficulties. In addition, presenting the results from the interviews in richly descriptive formats allows others to assess whether their own organizations experience similar phenomena or processes as those described in this study.

The study relied on self-reported data, which results in the possibility of collecting limited data for two reasons. Demand characteristics might have influenced participants' responses, as they could have inferred the researcher's purpose and attempted to change their behavior accordingly. In an attempt to prevent this type of bias, I asked them if what they reported in the diaries was representative of their typical information seeking or giving behavior in everyday work. Another threat to the validity of the findings may derive from social desirability bias. Participants may have self-censored their answers to make themselves appear capable, competent, or trustworthy.

A researcher expectancy effect is another potential threat to the validity of this study's findings. My preconceived notions about the impact of interpersonal trust on information behavior could have been unconsciously communicated to the participants and influenced their responses. To avoid this type of bias, I attempted to phrase questions in an even-handed and neutral manner and to strive for consistency across the interviews.

Given that the diary data involve repeated measurements, there were some limitations in data analysis. First, I could not measure the overall model fit, such as R^2, or effect sizes due to the nested structure of the data. As the diaries were collected multiple times from the same individuals, the responses are nested within individual participants in both sets of diaries, as well as within tasks in the information-seeking diaries. Currently, there is still no unique definition of how to measure the overall model fit or effect sizes in mixed models among the statisticians (Peugh, 2010), and no statistical software available for calculating it other than measuring the reduction of variance of each level of the model. Second, it was not feasible to conduct any factor analysis or measure Cronbach's alpha for the diary data, such as for measures of credibility or value perceptions. It is because factor analysis and Cronbach's alpha involve between-subject designs and assume the independence of data, which cannot be assumed in within-person data points in diaries. In other words, there is no guarantee that those measures are reliable and valid for assessing within-person variability. Researchers have only recently begun to explore different methods to conduct multilevel factor analysis (e.g., D'Haenens, Damme, & Onghena, 2010).

Chapter 6

Conclusion

This chapter discusses the theoretical, methodological, and practical implications of this study, suggesting several implications for system design and for managers and practitioners who seek to promote the sharing of information and knowledge within their organizations. Suggestions for future research in this area are then provided. The chapter closes with concluding remarks.

6.1 Theoretical Implications

This study makes a number of contributions to the theory of information behavior and to credibility research. To the theory of information behavior, the collegial information mediation (CIM) framework presented in Chapter Two represents a novel contribution in that it takes a dual-perspective approach to understanding the intersection between human-information and human-human interaction. Based on real-world data, this framework lends strong support to the notion that information behavior, especially in interpersonal contexts, needs to be investigated from dual perspectives – that of the information seeker and of the information giver.

The dual-perspective approach allowed the identification of disparity in perceptions of and perceived ability to perform a task depending on the role one plays, and further allowed consideration of not only the seeker's but also the giver's needs. Perception of task characteristics has been one of the main research objects in information behavior, as it affects the choice of sources, channels, and types of information sought (Byström & Järvelin, 1995; Vakkari, 1998; Yuan et al., 2010). The present study, however, found that the traditional, seeker-oriented approach to understanding task perceptions does not tell a complete story. By examining both perspectives, this study was able to identify that perceptions of task complexity involve two different dimensions. Compared to when seeking information, when providing

information, task complexity was evaluated more at the level of information task (e.g., breadth of information to be explored and level of information judgment involved) than at the level of work task (e.g., number of goals involved, skills required, and uncertainty of outcome). This is deeply related to another finding of this study regarding the disparity in perceived complexity of different task types. When providing information, *evaluation* tasks were perceived to be most complicated; whereas, when seeking information, they were perceived to be least complicated. These findings indicate that people perceive the same kind of task differently depending on whether they seek or provide information, and therefore, they desire different kinds of support in dealing with its complexity. Given that increasing popularity of social computing empowers users to be prosumers of information, the disparity in perceptions and practices between seekers and givers deserves further research attention.

Furthermore, the investigation of dual perspectives also enabled this study to identify a carryover between the two roles. It was found that as they interchangeably play the dual roles of seeker and giver in the workplace, individuals' expectations, preferences, or strategies when seeking information were carried over to or shaped their expectations, preferences, or strategies when providing information, or conversely. In this study, carryover occurred in the following dimensions: breadth and detail of information (e.g., aversion to unsolicited details), communication style (e.g., compatible communication pattern), thinking style (e.g., bigger picture thinking), and media choice (e.g., email communication prior to a meeting). If an individual emphasized the importance of one of those dimensions when seeking information, he or she consistently took it into account when providing information, and the converse was also true. The dynamics and nature of the carryover need attention in information behavior research.

Furthermore, results from this study add to the literature on information credibility in three ways. First, this study suggests that future credibility research pay attention to people's assessment of *value-in-experience* in addition to their assessment of information. The results demonstrated that, in the context of human mediation of information, people evaluate not just the credibility of information, but also the value of an overall experience and interpersonal interaction. In both information-seeking and information-giving cases, the evaluation of value-in-experience and that of information

credibility were distinguished in that those two perceptions were influenced by different factors. This suggests that by integrating the notion of value-in-experience, researchers can expand their approach beyond information credibility as a static notion or simple binary evaluation of information, to include a process-oriented and experience-centered approach to understanding the value that results from interactions with information.

Second, it highlights the importance of investigating the effect of perceived task characteristics in credibility research. To my best knowledge, this is the first study to directly demonstrate the effect of task type, task complexity, and task urgency on the perceived credibility of information. It found that even after controlling the effects of the characteristics of source (e.g., gender and job tenure) and channel (e.g., number and type of media used), credibility perception was affected by task-related factors, in both information-seeking and information-providing situations. This suggests that perceived task characteristics need to be incorporated in models for explaining people's judgment of information credibility.

Lastly, while most credibility studies have been conducted in the context of everyday Web use, this study expands our limited knowledge of the issue of information credibility in an organizational work setting. It suggests that in the workplace, information credibility is a multifaceted concept which is reflective of the credibility construct at individual, team, and organizational levels. It was found that to employees, whether information is believable or not from their individual perspective is not the only or primary concern when making decisions. Rather, even though they do not fully trust or agree with information, they may decide to accept and act upon it if the information conforms to what their organization or team has decided to pursue. The interplay or conflict between credibility constructs at different levels is a unique issue in credibility assessment in the workplace and requires additional exploration in future research.

6.2 Methodological Implications

This study makes several methodological contributions to information behavior research. First, the richness of the findings underscores the power of using a combination of multiple methods, both quantitative and qualitative. The unique combination of data collection and analysis methods used for this study proved to be beneficial. While the diaries allowed capturing of events and experiences in their natural context, providing

both quantitative and qualitative data, the interviews elicited people's in-depth narratives about their perceptions and thinking processes in their own words. The data from interviews illustrated and clarified some of the results from the quantitative analysis of diary data.

Second, although the diary method has been used in previous studies (Byström, 2002; Cool & Belkin, 2002; Rieh et al., 2010; St. Jean et al., 2012; Xie, 2006), this study collected diary data on individuals' dual roles and perspectives, not only as information seekers and but also as information givers, over a longer period. In adopting a dual-perspective approach to studying information behavior, the diary method proved to be useful to identify both within-person patterns and individual differences. The web-based diary method proved to be advantageous in that it provided time-stamps and kept track of individuals' participation. Notably, the increasing use of mobile communication offers a greater opportunity for information researchers to utilize a web-based diary method. In fact, a number of participants in this study completed their diaries using smart phones. Future research could employ new techniques such as real-time tailoring of questions (e.g., Jamison et al., 2001) or voice-recording.

Third, this study emphasized the need to study people's information behavior as a socially-driven process, which requires the investigation of the effect of interpersonal relationships. To this end, this study adopted a bull's eye method that might be of use to other information behavior researchers. It proved to be advantageous in that the diagrammatic measures elicited more concrete information than verbal measures. In completing the bull's eye diagrams, participants were able to represent their cognitive or emotional distances from individual colleagues, which are hard to articulate in the questionnaire. The bull's eye method also proved to be useful in refreshing participants' memory about their information–seeking and -giving episodes prior to the interviews. Sometimes participants referred back to the diagram to support their responses to the interview questions. Additionally, many participants mentioned that they enjoyed completing the diagram.

