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### Inquiry in Support of the Knowledge Sharing Life Cycle Within a Higher Education Database Practicum: a Case Study at Regis University

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**Regis University**  
College for Professional Studies Graduate Programs  
**Final Project/Thesis**

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**INQUIRY IN SUPPORT OF THE KNOWLEDGE SHARING LIFE CYCLE WITHIN A  
HIGHER EDUCATION DATABASE PRACTICUM:  
A CASE STUDY AT REGIS UNIVERSITY**

A THESIS

SUBMITTED ON 26 OF MAY, 2010

TO THE DEPARTMENT OF INFORMATION TECHNOLOGY  
OF THE SCHOOL OF COMPUTER & INFORMATION SCIENCES  
OF REGIS UNIVERSITY

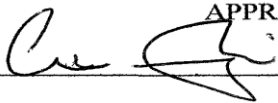
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF MASTER OF SCIENCE IN  
COMPUTER INFORMATION TECHNOLOGY

BY



Martha Jorgensen

APPROVALS



Charles Thies, Thesis Advisor



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**Abstract**

The Regis University database practicum provides an opportunity for students to get hands-on experience with Database Administrator (DBA) tasks as they support the virtual lab environment used by students enrolled in database courses at the university. The student DBA team is new each semester and has a short time to become familiar with the environment they are supporting and the tools they will be using. Inefficient communication and organization delay the resolution of production issues. This study analyzed the current knowledge sharing culture, technologies, and processes of the database practicum. The goal of the study was to determine accessibility of core knowledge needed by DBA teams to improve collaboration and reduce time for teams to begin actively supporting the online environment. This paper can be used by any higher education administrator wishing to implement a collaborative information technology.

### **Acknowledgments**

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## **Chapter 1 – Introduction**

The database practicum at Regis University simulates an IT organization in its support of databases for current online students. The practicum is managed like an IT organization and gives students an opportunity to support a production environment and collect data for their research. The student DBA support team is new each semester and has a short time (a few days to a week) to become familiar with the environment they are supporting and the tools they will be using. Documentation provided in emails is difficult to locate when the need arises, delaying responses to production problems and causing unnecessary stress for both the student DBAs and the students requiring support. In the first month of the 2009C practicum, the majority of efforts were spent on locating existing documentation, updating documentation, and learning methodology and tools. Inefficient communication and organization delayed resolution of production issues. The researcher hopes this study will help improve access to core knowledge needed by a new practicum group and reduce time for subsequent practicum participants to begin actively supporting the online environment.

### **Problem Statement**

Practicum experiences such as the one offered through Regis University School for Professional Studies often require that graduate students work in a virtualized environment, separated by disparate geographical locations, with frequent turnover in personnel. These conditions present the need for an improved collaborative strategy for knowledge sharing. What methodology can be used to improve tacit knowledge sharing between team members in such an environment?



**Statement of Goals and Objectives**

The primary goal of this research was to identify a methodology and procedures for managing and sharing knowledge generated and used by the Regis University database practicum team as they carry out their responsibilities. The researcher identified the following supporting objectives in the form of three research questions:

- Is the culture of the Regis University Database Practicum conducive to knowledge sharing? What is working well? What areas need improvement?
- What tools are in place for knowledge sharing in the practicum? How can the tools be improved, and what additional tools might be useful?
- What processes and methods are in place for sharing knowledge? Are they sufficient? What areas need improvement, and how can they be improved?

## Chapter 2 – Review of Literature and Research

### Virtual Teams and Distance Learning

Evidence from the literature suggests trends toward the increased use of online education, the benefits of which include lower cost of delivery, accessibility to remote locations, reductions in learning time through the use of collaborative environments, availability of “turnkey e-learning” systems for delivering content electronically instead of developing proprietary delivery mechanisms, and on-the-job training to keep workers’ skill sets up-to-date with emerging technology. As more jobs require computer use, the demand for training has grown. Online learning helps meet higher demand for educational services through remote access, flexible scheduling, the quick delivery of content and knowledge, and savings for companies that might otherwise pay more for onsite training (Shank & Sitze, 2004; WorldWideLearn). In a recent study by the U.S. Department of Education comparing online and traditional face-to-face learning, Means, Toyama, Murphy, Bakia, and Jones (2009) found that participants of online programs tested higher than those in traditional classrooms. Online learning is particularly conducive to experiential, collaborative, constructive, problem-based learning models which center on actively constructing knowledge, learning through experience, finding solutions to problems in real-life contexts, and interacting with peers. This study pertains to the database practicum component of one of Regis University’s CPS programs, which offers courses in both traditional and online formats (The University of Adelaide; Regis University CPS; Means et al., 2009).