6.3 Implications for Designing and Implementing Workplace Social Software

This study has yielded several suggestions for designing and implementing workplace social software. Social software is a range of web-based applications that

allows users to interact and share information with one another (Green & Pearson 2005). It includes a diverse set of tools such as instant messaging, forums, blogs, wikis, and social networking services. A 2008 study by Gartner Consulting estimates that 60% of Fortune 1000 companies are experimenting with social software (Sarner, 2008). This study proposes specific guidelines on the design and implementation of social software to facilitate collegial information mediation as follows:

Be cautious about pushing for openness and transparency: Despite the growing popularity of social software in the workplace, this study demonstrates that employees have reservations about the push for open, many-to-many networked interaction. Rather, they still rely heavily on face-to-face conversation with their colleagues for information due to its benefit of offering a sense of privacy in addition to immediacy of answers. Regarding the adoption of social software, one of the main concerns that employees reported was the fear of how easy it would become for anyone in the organization to access information or ideas that might be sensitive or not fully developed to be shared broadly. They also expressed a fear that a public display of their knowledge or skills via social software such as a forum might lead to an overload of requests for help from other colleagues who view it. These provide a cautionary tale to the direct adoption of Web 2.0 tools and social software in the workplace. Rather, companies need to appropriate social software in a way that balances the opportunities it offers with the issues of privacy and security it creates. One way to achieve this balance is to provide a mechanism to allow users to easily control the visibility of their conversations.

For example, if a company wishes to develop a social Q&A system to support collegial information mediation, it needs to ensure that users can control the visibility of their questions and answers. In the workplace, a social Q&A system can enable employees to post their requests for help and allow others to directly answer them. To reduce latency between the question and response, researchers have leveraged existing synchronous communication channels such as instant messaging (IM) for Q&A services. Examples of such systems include *Zephyr* (Ackerman & Palen, 1996), IBM community tools (Weisz, Erikson, & Kellogg, 2006), and IM-an-Expert (Richardson & White, 2011). While these systems attempt to avoid the latency concern, another concern that may arise

in using such systems is fear of open access to one's questions and answers. To reduce that fear, the synchronous social Q&A system needs to provide a mechanism that allows users to easily select and manage who can view their posts in the system.

Allow coordination of multiple information mediations: In the workplace, social software also needs to provide a mechanism to coordinate multiple information mediations by a single person or multiple people. This study showed that information mediation often occurs multiple times in the course of seeking information. To accomplish a task, a seeker may consult the same colleague multiple times or consult multiple colleagues one after another. Through multiple information mediations, a problem or the understanding of that problem evolves as new information is added. This suggests that social software (e.g., IM or IM-based systems) should ensure that users can keep track of and coordinate among multiple mediations so that both the seeker and giver can easily grasp the progress of the information-seeking process. From the giver's perspective, the coordination method is also required when engaging in multiple but similar mediations. It should allow users to ensure the consistency of the information communicated across multiple people, while preventing them from wasting time generating the same advice multiple times.

Incorporate task type categories in people recommenders: This study also prompts a suggestion for the design of people recommenders in enterprise social software. Recently, social network has been increasingly adopted in recommender systems in the workplace (e.g., Kautz, Selman, & Shah, 1997; Ogata, Yano, Furugori, & Jin, 2001). Results from this study, however, demonstrated that there is another factor – types of task – that needs to be incorporated in the design of recommender systems. It was found that employees do not always prefer to talk to someone with whom they have developed a relationship. Rather, their preferences depend on the types of tasks for which they need help. For example, when seeking help for the task of determining actions (e.g., making decisions, solving problems, or planning for future), employees were more likely to prefer to consult someone close to them, compared to when seeking help for merely gaining knowledge or assessing value. Regarding the incorporation of social networks into a recommender system, especially with respect to expert locating within an organization, McDonalds (2003) pointed out the dilemma between recommending

someone who is most comfortable to turn to and recommending someone who has expertise. This dilemma may be resolved by including the categories of task type in the recommendation equation in addition to information about expertise and social networks.

Minimize the cost of interruption: In this study, one of the main challenges of information mediation was associated with the issue of time. From the seeker's perspective, the challenge was in receiving help in a timely manner; however, from the giver's perspective, the challenge was in the negative effect of facing too many interruptions to their work. This suggests that social software (e.g., IM or IM-based systems) needs to provide a mechanism to minimize the cost of interruptions while enabling users to effectively signally the urgency and time-sensitivity of their requests. As a method to reduce interruptions, recent studies have attempted to utilize online status information or incoming event features to generate a ranked list of candidate answers (e.g., Avrahami & Hudson, 2006; Richardson & White, 2011). In employing such a sophisticated ranking algorithm, enterprise social software needs to balance between maximizing the benefit of collegial information mediation and minimizing the cost of interruption. The use of a sophisticated ranking algorithm is crucial.

Support media multiplexity: This study found that employees use multiple communication media during the process of information mediation, mainly combining oral and written communication. Usually, the media choice was made by the seeker who initiated the conversation, but during the process of conversation, it was also determined by the giver's preference. The system therefore needs to provide a platform that integrates diverse media, including traditional communication tools (e.g., e-mail) and social software (e.g., IM, blog, wiki, or SNS), so that users can seamlessly switch between media types. A recent example of such an effort is Topika (Mahmud, Matthews, Whittaker, Moran, & Lau, 2011), which allows users to post email conversations to relevant shared spaces such as wikis. Still, more research is required to design an efficient integrated platform that supports synergetic use of both traditional communication tools and social software while reducing users' labor in switching between multiple media while playing the dual roles of the seeker and giver.

6.4 Implications for Managers and Practitioners

In addition to the implications for system design, this study also has significant implications for managers and practitioners who desire to encourage collegial information mediation within their organizations.

Include collegial information mediation in a job description: One of the main challenges employees experienced when providing information was the lack of time. It was found that some of them are more frequently consulted than the others, because of their subject matter or system expertise, or problem-solving skills. Consequently, those heavy information givers ended up spending too much time helping others, to the point where they did not have enough time to accomplish their own work. To promote information mediation between employees, therefore, management should be aware of the dilemma faced by the heavy information givers and reduce their workloads by specifically including time spent helping others in job descriptions and performance evaluations.

Increase perceptions of reciprocal benefits of information mediation: This study provides concrete evidence that the benefits of information mediation are not one-directional, but reciprocal. For example, as a result of information mediation, information givers were able to make better sense of work environments or to acquire new methods or techniques. It also reinforced their existing knowledge and provided opportunities to reflect on previously held assumptions. To promote information mediation between employees, therefore, managers need to increase perceptions of reciprocal benefits and outcomes.

Encourage employees to explicitly show appreciation and valuation of information: The results of this study show that the feeling of self-efficacy, which is a strong source of motivation to share knowledge, arises when there is a positive reaction or positive feedback from its recipients. While extrinsic rewards, including bonuses or promotions, serve only as temporary incentives (Kohn, 1993), it is the intrinsic motivation that is most important in promoting information mediation. Managers, therefore, need to focus on increasing intrinsic motivation by developing a culture that encourages employees to explicitly show appreciation and valuation of information when they receive it from colleagues.

Create a safe environment to be vulnerable: From the seeker's perspective, one of the main challenges of information mediation was to admit the fact that he or she needed assistance from colleagues. Especially among the scientists, there was a tendency to push for independence, which made them feel ashamed to ask for help. To increase knowledge sharing through information mediation, it is important to create an environment where everyone in the organization feels safe being vulnerable with one another.

Foster a positive environment for expressing and tolerating contradictory information: Another challenge of information mediation was to receive or provide contradictory information. When seeking information, employees found it challenging to accept information that was contradictory to what they had known or believed. When providing information, they felt afraid of expressing disagreement or critical remarks to their colleagues. Efforts to foster a positive environment for expressing and tolerating contradictory information is necessary for enhancing innovation and learning in organizations.

6.5 Suggestions for Future Research

The limitations resulting from the specific research methods employed in this study could be addressed by future studies. For example, observational study would enable us to collect data on information mediation events that may not be conveyed in words. In addition, it would allow the real-time, direct capturing of seeker-giver matches and the dynamics of interactions, such as conflict, negotiation, and influence, between the two. Using a detailed social network survey in addition to the bull's eye method would also enable us to understand different types of relationship patterns and their impact on information mediation practices. Lastly, conducting member checking could help us to assess whether participants' viewpoints were accurately translated into data, such as analytical categories, interpretations, and implications.

In addition to the methodological adaptations to this study, another suggestion for future research is to broaden the scope of the study to include other industries or types of organizations in which members consult one another for guidance in finding, evaluating, interpreting, or applying information, and, therefore, the quality of their decision-making is dependent on informal information mediation. An example of such organizations

includes healthcare organizations. Previous studies have shown that physicians usually rely on their colleagues for information and consider colleagues as most valued information sources and influences (Keating & Ayanian, 2007; West, Barron, Dowsett, & Newton, 1999). The findings from this study suggest that future studies should investigate the dual roles of information seekers and givers and how the perspectives and strategies of one role are carried over to those of the other role. This study also provides strong evidence that assessment of interpersonal trustworthiness, information credibility, and value of experience is made from both perspectives. Furthermore, those three perceptions interact with each other, while being influenced by individual, situational, and relational factors. Findings from future studies that investigate other types of organizations could be used to further refine or enhance this study's conceptual framework to make it applicable to a variety of contexts.

Another direction for future research is to examine the nature of collegial information mediation at companies that have established themselves as pioneers in adopting social software in the workplace. The availability of more recently adopted tools such as micro-blogging services or social networking sites may result in different potentials and challenges in employees' information-seeking and -providing activities. In addition, as those new technologies enable employees to establish better connections not only with collocated but also with non-collocated colleagues, future studies can explore collegial information mediation in the context of long-distance collaboration.

Managerial strategies that aim to address the practical implications of this study, such as the incorporation of information mediation responsibilities in job descriptions or performance evaluations, could be developed and the outcome of those strategies could be measured over time. The findings from outcome evaluations could inform future development of such managerial approaches and strategies in organizations.

This study also attempted to identify implications for the design of enterprise social software. Another possible area of research might be to develop some features or functionalities that aim to address one or more implications from this study, such as a mechanism to control for the visibility of conversations and/or minimize the cost of interruption, and evaluate their effectiveness and usability.

6.6 Concluding Remarks

The need to understand and better support the collegial information mediation in the workplace from both an information seeker's and an information giver's perspective was the starting point for this research. I investigated the perceptions and practices of both the seeker and giver throughout the entire process of information mediation, including interpretation, mediation, assessment – assessment of people, information, and experience – and outcome phases. The major contribution of this work is the exploration of these dual perspectives within an integrated conceptual and analytical framework, which represents an approach to extending traditional seeker-oriented information behavior research, system design, and organizational practice toward becoming capable of addressing the challenges posed by both sides the dyad.

Appendices

Appendix A: Recruitment Email for Diary Study

[*The recruitment email was sent by the company's knowledge management director*.]

Hello Everyone,

I would like to invite you join an RQT Knowledge Management study. This study is being conducted by Ji Yeon Yang, PhD candidate of the University of Michigan, School of Information. Ji Yeon was an intern for us in 2008 and we still use the insights from her research. The purpose of the study is to investigate how RQT employees receive or provide advice from/to each other in finding or using work-related information. This will contribute to the development of strategies and systems for organizational knowledge sharing.

This study has two parts: an online diary study and a potential in-depth interview. For the online diary study, you will have the opportunity to complete very brief online diaries twice a day, at noon and 4PM, for two weeks (Feb 6 - Feb 17), excluding weekends. Although it would be great for you to complete all diaries, if you can complete 4 (two each week) you will qualify for the incentive (see below).

In the diaries, you will record your advice-receiving activities for one week and your advice-providing activities for the other week. You can submit up to 20 diaries in total, 10 diaries for recording when you receive advice from others and 10 diaries for recording activities when you provide advice to others. If you submit the minimum 4 diaries, 2 advice-receiving and 2 advice-providing diaries, you will receive a $7.50 company store coupon. The diaries will take about 5 minutes to complete each time. Once you participated in the diary study, you may be contacted for the follow-up interview.

Participation is voluntary. You may withdraw from the study at any time. The information you provide will be kept confidential. It will not include your name or any other identifying information, and no one at the company will see your answers.

If you would like to participate in the study, please click the link below.

[A link to the participant recruitment]

Deadline for letting us know you wish to participate is January 27, 2012

I would greatly appreciate your participation in this study. It will not take much time and I believe it will provide useful insights for our knowledge sharing projects.

Thanks for considering this request.

[Name of the knowledge management director]

Appendix B: Informed Consent Form for Diary Study

You are invited to be a part of a R&D information mediation study conducted by Ji Yeon Yang, PhD candidate of the University of Michigan, School of Information. The purpose of the study is to investigate how organizational workers provide or receive advice from/to each other in finding or using work-related information. The study will include two parts: online diaries and interview.
If you agree to be part of the research study, you will be first asked to complete background questionnaire about your demographic information. You will then be asked to complete online diaries twice a day, at noon and 4PM, for the next two weeks, excluding weekends. In the diaries, you will be asked to record your **advice-providing** activities for one week and **advice-receiving** activities for the second week. The online diaries will take about 5 minutes to complete each time. The total estimation of the time necessary to participate is no more than 2 hours over the 2 week period. Your multiple responses will be accumulated through a number code, and your name and any information that could be used to identify you will be kept confidential at all times both during and after completion of the study. If you submit more than **4 diaries in total, at least 2 advice-providing and 2 advice- receiving diaries,** you will receive a $7.50 company store coupon.

We also would like to contact you at a later time for the follow-up interview on the diaries you will submit. If you are willing to be re-contacted, please check off below. Even though you agree to be re-contacted now, you may change your mind when re-contacted.

We do not expect that participation in the study will cause you any side effects, psychological or physical discomfort or expose you to any risks. There is no direct personal benefit to you from participating in this study. However, the data to be collected from both advice-providing diaries as well as advice-receiving ones could contribute to the development of strategies and systems for organizational knowledge sharing.

Participating in this study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time. You may choose not to answer questions for any reason. You will not be identified in any reports on this study. Records will be kept confidential to the extent provided by federal, state, and local law. However, the Institutional Review Board or university and government officials responsible for monitoring this study may inspect these records. Because of the nature of Internet transmission of the diary data, the confidentiality may not be assured. At the conclusion of this study, all data will be stored in a locked office for a period of three years for the future research use of the principal investigator and then will be destroyed. The link between your data and identity will be destroyed upon the completion of data collection.

If you have questions about this research study, you can contact the researcher, Ji Yeon Yang, University of Michigan, School of Information, 3349 North Quad., 105 S. State St. Ann Arbor, MI 48109-1285, (734) 945-2794, jiyeon@umich.edu, and the faculty advisor, Soo Young Rieh, University of Michigan, School of Information, 4433 North Quad, 105 S. State St., Ann Arbor, 48109-1285, (734) 647-8040, rieh@umich.edu.

If you have questions about your rights as a research participant, or wish to obtain information, ask questions or discuss any concerns about this study with someone other than the researcher(s), please contact the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board, 540 E Liberty St., Ste 202, Ann Arbor, MI 48104-2210, (734) 936-0933 [or toll free, (866) 936-0933], irbhsbs@umich.edu.

Please check off below if you are willing to participate in this study.

_____ I have read the information above and I consent to participate in this study.

Please check off below if you are willing to be contacted for the follow-up interview study. You may still participate in this study even if you do not agree to be contacted for the interview study.

_____ I am willing to be contacted in the future for the follow-up interview study.

Appendix C: Background Questionnaire

1. What is your gender?

- ❍ Male
- ❍ Female

2. What is your age?

- ❍ 18-24
- ❍ 25-34
- ❍ 35-44
- ❍ 45-54
- ❍ 55-64
- ❍ 65+

3. How long have you been working at this company? _____

4. Which department are you in? _____

5. What are your main work responsibilities? _____

Appendix D: Information-Seeking Diary

Instructions: Think about situations during the past 4 hours in which you turned to your colleagues for work-related advice or information.

Examples may include, but are not limited to, the situations in which you received guidance from your colleagues in:

- thinking through a problem
- understanding previous projects
- deciding among different options
- finding references to other sources of information (particular documents, files, or colleagues)

Choose the situation that took the most time, and then answer the following questions. *This will be used in the follow-up interview; please provide as much detail as you can.*

1. What was the specific work task that prompted you to seek advice/information from your colleague(s)? _____

2. How urgent was the task for which you needed the advice/information?

1 Not at all urgent	2	3	4 Somewhat urgent	5	6	7 Very urgent
❍	❍	❍	❍	❍	❍	❍

3. How complicated was the task?

1 Not at all complicated	2	3	4 Somewhat complicated	5	6	7 Very complicated
❍	❍	❍	❍	❍	❍	❍

4. Who did you turn to? Please list the first name(s) or initial(s) of the person (people) you consulted, in order from first to last.
[Everything you write here is confidential. The data will be sent directly to the researchers and be anonymized such that no individuals will be identified. This will be used in the interview to help you recall this situation.]