Online practicum programs extend online learning to provide real-world situations and mentoring in a collaborative, supervised learning environment. For this research it was assumed that the online practicum faces challenges similar to other virtual, geographically diverse teams,

with the added dimension of regular turnover in personnel due to the change in participants each session. According to Jones, Oyung, and Pace (2005), the challenges of a virtual team are building community and common purpose, scheduling real-time communication when members are in different time zones, and working with language and cultural differences. Jones et al. also identify trust and communication as critical factors for success of a virtual team. Similarly, Nemiro, Beyerlein, Bradley, and Beyerlein (2008) also listed trust, shared understanding, and building relationships as key components for successful virtual teams. Communication in the form of conference calls and discussion forums are central to the Regis database practicum team. Efforts to share knowledge and keep participants informed also include a central document repository (Jones et al., 2005; Nemiro et al., 2008).

### **Knowledge Management**

Davenport and Prusak (1998) defined the components of knowledge as data and information. Data is “raw material” that informs decision making. Information adds impact to data to make a difference in perception and judgment, such as statistical evaluation, summarization, or organization that gives data meaning. Knowledge is the added human components of experience, context, and insight to evaluate and use information. When data and information become knowledge, their true value is realized. Davenport and Prusak assert knowledge is the most sustainable advantage an organization can achieve. Products and services can be mimicked and duplicated, but knowledge generates new ideas, and the sharing of knowledge feeds creativity and collaboration with limitless possibilities (Davenport & Prusak, 1998).

The human elements that define knowledge and make it so valuable are also what make it difficult to manage, maintain, and leverage. Knowledge is created through the analysis,

categorization, summarization, and contextualization of information by a person and conversely must be accessed and used by a person to provide value. Some aspects of knowledge which give it meaning—the understanding of information, giving it context, embedding it in processes—also add to the difficulty of both capturing and communicating it. These are qualities of tacit knowledge, described by Davenport and Prusak (1998) as “complex knowledge, developed and internalized by the knower over a long period of time ... [that] incorporates so much accrued and embedded learning that its rules may be impossible to separate from how an individual acts” (Chapter 4 - Knowledge Codification and Coordination, para. 7). Small and Sage (2005) described tacit knowledge as “highly personal, ... difficult to articulate and ... rooted primarily in our contextual experiences” (p. 154). Another type of knowledge is explicit knowledge, which is more formal, rule-based, and codifiable (Small & Sage, 2005).

The field of knowledge management has grown out of recognition of knowledge as a critical organizational asset to be purposefully cultivated and maintained. Alavi (1999) asserts, “in the absence of a knowledge management strategy, technologies that facilitate communication and information storage and retrieval, may have only a marginal effect on organizational knowledge flows” (p. 15). Knowledge in itself is beneficial, but it must be effectively applied to result in a competitive advantage. A knowledge management strategy defines methods and processes “of identifying, capturing, and leveraging the collective knowledge in an organization to help the organization compete” (p.55) by informing decision making, reducing repeated mistakes, and improving response time and productivity to reduce costs and increase performance and profitability (Alavi, 1999).

A number of stages and subprocesses of the life cycle of knowledge management have been identified by various authors. They range from a broad categorization of creating, sharing,

and applying knowledge to more complex and detailed models, which break down the broad categories into multiple subprocesses. One of the more complex models, from a Cranfield University study (Alavi, 1999), breaks the category of creating knowledge into creating, finding, having, and acquiring knowledge from internal and external sources. Sharing knowledge is divided into sharing within and sharing externally to the organization. Applying knowledge includes reusing knowledge and the resulting updates to existing knowledge, which would pair with the knowledge creation phase. Complex as the Cranfield model is, it does not explicitly include storage and retrieval. Storage and retrieval processes include recording knowledge; locating sources of knowledge; recording it in documents, databases, and repositories; and embedding it in processes and products. Another category is the measurement of existing knowledge and knowledge management processes (Alavi, 1999).