1st Person _____
2nd Person_____
3rd Person_____
4th Person_____
5th Person_____

Instruction: For each person listed, please answer the following questions:

5. How did you find the person? Check all that apply.
- ❑ Based on previous knowledge of this person
- ❑ By asking colleagues who to contact
- ❑ By looking through previous documents or files
- ❑ Through the company intranet site
- ❑ Through Sharepoint My site
- ❑ Through Sharepoint Project site
- ❑ Through social network sites (e.g., LinkedIn, Facebook)
- ❑ Other _____

6. Why did you choose the person for advice/information?

7. How did you communicate with the person? Check all that apply.
- ❑ Email
- ❑ Face-to-face
- ❑ Company phone
- ❑ Skype
- ❑ Sharepoint My site
- ❑ Sharepoint Project site
- ❑ Online chat
- ❑ Social network sites (e.g., LinkedIn, Facebook)
- ❑ Online conferencing (e.g., WebEx)
- ❑ Fax
- ❑ Other _____

8. How long did the conversation with the person take?
_____ hour(s)
_____ minute(s)

9. Have you consulted the person before regarding this task? If yes, please indicate why you decided to consult this person again.
- ❍ Yes _____
- ❍ No

10. How did the person assist or advise you?
_____

11. Did the person refer you to a particular document, file, or website? If yes, please list them.
_____

12. Did the person refer you to someone else? If yes, please list the first name(s) or initial(s) of the person (people). _____

13. Did you save any of the advice/information for future use? If yes, please describe where and how you saved it. _____

14. To what extent did you trust the person's advice/information?

1 Not at all	2	3	4 Somewhat	5	6	7 A great deal	8 Not applicable
❍	❍	❍	❍	❍	❍	❍	❍

15. To what extent did you rely on the person's advice/information?

1 Not at all	2	3	4 Somewhat	5	6	7 A great deal	8 Not applicable
❍	❍	❍	❍	❍	❍	❍	❍

16. How valuable was the person's advice/information?

1 Not at all valuable	2	3	4 Somewhat valuable	5	6	7 Very valuable	8 Not applicable
❍	❍	❍	❍	❍	❍	❍	❍

17. To what extent did you agree with the person's advice/information?

1 Not at all	2	3	4 Somewhat	5	6	7 A great deal	8 Not applicable
❍	❍	❍	❍	❍	❍	❍	❍

18. Please rate how you felt after consulting the person on a scale from 1 to 7:

Time wasted (1)	❍	❍	❍	❍	❍	❍	❍	(7) Time well spent
Uncertain (1)	❍	❍	❍	❍	❍	❍	❍	(7) Certain
Unsatisfied (1)	❍	❍	❍	❍	❍	❍	❍	(7) Satisfied
Problem unsolved (1)	❍	❍	❍	❍	❍	❍	❍	(7) Problem solved
Learned nothing (1)	❍	❍	❍	❍	❍	❍	❍	(7) Learned something new

Appendix E: Information-Giving Diary

Instructions: Think about situations during the past 4 hours in which your colleagues turned to you for work-related advice or information.

Examples may include, but are not limited to, the situations in which you provided your colleagues with guidance in:

- thinking through a problem
- understanding previous projects
- deciding among different options
- finding references to other sources of information (particular documents, files, or colleagues)

Choose the situation that took the most time, and then answer the following questions.
This will be used in the follow-up interview; please provide as much detail as you can.

1. Who was the person who turned to you for your advice/information? Please write the first name or initial of the person.
[Everything you write here is confidential. The names will be sent directly to the researcher and be anonymized such that no individuals will be identified. This will be used in the interview to help you recall this situation.]

_____

2. What was the specific work task for which this person needed advice/information?

_____

3. How complicated did you think this person's task?

1 Not at all complicated	2	3	4 Somewhat complicated	5	6	7 Very complicated
❍	❍	❍	❍	❍	❍	❍

4. How did you communicate with this person? Check all that apply.

- ❑ Email
- ❑ Face-to-face
- ❑ Company phone
- ❑ Skype
- ❑ Sharepoint My site
- ❑ Sharepoint Project site
- ❑ Online chat
- ❑ Social network sites (e.g., LinkedIn, Facebook)
- ❑ Online conferencing (e.g., WebEx)
- ❑ Fax
- ❑ Other _____

5. In total, how long did the conversation with this person take?
_____ hour(s)
_____ minute(s)

6. Why do you think this person chose to seek advice/information from you?
_____

7. How did you assist or advise this person?
_____

8. Did you refer this person to a particular document, file, or website? If yes, please list them.
_____

9. Did you refer this person to someone else? If yes, please list the first name(s) or initial(s) of the person (people). _____

10. What did you take into account to decide what kind of advice/information would be helpful to this person? _____

11. Has this person consulted you before regarding this task? If yes, please indicate how you assisted or advised this person.
❍ Yes _____
❍ No

12. How would you rate your expertise in the topic about which this person needed help?

1 None	2	3	4 Some	5	6	7 High	8 Not applicable
❍	❍	❍	❍	❍	❍	❍	❍

13. To what extent did you trust the advice/information that you provided to this person?

1 Not at all	2	3	4 Somewhat	5	6	7 A great deal	8 Not applicable
❍	❍	❍	❍	❍	❍	❍	❍

14. How confident did you feel that your advice/information would be helpful to this person?

1 Not at all confident	2	3	4 Somewhat confident	5	6	7 Very confident	8 Not applicable
❍	❍	❍	❍	❍	❍	❍	❍

15. How satisfied were you with the advice/information that you provided to this person?

1 Not at all satisfied	2	3	4 Somewhat satisfied	5	6	7 Very satisfied	8 Not applicable
❍	❍	❍	❍	❍	❍	❍	❍

16. How well did you think your advice/information was accepted by this person?

1 Not at all accepted	2	3	4 Somewhat accepted	5	6	7 Entirely accepted	8 Not applicable
❍	❍	❍	❍	❍	❍	❍	❍

17. Please rate how you felt after having a conversation with this person on a scale from 1 to 7:

Time wasted (1)	❍	❍	❍	❍	❍	❍	❍	(7) Time well spent
Uncertain about what I knew(1)	❍	❍	❍	❍	❍	❍	❍	(7) Certain about what I knew
Learned nothing (1)	❍	❍	❍	❍	❍	❍	❍	(7) Learned something new
Opinion not changed (1)	❍	❍	❍	❍	❍	❍	❍	(7) Opinion changed

Appendix F: Recruitment Email for Interview

Thank you for agreeing to participate in this INTERVEW STUDY pertaining to the online activity diary study conducted by Ji Yeon Yang, PhD candidate of the University of Michigan, School of Information. The purpose of this interview is to investigate how organizational workers receive or provide advice from/to each other in finding or using work-related information. If you agree to participate, I will conduct a 60-90 minute one-on-one interview. During the interview, you will be asked to talk about how you make decisions and judgments when you receiving or providing advice. As a part of the interview, you will also be asked to provide a visual representation of your relationships. Your responses from diaries and interview will be linked via an anonymous code to your identity. You will receive a $15 company store coupon upon your completion or voluntary termination of your interview.

Participation is voluntary. You may withdraw from the study at any time. The information you provide will be kept confidential. It will not include your name or any other identifying information, and no one at the company will see your answers.

* interview Scheduling*
If you would like to participate in the study, please click the link below
and pick FIVE time slots that work best for you. [Link to the scheduler]

Please submit your available time slots AS SOON AS POSSIBLE.

Thank you for your participation in advance.
I look forward to meeting you soon.

If you have any questions, please contact me at:
Email: jiyeon@umich.edu
Phone: (734) 945-2794

Appendix G: Informed Consent Form for Interview

Thank you for agreeing to participate in this follow-up interview pertaining to the online activity diary study conducted by Ji Yeon Yang, PhD candidate of the University of Michigan, School of Information. This interview will take approximately 60–90 minutes. You will receive a $15 company store coupon upon your completion or voluntary termination of your interview.

The purpose of this interview is to gather more in-depth information about your experiences that you reported in the diaries. During this interview, you will be asked to talk about how you make decisions and judgments when you receive or provide advice from/to your colleagues. As a part of the interview, you will also be asked to provide a visual representation of your relationships.

We do not expect that your participation in this study will cause you any side effects or psychological or physical discomfort or expose you to any risks. There is no direct personal benefit to you from participating in this study. However, the findings from this study will be useful for researchers, educators, and information professionals.

Your participation in this study is completely voluntary. Even after you indicate your agreement to this informed consent document by checking off the appropriate spaces below, you may decide to leave the study at any time without penalty or loss of benefits to which you may otherwise be entitled. Also, you may choose not to answer any question for any reason.
You will not be identified in any reports on this study. Records will be kept confidential to the extent provided by federal, state, and local law. However, the Institutional Review Board or university and government officials responsible for monitoring this study may inspect these records. At the conclusion of this study, all data will be stored in a locked office for a period of three years for the future research use of the principal investigator and then will be destroyed. The link between your data and identity will be destroyed upon the completion of data collection.

If you have questions about this research study, you can contact the researcher, Ji Yeon Yang, University of Michigan, School of Information, 3339 North Quad., 105 S. State St. Ann Arbor, MI 48109-1285, (734) 945-2794, jiyeon@umich.edu, and the faculty advisor, Soo Young Rieh, University of Michigan, School of Information, 4433 North Quad, 105 S. State St., Ann Arbor, 48109-1285, (734) 647-8040, rieh@umich.edu.

If you have questions about your rights as a research participant, or wish to obtain information, ask questions or discuss any concerns about this study with someone other than the researcher(s), please contact the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board, 540 E Liberty St., Ste 202, Ann Arbor, MI 48104-2210, (734) 936-0933 [or toll free, (866) 936-0933], irbhsbs@umich.edu.

I have read the information in this consent form and I agree to participate in this interview.

_____ **I agree**

_____ **I do not agree**

I would like to audio-tape the interviews for transcribing and further analysis. The tapes will be destroyed three years after the project has been completed.

I give permission for my interview to be tape-recorded. Please note that you may still participate in this study if you are not willing to have the interview recorded.

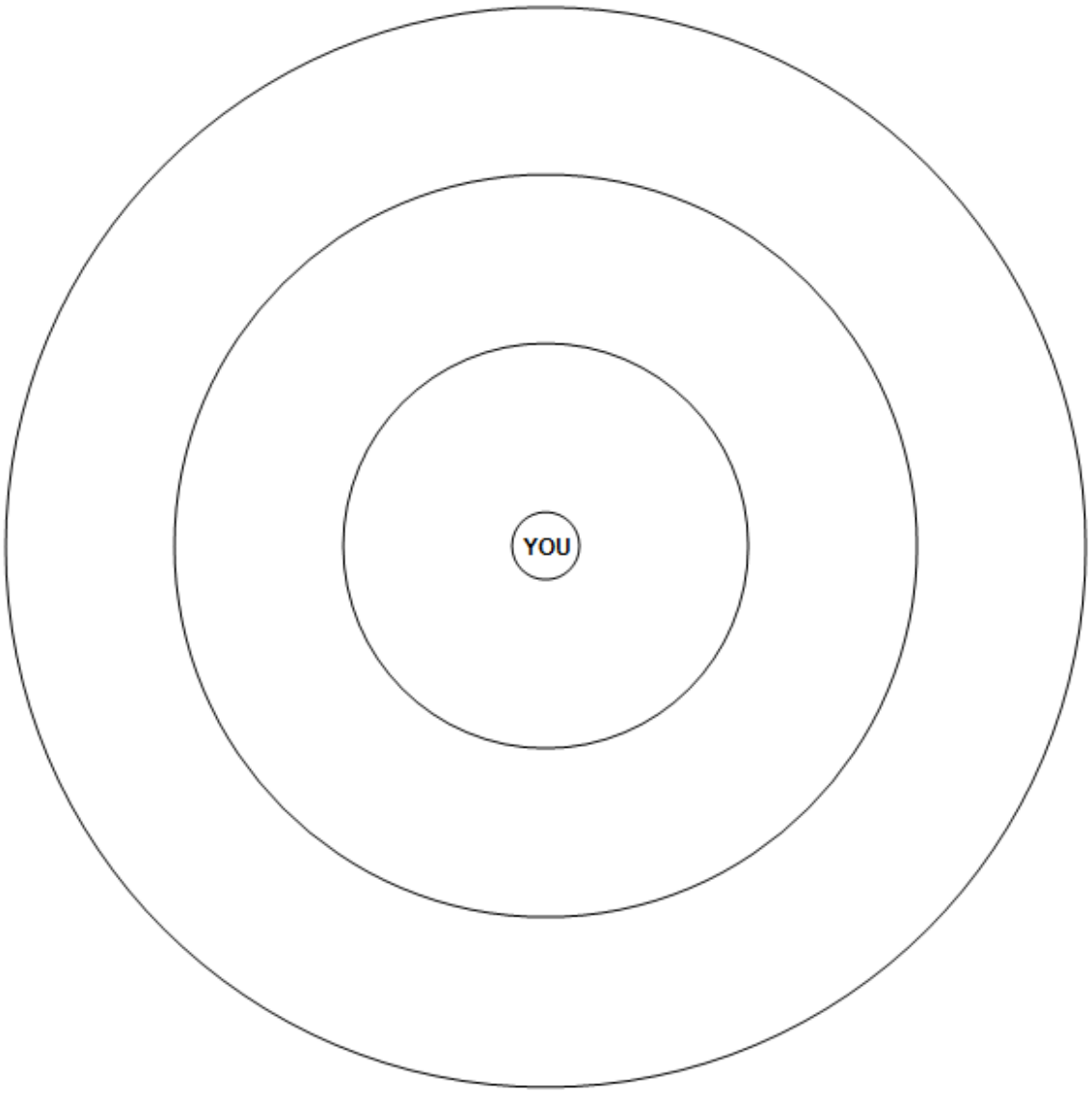
_____ **I give permission**

_____ **I do not give permission**

Appendix H: Bull's Eye Method

Instruction: Before we start the interview, we are going to do a little warming up activity on this Bulls eye diagram. For the last two weeks, you submitted [number] diaries in total, [number] advice-providing and [number] advice-receiving diaries. In your diaries, you have included in total [number] people and here you can see the list of them. On the stickers, I wrote the initials of all the people that you included.

Please place the round stickers onto the three concentric circles. This one represents *You*. Each of the three circles represents levels of closeness to you: the inner circle is for individuals who you feel are closest to you, the middle circle is for individuals who you feel are not as close to as your inner circle, but are still important to you, and the outer circle is for individuals who you feel are less close to but are important enough to be included in your diaries. Please place them in a way that is meaningful to you.



Appendix I: Interview Protocol for Information-Seeking Episodes

Instructions: This diary was submitted on [date] at [time]. In this diary, you needed [information needs reported in the diary entry] and talked to [name/Initial of the colleague].

For each diary:

1. Tell me more about the situation; what prompted it?

2. You rated the complexity of the task [fairly high/in the middle/low]. Why did you think the task was complicated/not that complicated?

   Probing: Was this task something new, unexpected, or unfamiliar?

For each person listed in the diary:

From now on, I'll ask you some questions about each person you listed in the diary.

3. You mentioned that you found this person through [system]. Why did you use that method? Could you tell me more about what you knew about this person?

   Probing: Do you ever use any other resources such as intranet or directory to find out who to turn to? How about documents or files? Have you ever found out who to turn to by reading documents, presentations, or reports?

4. Why did you turn to this particular person? Was he/she the only person that you can turn to? Weren't there any other colleagues you could've talked to? Then why did you choose this person?

5. Why did you turn to this person rather than using electronic resources such as intranet, internet, shared file storage, or database? Could you find the information from those resources? What were your expectations from this person?

6. How is this person's position related to yours?

   Probing: Are you and this person on the same project? Are you in the same department? Is he/she above, below, or equivalent to you in the organizational hierarchy?

7. You mentioned that you communicated through [system] with this person. What did you take into account in choosing which method to use?

8. What kind of advice/information did this person give you?

9. You mentioned that this person referred you to these sources including [document, file, website, or person]. Please describe these sources in order from first to last.
   Probing: What specific instructions did this person give you in using the sources?
   - *Document/File: For example, did the person point out a particular part of the document?*
   - *Person: For example, did [Name/Initial] tell you how to consult the next person?*

10. [Ask only if 1=Yes was selected in the diary Q.9] You said you talked to this person before you completed this diary. Could you tell me how the conversation proceeded from the first moment?