Becerra-Fernandez, Gonzalez, and Sabherwal (2004) and Sağsan (2006) offer higher-level models of the knowledge management life cycle. The model by Becerra-Fernandez et al. at the highest level includes knowledge discovery, capture, and application, each of which can be broken down into subprocesses (see figure 1). The Sağsan model divides knowledge management into creating, sharing, organizing, using, and auditing knowledge. The researcher found these high-level models suitable for the purposes of this study because the current maturity level of knowledge sharing and the frequent turnover of participants in the practicum environment limit the potential for complex knowledge management processes. Knowledge is created as participants learn new skills and tasks, interpret data, and apply information. Knowledge must be shared to benefit the organization. Methods of knowledge sharing may be both formal and informal, ranging from social interaction and teamwork to more structured learning and communication networks such as email, discussion forums, and conference calls.

To repeatedly and efficiently use knowledge, it must be structured, classified, and stored to facilitate retrieval. Knowledge maps and repositories combined with retrieval technologies are common methods used by organizations to make knowledge available to use and apply (Becerra-Fernandez et al., 2004; Sağsan, 2006).

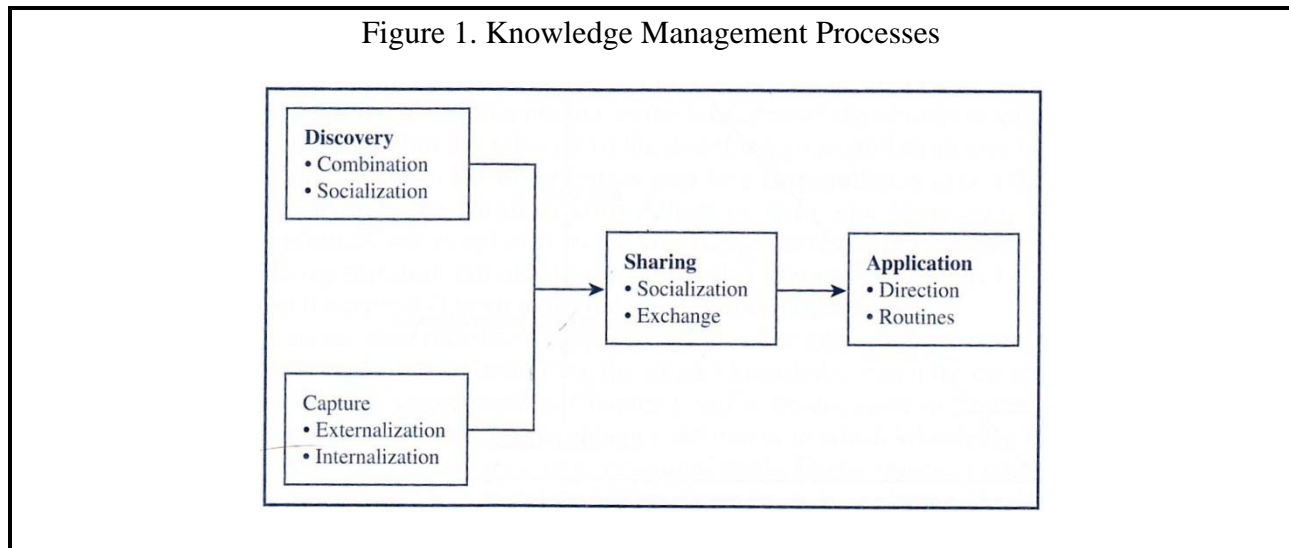


Figure 1. Knowledge management life cycle processes and sub processes (Becerra-Fernandez et al., 2004).