11. You mentioned that you saved the advice/information from this person in [system]. Why? Do you usually keep info in [system]? Do you ever share the info with others?

12. After talking to this person, did you feel you got what you asked for? Or more than you asked for? If not, what else did you still need to know?

13. You rated your feelings after consulting this person in the diary question 18. Your overall feelings seem to be [positive/ negative/ or mixed] in terms of [whether the time was well spent/ whether you were more certain about the topic/ whether you were satisfied/ whether the problem was solved/ or whether you learned something new]. Why did you feel that way?

14. Could you entirely accept the advice from this person or did you have any other opinions or feel conflicted in anyway? Why?

    Probing:
    If accepted: Is accepting the advice same things as trusting the advice? How so? Why?
    If conflicted: If you were conflicted, do you feel it is because you could not trust the advice? How?

15. What action(s) did you take after receiving the advice/information? Why?

    Probing: Do you think you did anything differently?

16. How much do you feel the advice influenced your decision making? What level of influence do you feel the advice had on your action/decision-making?

17. Thinking about the outcome, if you acted on this person's advice/information, did it turn out to be as useful as you hoped? Or did it turn out to be not as useful as you hoped?

18. For this specific task, did you feel this person to have enough expertise? Again for this specific task, did you feel this person to be reliable or to be trustworthy for this task?

    Probing: What made you think so? Why do you trust this person for this specific task?
    Is somebody being expert same as being reliable or trustworthy to you?

19. Then do you trust anyone in the company? Is this more like default assumption you have? Or is that really based on some sort of evidence or specific reason?

20. Do you think your perception on this person changed after this conversation? How so?

21. Would you consult this person again if you need similar help in the future or is there any other option you can think of? Why?

<u>After finishing **all** the advice-receiving interviews:</u>

22. What was the most difficult part in getting advice/information over time from the same colleague or multiple colleagues?

23. So we talked about both advice-providing and receiving experiences. Do you think you act differently or take different things account when you provide vs receive experience? Or the same things? If yes what would that be?

Appendix J: Interview Protocol for Information-Giving Episodes

Instructions: This advice-providing diary was submitted on [date] at [time]. In the first question, you said you advised [name/Initial] who [information needs of the colleague reported in the diary].

For each diary:

1. Tell me more about this situation. What prompted it?

2. Were you able to fully understand what this person was looking for? How could you tell?

3. You rated the complexity of the task they were asking about [fairly high/in the middle/low]. Why did you think the task was complicated/not that complicated? Was their task something new, unexpected, or unfamiliar to you?

4. How is this person's position related to yours?

   Probing: Are you and this person on the same project? Are you in the same department? Is he/she [above, below, or equivalent to] you in the organizational hierarchy?

5. Why do you think this person chose to seek advice/information from you? Do you think there was any other option than coming to you for that person? Any other person he/she could've turned to or any resources such as database, intranet, or shared file storage?

6. (How familiar are you with the topic about which this person needed advice/information? Why do you think so?

7. You mentioned that you used [system] to communicate with this person. Why did you use it? Do you typically use this to communicate?

8. What kind of advice/information did you give this person?

   You mentioned that you referred this person to these sources including [document, file, website, or person]. Please describe these sources in order from first to last.
   Probing: What specific instructions did you give this person in using the sources?
   - *Document/File: For example, did you point out a particular part of the document?*
   - *Person: For example, did you tell [name/initial] how to consult the next person? Did you give (initial) pointers on how to approach the person?*

9. Why did you provide that particular advice/information? What did you take into account to decide which advice/information would be helpful to this person?

10. When you gave the advice/information to this person, did you tell him/her in steps, what needed to be done first and what needed to be done next? If yes, how did you explain the process?

11. [Ask only if 1=Yes was selected in the diary Q.11] You mentioned that you have talked about this topic with this person more than once before you completed the diary. Could you tell me more about how the conversation has proceeded, starting from the first moment until now?

12. How confident were you that the advice/information you provided was trustworthy? What made you think so?

13. Do you think this person also perceive it trustworthy? Why do you think this person trusted you?

14. Did you receive any kind of response or feedback beyond ‘thank you’ from this person? What was it?

15. You rated your feelings after consulting this person in the diary question 17. Your overall feelings seem to [be positive/ negative/ or mixed] in terms of [whether the time was well spent/ whether you felt more certain about what you knew/ whether you learned something new]. Why did you feel that way? Is it usual when you give advice?

16. Overall, then, does it mean that this advice-giving experience really rewarding to you or not? Could you tell me more why?

17. After this conversation, do you think the way you think about this topic or how you will go about to find information about this topic changed in anyway? Or, has your idea or perspective or opinion about the topic changed? In the diary question it seems that your opinion did [not change at all/ somewhat changed/ entirely changed] after talking to this person. Could you tell me more? How was your opinion or perspective influenced?

    Probing: [If the person answered differently from their original rating] I wonder why your answer has changed.

<u>After finishing **all** the advice-providing interviews:</u>

18. What was the most difficult aspect of providing advice/information to your colleagues over time?

Appendix K: Estimates of Fixed Effects for All Factors on Credibility and Value Perception Measures in Information-Seeking Diaries

	Estimates of Fixed Effects for All Factors on Credibility and Value Measures in Information-Seeking Diaries								
	Credibility of Information Estimate (95% Confidence Intervals)				Value of Experience Estimate (95% Confidence Intervals)				
	Trustworthy	Reliable	Valuable	Agreeable	Time well-spent	Certain	Satisfied with experience	Problem-solved	Learned new things
Gender	**p=0.213**	**p=0.545**	**p=0.090**	**p=0.342**	**p=0.838**	**p=0.898**	**p=0.85**	**p=0.89**	**p=0.353**
Male (=1)	E(-0.37, 0.08)	E(-0.43, 0.23)	E(-0.56, 0.04)	E(-0.39, 0.14)	E(-0.24, 0.3)	E(-0.52, 0.45)	E(-0.43, 0.36)	E(-0.54, 0.47)	E(-0.27, 0.73)
Female (=2)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Job tenure	**p=0.265**	**p=0.446**	**p=0.598**	**p=0.08**	**p=0.418**	**p=0.941**	**p=0.387**	**p=0.096**	**p=0.067**
<1yr	E(-0.83, 0.43)	E(-1.07, 0.74)	E(-0.8, 0.84)	E(-1.32, 0.11)	E(-1.36, 0.13)	E(-1.38, 1.28)	E(-1.17, 0.98)	E(-0.28, 2.54)	E(-0.56, 2.2)
1~5yr	E(-0.71, 0.33)	E(-0.9, 0.62)	E(-0.84, 0.52)	E(-1.16, 0.01)	E(-1.02, 0.2)	E(-1.21, 1.05)	E(-1.13, 0.67)	E(-0.61, 1.77)	E(-0.86, 1.47)
5~10yr	E(-0.33, 0.67)	E(-0.46, 1)	E(-0.55, 0.75)	E(-0.7, 0.43)	E(-0.9, 0.27)	E(-0.99, 1.2)	E(-0.81, 0.93)	E(-0.12, 2.18)	E(-0.96, 1.3)
10~20yr	E(-0.44, 0.57)	E(-0.85, 0.62)	E(-0.84, 0.47)	E(-0.94, 0.19)	E(-0.73, 0.45)	E(-1.11, 1.1)	E(-0.96, 0.8)	E(-0.76, 1.57)	E(-1.46, 0.82)
20~30yr	E(-0.66, 0.5)	E(-0.67, 1.02)	E(-1.08, 0.44)	E(-1.32, 0)*	E(-1, 0.37)	E(-1.64, 0.87)	E(-1.76, 0.25)	E(-1.49, 1.18)	E(-2.08, 0.52)
30yr<	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Task type	**p=0.007**	**p=0.153**	**p=0.009**	**p=0.003**	**p=0.004**	**p=0.002**	**p=0.003**	**p=0.035**	**p=0.283**
Gain technical know-what	E(-0.75, 0.43)	E(-0.27, 1.13)	E(-0.49, 0.93)	E(-0.41, 0.89)	E(-1.39, 0.18)	E(-1.06, 0.9)	E(-1.12, 0.8)	E(-0.5, 2.35)	E(-1.51, 0.88)
Gain non-technical know-what	E(-0.55, 0.8)	E(0.12, 1.72)*	E(-0.11, 1.51)	E(-0.1, 1.39)	E(-1.05, 0.7)	E(-0.84, 1.36)	E(-1.07, 1.08)	E(0.12, 3.27)*	E(-1.43, 1.24)
Gain technical know-how	E(-0.93, 0.35)	E(-0.5, 1.02)	E(-0.92, 0.61)	E(-0.45, 0.96)	E(-1.8, -0.13)*	E(-1.23, 0.86)	E(-1.53, 0.52)	E(-0.58, 2.44)	E(-1.74, 0.8)
Gain non-technical know-how	E(-0.83, 0.59)	E(-0.33, 1.33)	E(-0.39, 1.3)	E(-0.15, 1.4)	E(-1.08, 0.74)	E(-0.75, 1.52)	E(-1.07, 1.16)	E(-0.19, 3.11)	E(-1.52, 1.25)
Evaluate	E(-0.53, 1.03)	E(-0.65, 1.19)	E(-0.81, 1.06)	E(-0.04, 1.67)	E(-1.58, 0.4)	E(-1.29, 1.19)	E(-1.32, 1.11)	E(-1.13, 2.41)	E(-1.56, 1.44)
Verify	E(-1.74, -0.31)**	E(-0.84, 0.83)	E(-1.63, 0.07)	E(-1.31, 0.23)	E(-2.41, -0.56)**	E(-2.77, -0.54)**	E(-2.93, -0.69)**	E(-1.85, 1.57)	E(-2.65, 0.14)
Decide	E(-0.66, 0.76)	E(-0.8, 0.87)	E(-0.87, 0.85)	E(-0.78, 0.78)	E(-1.17, 0.66)	E(-0.99, 1.26)	E(-1.31, 0.92)	E(-0.44, 2.83)	E(-2.11, 0.64)
Solve	E(-1.07, 0.19)	E(-0.41, 1.08)	E(-0.63, 0.87)	E(-0.63, 0.74)	E(-1.5, 0.15)	E(-1.36, 0.71)	E(-1.4, 0.63)	E(-1.21, 1.79)	E(-2.24, 0.28)
Plan	E(-0.58, 0.81)	E(-0.15, 1.48)	E(-0.45, 1.21)	E(-0.03, 1.51)	E(-1.3, 0.49)	E(-0.8, 1.46)	E(-0.89, 1.31)	E(0.03, 3.23)*	E(-1.68, 1.04)
Obtain data	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Mediation Type	**p=0.439**	**p=0.736**	**p=0.636**	**p=0.218**	**p=0.046**	**p=0.055**	**p=0.262**	**p=0.12**	**p=0.333**
Aggregation	E(-0.36, 1.22)	E(-1.03, 0.77)	E(-0.55, 1.36)	E(-0.31, 1.51)	E(-0.66, 1.24)	E(-0.11, 2.18)	E(-0.5, 1.72)	E(-0.56, 2.28)	E(-1.51, 1.11)
Background knowledge	E(-0.43, 0.83)	E(-0.51, 0.9)	E(-0.3, 1.22)	E(-0.67, 0.78)	E(-0.29, 1.21)	E(-0.49, 1.29)	E(-0.82, 0.9)	E(-0.56, 1.45)	E(-0.81, 1.19)
Experience sharing	E(-0.77, 0.42)	E(-0.38, 0.97)	E(-0.7, 0.75)	E(-0.85, 0.52)	E(-0.87, 0.55)	E(-0.86, 0.84)	E(-0.63, 1.01)	E(-0.88, 1.04)	E(-1.21, 0.69)
Idea/opinion	E(-0.49, 0.33)	E(-0.28, 0.66)	E(-0.3, 0.69)	E(-0.71, 0.22)	E(-0.39, 0.59)	E(-0.67, 0.53)	E(-0.62, 0.53)	E(-0.34, 1.03)	E(-0.75, 0.6)

Suggestion	E(-0.32, 0.58)	E(-0.24, 0.79)	E(-0.27, 0.81)	E(-0.53, 0.48)	E(-0.33, 0.74)	E(-0.41, 0.91)	E(-0.58, 0.68)	E(-0.73, 0.81)	E(-0.88, 0.61)
Explanation/demonstration	E(-0.32, 0.5)	E(-0.34, 0.59)	E(-0.23, 0.76)	E(-0.44, 0.5)	E(-0.27, 0.71)	E(-0.21, 0.98)	E(-0.36, 0.78)	E(-0.08, 1.28)	E(-0.34, 1)
Validation	E(-0.15, 0.82)	E(-0.23, 0.86)	E(0.1, 1.26)*	E(-0.13, 0.97)	E(0.36, 1.51)**	E(0.21, 1.59)*	E(0.22, 1.55)**	E(0.09, 1.66)*	E(-0.54, 1.01)
Solution	E(-0.31, 0.56)	E(-0.22, 0.75)	E(-0.18, 0.85)	E(-0.32, 0.66)	E(-0.14, 0.89)	E(-0.07, 1.16)	E(-0.37, 0.82)	E(0.21, 1.63)*	E(-0.38, 1.01)
Referral to documents or files	E(-0.11, 1.08)	E(0.04, 1.36)*	E(-0.38, 1.05)	E(-0.31, 1.05)	E(-0.01, 1.47)	E(-0.25, 1.48)	E(-0.51, 1.17)	E(-0.01, 1.97)	E(0.14, 2.08)*
Referral to other people	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Task urgency	**p=0.034**	**p=0.016**	**p=0.053**	**p=0.041**	**p=0.06**	**p=0.008**	**p=0.066**	**p=0.001**	**p=0.314**
Task complexity	**p=0.396**	**p=0.120**	**p=0.222**	**p=0.018**	**p=0.149**	**p=0.003**	**p=0.004**	**p=0**	**p=0.498**
Order of the incident	**p=0.103**	**p=0.150**	**p=0.331**	**p=0.157**	**p=0.198**	**p=0.467**	**p=0.074**	**p=0.49**	**p=0.844**
Number of media used	**p=0.057**	**p=0.004**	**p=0.161**	**p=0.011**	**p=0.286**	**p=0.837**	**p=0.578**	**p=0.117**	**p=0.291**
Social closeness†	**p=0.413**	**p=0.416**	**p=0.794**	**p=0.308**	**p=0.641**	**p=0.001**	**p=0.046**	**p=0.157**	**p=0.661**
Hierarchical level††	**p=0.007**	**p=0.032**	**p=0.104**	**p=0.008**	**p=0.003**	**p=0.049**	**p=0.005**	**p=0.017**	**p=0.027**
Lower than or equivalent to me (=1)	E(-1.29, -0.22)**	E(-1.38., -0.06)*	E(-0.98, 0.09)	E(-1.66, -0.26)**	E(-1.42, -0.31)**	E(-1.51, -0.04)*	E(-1.98, -0.39)**	E(-1.57, -0.20)*	E(-1.70, -0.11)*
Higher than me (=2)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

Note: P values are from F-statistics.
*P<0.05, **P<0.01
† Results from the data set of 132 information–seeking diary entries
†† Results from the data set of 100 information–seeking diary entries

Appendix L: Estimates of Fixed Effects for All Factors on Credibility and Value Perception Measures in Information-Giving Diaries