## Knowledge Sharing

**Definition.** Becerra-Fernandez et al. (2004) defined knowledge sharing as “the process through which explicit or tacit knowledge is communicated to other individuals” (p. 34)—not simply communicated, but effectively transferred. Knowledge sharing is effective when it can be used, or acted upon, by the recipient (Becerra-Fernandez et al., 2004). Knowledge must be shared to fully benefit an organization. Several knowledge management studies have demonstrated the importance of knowledge sharing. Fifty to sixty-one percent of the organizations surveyed reported being affected when knowledgeable employees leave, which resulted in loss of income or impaired organizational relationships. Knowledge lost when employees leave demonstrates two problems of inadequate knowledge sharing. First, knowledge is personalized when information is understood and applied, and that understanding is what

needs to be shared with others to realize the full potential of the knowledge. Second, information hoarding isolates knowledge, which is at risk of being lost if the person with the knowledge leaves the organization (Alavi, 1999).

### **Factors Affecting Knowledge Sharing**

The personal nature of knowledge is manifested in knowledge sharing as well as knowledge capture and storage. Technology can support knowledge sharing, but personal and cultural factors play a large role in successful knowledge sharing. These factors include reciprocity, repute or self-worth, altruism, and trust. Reciprocity is the weighing of the benefits of sharing knowledge against the cost of knowledge, comparing the effort of sharing knowledge with the expected return. The return may be extrinsic rewards such as a raise or intrinsic rewards of pride or self-worth. One who shares to enhance their reputation is motivated by an expected gain in repute. Return on investment and gains in reputation may also include monetary gains in the form of promotions. Altruism is the motivation to share for the good of the organization, for the love of the subject, or to help another person. Trust, both among colleagues and in the organization as a whole, is a major cultural factor in people's willingness to share knowledge (Davenport & Prusak, 1998; Orhum & Hopple, 2008).

Davenport and Prusak (1998) considered trust to be the most important factor in knowledge sharing. They identify visibility, pervasiveness, and organizational culture as important aspects of trust. Trust is generated when people see and receive rewards and recognition for sharing knowledge. If the organization is not perceived as trustworthy, and if trustworthiness does not start at the highest level of the organization, the flow of knowledge will be inhibited. Informal networks, where most knowledge sharing happens, develop as relationships are developed, trust is built, and reputations are earned. Informal networks are built

as people ask each other for information, learn who is knowledgeable and reliable, and refer each other to sources of knowledge. The informality and personal contact in these networks in turn build more trust, which facilitates knowledge sharing. Factors that inhibit knowledge sharing include an inability to find knowledge, isolated pockets of knowledge, and distance. When knowledge is local to one area of an organization and does not flow to other areas, a person who is remote from the area with the knowledge is less likely to find it (Davenport & Prusak, 1998).

**Processes, conditions.** Having knowledge and the technology to store and share it are not enough to realize the full benefit of the knowledge. As previously discussed, culture plays a large role in the success or failure of knowledge management efforts. Burk (1999) stated that “knowledge management means more than databases and networks. Companies that have undertaken such initiatives have found that only 20 percent of their efforts involve technical issues; the remaining 80 percent of their time is taken up with institutional matters to create an environment for sharing and open exchange” (para. 13). Becerra-Fernandez et al. (2004) cite a similar 80–20 rule, saying “effective KM is 80% related to organizational culture and human factors, and is 20% related to technology” (p. 8). A strategy, or framework, for knowledge sharing is important to formalize the importance of, and procedures for, sharing knowledge. A knowledge sharing framework should include the types of knowledge to store and share, processes for creating and sharing knowledge, and the conditions conducive to those processes. Orhum and Hopple (2008) identified the following conditions as being important for an organization to develop in order to enhance knowledge sharing: the strength of interpersonal and team relations, trust, and the expectation of participation in knowledge sharing as the norm (Becerra-Fernandez et al., 2004; Burk, 1999; Orhum & Hopple, 2008; Small & Sage, 2005).



A study by Galletta, Marks, McCoy, and Polak (2008) showed individual prosocial traits, identification with a group, and managerial prompting to increase participation in knowledge sharing activities. Galletta et al. found that people who feel a part of a group or team will share knowledge for the greater good of the group, whereas someone who does not identify with the group is less likely to share knowledge. Prosocial traits also play a role, as people predisposed to sharing will contribute to knowledge sharing efforts because they get satisfaction from contributing to collective success by achieving a group goal. The study also found reminders from managers increased participation in knowledge sharing regardless of group affiliation or disposition toward sharing (Galletta et al., 2008).

Becerra-Fernandez et al. (2004) divided knowledge management solutions into processes, systems, technologies, and infrastructure. Knowledge management processes are supported by systems and subprocesses. Those systems are comprised of technologies that are based on an infrastructure. Knowledge management processes are discovery and capture, sharing and exchange, and application in the form of giving direction and establishing routines (Becerra-Fernandez et al., 2004).

Establishing a set of roles to define who is responsible for managing knowledge is recommended to give structure to knowledge management efforts. Burk (1999) recommended establishing a knowledge manager role to establish and encourage best practices and organization, assist people in locating knowledge, and provide prompting to others to participate in sharing knowledge. Davenport and Prusak (1998) also advocated roles for knowledge while warning that “the most successful organizations are those in which knowledge management is part of everyone’s job” (Chapter 6: Knowledge Roles and Skills, para. 2).

**Methods, tools.** Methods for knowledge sharing include formal and informal social networks, teams and communities of practice, organizational learning, and communication technologies and networks. Informal networks, interactions, and communications are important for building trust and exchanging tacit knowledge. Tools for knowledge sharing include communication technologies, data warehousing, and data mining combined with advanced search engines and retrieval techniques. Communication technologies such as email, networks, chat, and the telephone aid both informal and formal knowledge sharing. Databases, shared repositories, and information networks are more formal sharing mechanisms. Technologies which are best suited to knowledge sharing allow knowledge flow, information mapping, timely communication, structuring, searching, routing and workflow. Sağsan (2006) stated, “mapping, storing and retrieving information are three important components of knowledge structuring” (p.6). Information mapping is frequently recommended as an aid for retrieving knowledge. Knowledge repositories aid in building organizational memory by centrally storing and structuring knowledge. Routing and workflow automation help categorize and locate knowledge (Sağsan, 2006; Alavi, 1999).

An information, or knowledge, map is typically a high-level map, index, list, picture, or database used to point to the location of specific knowledge or expertise. It can help overcome “localness of knowledge” (Davenport & Prusak, 1998, Chapter 2 - The Promise and Challenge of Knowledge Markets, para. 7)—the tendency of local knowledge to stay local rather than be shared widely—by aiding people throughout an organization to locate knowledge. The high-level, visual nature of a knowledge map makes it useful to people of varying expertise and can be more intuitive than other storage structures. It can contain knowledge in many forms (textual, graphical, narrative, and raw data) as well as point to sources for more details or help in locating

experts. The somewhat free form of a knowledge map makes it ideal for capturing evolving knowledge because it does not have to fit some existing structure. Limiting the knowledge contained in a knowledge map to high-level knowledge also helps with maintenance. If it is too detailed, it will have to be changed as knowledge evolves, so it should be a high-level resource for containing commonly sought knowledge and for locating knowledge, rather than a repository itself. A white paper from the corporation Arthur Andersen (1998) claimed, “Knowledge maps also facilitate faster job and role orientation and training for new or re-assigned employees or contractors” (p. 3) by providing orientation to their role and responsibilities, support resources, and context within the larger organization. Corporate directories are another form of a knowledge map or expert locator. They point to who has expertise within the organization rather than containing knowledge themselves (Sağsan, 2006; Arthur Andersen, 1998; Alavi, 1999).

According to Davenport and Prusak (1998), “the computational power of computers has little relevance to knowledge work, but the communication and storage capabilities of networked computers make them knowledge enablers” (Chapter 1 - What Do We Talk about When We Talk about Knowledge?, para. 18). Email and discussion forums enable group communications, and audio and video technologies add expression, which aids in understanding and transferring subtle, implicit knowledge. Davenport and Prusak stressed that information technology enables knowledge storage and sharing but does not create knowledge or a culture conducive to knowledge sharing. Information technology also has its limitations in the area of knowledge management because the richness of knowledge can be difficult to capture or fit into structured systems. Information technology is a powerful tool for knowledge storage and sharing, but it is not a panacea. It must be paired with conditions, processes, and methods conducive to knowledge management (Davenport & Prusak, 1998).