	Estimates of Fixed Effects for All Factors on Credibility and Value Measures in Information-Giving Diaries								
	Credibility of Information Estimate (95% Confidence Intervals)					Value of Experience Estimate (95% Confidence Intervals)			
	Expert	Trustworthy	Confident	Satisfied with info. quality	Accepted	Time well-spent	Certain about what I knew	Learned new things	Opinion changed
Gender	**p=0.115**	**p=0.087**	**p=0.196**	**p=0.501**	**p=0.1**	**p=0.654**	**p=0.101**	**p=0.247**	**p=0.587**
Male (=1)	E(-0.07, 0.62)	E(-0.04, 0.55)	E(-0.1, 0.5)	E(-0.18, 0.37)	E(-0.06, 0.67)	E(-0.3, 0.47)	E(-0.07, 0.72)	E(-1.11, 0.29)	E(-0.48, 0.83)
Female (=2)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Job tenure	**p=0.002**	**p=0.034**	**p=0.268**	**p=0.046**	**p=0.113**	**p=0.816**	**p=0.257**	**p=0.162**	**p=0.497**
<1yr	E(-2.67, -0.67)**	E(-2.14, -0.46)**	E(-1.65, 0.08)	E(-1.84, -0.24)*	E(-1.77, 0.29)	E(-0.99, 1.18)	E(-2.1, 0.09)	E(-0.49, 3.5)	E(-0.98, 2.72)
1~5yr	E(-1.61, 0)*	E(-1.15, 0.25)	E(-1.16, 0.26)	E(-1.04, 0.28)	E(-1.12, 0.6)	E(-0.89, 0.93)	E(-1.39, 0.47)	E(-1.27, 2.07)	E(-1.86, 1.26)
5~10yr	E(-1.42, 0.18)	E(-1.38, -0.01)*	E(-1.09, 0.31)	E(-1.28, 0.03)	E(-0.99, 0.71)	E(-1.16, 0.63)	E(-1.64, 0.19)	E(-2.02, 1.29)	E(-1.73, 1.36)
10~20yr	E(-1.22, 0.33)	E(-1.22, 0.12)	E(-1.1, 0.26)	E(-1.12, 0.15)	E(-1.23, 0.42)	E(-1.17, 0.59)	E(-1.35, 0.44)	E(-1.86, 1.37)	E(-2.04, 0.97)
20~30yr	E(-0.83, 0.88)	E(-1.01, 0.47)	E(-0.78, 0.72)	E(-0.81, 0.59)	E(-0.56, 1.28)	E(-1.11, 0.83)	E(-1.11, 0.87)	E(-2.19, 1.37)	E(-2.1, 1.24)
30yr<	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Task type	**p=0.081**	**p=0.166**	**p=0.12**	**p=0.01**	**p=0.524**	**p=0.008**	**p=0.209**	**p=0.616**	**p=0.369**
Gain technical know-what	E(-1.24, 0.46)	E(-0.37, 0.93)	E(-0.57, 0.77)	E(-0.45, 0.85)	E(-0.94, 0.54)	E(-0.94, 0.57)	E(-0.49, 0.97)	E(-1.38, 1.5)	E(-1.52, 1.05)
Gain non-technical know-what	E(-2.81, -0.5)**	E(-1.47, 0.27)	E(-1.61, 0.23)	E(-1.47, 0.28)	E(-1.31, 0.72)	E(-1.62, 0.41)	E(-1.2, 0.75)	E(-1.3, 2.54)	E(-1.97, 1.46)
Gain technical know-how	E(-1.47, 0.32)	E(-0.33, 1.04)	E(-0.63, 0.8)	E(-0.48, 0.88)	E(-0.94, 0.64)	E(-0.75, 0.84)	E(-0.43, 1.1)	E(-1.15, 1.87)	E(-1.84, 0.85)
Gain non-technical know-how	E(-1.44, 0.72)	E(-0.62, 1.02)	E(-0.83, 0.89)	E(-0.65, 1)	E(-1.25, 0.64)	E(-1.32, 0.58)	E(-0.47, 1.36)	E(-2.65, 0.96)	E(-1.51, 1.71)
Evaluate	E(-2.41, -0.01)	E(-1.19, 0.63)	E(-1.64, 0.27)	E(-1.75, 0.07)	E(-1.95, 0.17)	E(-2.7, -0.58)**	E(-1.74, 0.31)	E(-2.5, 1.52)	E(-1.48, 2.12)
Verify	E(-1.24, 1.27)	E(-0.48, 1.43)	E(-0.41, 1.59)	E(-0.1, 1.81)	E(-0.91, 1.3)	E(-1.1, 1.11)	E(-0.65, 1.47)	E(-1.36, 2.84)	E(-2.26, 1.49)
Decide	E(-1.32, 0.54)	E(-0.31, 1.11)	E(-0.45, 1.04)	E(-0.35, 1.08)	E(-0.91, 0.73)	E(-1.06, 0.59)	E(-0.36, 1.24)	E(-1.39, 1.75)	E(-1.99, 0.81)
Solve	E(-1.38, 0.56)	E(-0.5, 0.98)	E(-0.71, 0.84)	E(-0.47, 1.01)	E(-0.66, 1.04)	E(-0.76, 0.96)	E(-0.37, 1.28)	E(-0.92, 2.34)	E(-0.73, 2.18)
Plan	E(-1.18, 0.68)	E(-0.43, 0.99)	E(-0.58, 0.9)	E(-0.78, 0.65)	E(-0.73, 0.9)	E(-0.66, 0.99)	E(-0.56, 1.04)	E(-1.27, 1.88)	E(-1.67, 1.13)
Obtain data	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Mediation Type	**p=0.174**	**p=0.209**	**p=0.035**	**p=0.097**	**p=0.571**	**p=0.23**	**p=0.051**	**p=0.298**	**p=0.14**
Aggregation	E(-0.85, 0.83)	E(-0.43, 0.83)	E(-0.22, 1.09)	E(-0.02, 1.24)	E(-0.6, 0.87)	E(-0.71, 0.77)	E(-0.23, 1.21)	E(-0.12, 2.7)	E(0.15, 2.67)*
Background knowledge	E(-0.36, 1.33)	E(-0.27, 1.02)	E(0.23, 1.6)**	E(0.2, 1.49)*	E(-0.2, 1.31)	E(-0.93, 0.58)	E(-0.33, 1.12)	E(-1.58, 1.28)	E(-0.13, 2.43)

Experience sharing	E(-0.46, 1.12)	E(-0.62, 0.58)	E(-0.72, 0.55)	E(-0.25, 0.95)	E(-0.52, 0.89)	E(-0.41, 1)	E(-0.77, 0.59)	E(-1.05, 1.62)	E(-0.93, 1.46)
Idea/opinion	E(-0.22, 0.94)	E(-0.18, 0.72)	E(0.01, 0.96)*	E(0.07, 0.96)*	E(-0.26, 0.81)	E(-0.57, 0.51)	E(-0.34, 0.72)	E(-0.5, 1.55)	E(0.02, 1.87)*
Suggestion	E(-0.31, 1)	E(-0.07, 0.94)	E(-0.01, 1.05)	E(0.15, 1.16)*	E(-0.67, 0.51)	E(-0.91, 0.28)	E(-0.17, 0.98)	E(0.22, 2.48)*	E(-0.2, 1.82)
Explanation/demonstration	E(-0.18, 1.03)	E(-0.02, 0.92)	E(0.23, 1.22)**	E(0.3, 1.23)**	E(-0.26, 0.85)	E(-0.49, 0.63)	E(-0.19, 0.9)	E(-0.39, 1.72)	E(0.07, 1.97)*
Validation	E(-0.7, 1.65)	E(-1.19, 0.59)	E(-0.83, 1.05)	E(-0.81, 0.97)	E(-0.48, 1.6)	E(-1.06, 1.01)	E(-1.48, 0.52)	E(-2.22, 1.72)	E(-1.99, 1.52)
Solution	E(-1.08, 0.25)	E(-0.44, 0.58)	E(-0.2, 0.88)	E(-0.07, 0.94)	E(-0.71, 0.49)	E(-1.16, 0.04)	E(-0.95, 0.21)	E(-0.51, 1.76)	E(-0.51, 1.53)
Referral to documents or files	E(-0.42, 1.28)	E(0.03, 1.33)*	E(0.11, 1.49)*	E(-0.11, 1.19)	E(-0.51, 1.02)	E(-0.73, 0.8)	E(-0.36, 1.13)	E(-0.92, 1.98)	E(-1.33, 1.28)
Referral to other people	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Task complexity	**p=0.2**	**p=0.136**	**p=0.014**	**p=0.007**	**p=0.002**	**p=0.445**	**p=0.118**	**p=0**	**p=0.05**
Number of media used	**p=0.611**	**p=0.414**	**p=0.377**	**p=0.299**	**p=0.06**	**p=0.175**	**p=0.555**	**p=0.002**	**p=0.013**
Social closeness†	**p=0.408**	**p=0.393**	**p=0.501**	**p=0.695**	**p=0.152**	**p=0.147**	**p=0.993**	**p=0.174**	**p=0.278**
Hierarchical level††	**p=0.086**	**p=0.333**	**p=0.459**	**p=0.129**	**p=0.327**	**p=0.907**	**p=0.067**	**p=0.386**	**p=0.909**
Lower than or equivalent to me (=1)	E(-0.07, 1.06)	E(-0.21, 0.63)	E(-0.31, 0.69)	E(-0.11, 0.88)	E(-0.25, 0.75)	E(-0.56, 0.50)	E(-0.03, 0.92)	E(-0.63, 1.61)	E(-0.92, 1.03)
Higher than me (=2)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

Note: P values are from F-statistics.
*P<0.05, **P<0.01
† Results from the data set of 179 information–providing diary entries
†† Results from the data set of 88 information–providing diary entries

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