**Previous Studies**

A case study by Jon Davis (Davis, 2008), a former participant in the Regis database practicum, indicated the need for overlap of practicum teams for sharing tacit knowledge between the outgoing and incoming participants, for improvements in regular communication, and for centralization and organization of knowledge repositories. The Regis database practicum has made progress in the areas of regular communication and knowledge discovery, capture, and sharing. The culture of the practicum promotes communication and emphasizes the importance of sharing and documenting knowledge gained during the practicum. Weekly conference calls and the use of the WorldClass Learning Management System online forum (WorldClass forum) promote regular and centralized communication. The program can increase the maturity of its knowledge management in the areas of organizing and using knowledge so participants benefit more fully from previously captured knowledge. This study expands on Davis's findings related to sharing knowledge across practicum groups, capturing and sharing explicit and implicit knowledge, establishing methods for organizing knowledge sharing systems, and determining the need for an expertise locator system (Davis, 2008).

### Chapter 3 – Methodology

A case study is a type of qualitative research used to study individuals or groups using data collection techniques such as observations, interviews, and participant responses (Becker et al., 2005). Similarly, Yin (2003) described the case study as “an essential form of social science inquiry” (p. xi). It is useful for broad research topics, when isolating variables is difficult, and when the researcher wants to use multiple sources of evidence. Case studies are common research methods for social and organizational issues, education and child development, public policy, international affairs, and process evaluation and implementation (Yin, 2003).

The researcher chose a single case study methodology according to the criteria defined by Yin (2009): the situation being studied is current, the participants can be interacted with but not manipulated or controlled, and the problem being researched relates to *how* knowledge sharing may be improved. Problem statements put in the form of “how” questions are most appropriate for case studies, experiments, or history methodologies. Experiments are more appropriate to studies in which the researcher can control or manipulate events or behaviors, and histories are more appropriate to studying past events with which the researcher cannot interact. According to Yin (2009), “the case study is preferred in examining contemporary events, but when the relevant behaviors cannot be manipulated. The case study ... adds two sources of evidence not usually included in the historian’s repertoire: direct observation of the events being studied and interviews of the persons involved in the events” (p. 11). Case studies are also well suited for the use of multiple sources of evidence, including documents, interviews, and observations (Yin, 2009).

The case was identified during the researcher's participation in the Regis University School for Professional Studies Database Practicum Program. Having experienced firsthand the

frustration of not knowing where to find critical knowledge, the researcher became interested in improving the experience for future program participants and identified what appeared to be a research-worthy problem. As Marshall and Rossman (2006), suggested, “The researcher begins with interesting, curious, or anomalous phenomena that he observes, discovers, or stumbles across” (Marshall & Rossman, 2006, p. 24).

The project started with a literature review, suggested by Yin (2009) “to determine the questions that are most significant for a topic” (p. 14). Initially, the researcher hoped to contribute to the technical solution for knowledge management and sharing within the practicum. However, the literature emphasized the limitations of a purely technical solution and the need for a comprehensive organizational, cultural, and technical solution. By assessing the maturity of current knowledge sharing practices and suggesting a knowledge sharing framework, the researcher hoped to lay the groundwork for future technical improvements (Becerra-Fernandez et al., 2004; Davenport & Prusak, 1998; Yin, 2009).

### **Case Study Research Design**

According to Yin (2009), the components of a case study research design are (a) identify research questions and the problem statement; (b) develop propositions for what should be covered by the study; (c) determine the unit of analysis or the scope of the study; and (d) interpret the findings of the study. The researcher used Yin’s components in planning and structuring her own research.

The researcher identified the following research questions and propositions.

#### ***Research Questions:***

- Is the culture of the Regis University Database Practicum conducive to knowledge sharing? What is working well? What areas need improvement?

- What tools are in place for knowledge sharing in the practicum? How can the tools be improved, and what additional tools might be useful?
- What processes and methods are in place for sharing knowledge? Are they sufficient? What areas need improvement, and how can they be improved?

***Propositions:***

- Knowledge sharing needs to be a stated goal of the practicum, encouraged and recognized by faculty, and made part of all participants' responsibilities.
- A culture supportive of knowledge sharing needs to be established and maintained.
- Knowledge collection, storage, and sharing methods need improvement in organization and accessibility. A knowledge map may be helpful.

**Scope.** The scope of the study was the Regis University Database Practicum from September 2009 to April 2010. It included practicum faculty and participants in the 2009C and 2010A practicum groups. The 2009C practicum ran from September 2009 to January 2010. The time span for the 2010A practicum was January to June 2010. The unit of analysis included the participants from the 2010A practicum, although the data collection was completed before the end of the 2010A session. The researcher believed the 2010A participants had enough experience in the first half of their session to provide data relevant to the study.

**Interpreting findings.** The evidence collected was in the form of interview and survey responses from faculty and practicum participants as well as documentation of current knowledge sharing technology and organization of stored knowledge. Findings expanded on and were compared with a previous study of the practicum by Davis (2008).

### **Theory Development**

According to Yin's (2009) recommendation, the researcher formulated a descriptive theory to outline the purpose of the study, the range of topics to be studied, and the topics expected to be important. The case study shows weaknesses in current knowledge sharing methods in the database practicum and suggests ways in which a more comprehensive framework may be implemented. Weaknesses were demonstrated by survey responses indicating subjects' perception of a lack of a culture conducive to knowledge sharing, inadequate tools and methods for knowledge sharing, and difficulty locating knowledge when it was needed. Recommendations for a more comprehensive knowledge sharing framework were based on knowledge sharing literature and Davis's (2008) study of a previous database practicum group at Regis University.

### **Preparation to Collect Data**

Yin (2009) described a good case study investigator as one who understands the issues of the study and avoids bias and preconceptions, both in asking questions and in receiving responses. In preparation to collect data, the researcher developed interviews and surveys, planned for informed consent and anonymity of case study responses, submitted a plan to the Regis University Institutional Review Board, and received approval to collect the data. The researcher used the review of literature to familiarize herself with the conditions favorable for and detrimental to knowledge sharing and considered wording of survey questions to avoid bias. Survey questions were largely derived from knowledge sharing findings of Becerra-Fernandez et al. (2004) and Davenport and Prusak (1998). The surveys included informed consent sections, and no participants were identified in the survey result analysis. Appendix A contains the IRB approval letter (Yin, 2009).



## Data Collection

The interviews and surveys were developed and delivered using a web-based survey service. In addition to data collection by surveys, the researcher collected data in the form of participant observation and storage and document analysis during her participation in the 2009C practicum session. The researcher was aware of the possibility for bias from her personal involvement in the study, but the concept for the case study was initiated by the researcher's experience with the practicum and naturally informed the course of the study. The researcher used the knowledge of the existing practices to focus the data collection surveys on the less tangible aspects of knowledge sharing: culture, attitudes, and perception.

The researcher used an interview data collection method to collect data from the practicum faculty in the form of six open-ended questions. The purpose of the interview technique was to elicit information about the culture and conditions surrounding knowledge sharing in the practicum. Appendix B contains a sample of the faculty interview.

### *Faculty Interview Questions:*

1. How is knowledge sharing beneficial to the practicum?
2. Are individual practicum participants recognized for their knowledge sharing contributions? How?
3. Are the current methods and environments for knowledge sharing (WorldClass forum, SharePoint, and Track-It!) sufficient? If no, what is lacking?
4. Was the overlap in practicum sessions helpful for sharing knowledge between practicum groups? Did it help the new practicum group reduce the amount of time it took to assume their support role?

5. Are there roles in place in the practicum for promoting and ensuring knowledge capture and sharing activities?
6. Is knowledge sharing each person's responsibility? How is that responsibility communicated?

The researcher used a survey data collection technique to collect data from the practicum student participants in the form of fourteen Likert scale questions. The responses were a five-option format ranging from "Strongly Agree" to "Strongly Disagree." Appendix C contains a sample of the student participant survey.

***Likert Scale Responses:***

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly Agree

***Student Survey Questions:***

1. The practicum allows sufficient time for knowledge management.
2. The culture of the practicum encourages knowledge sharing.
3. Knowledge sharing is beneficial to the practicum.
4. Fellow students are willing to share knowledge freely.
5. Individuals are recognized for their knowledge sharing efforts and contributions.
6. Knowledge shared by fellow practicum members is accurate.
7. You trust the practicum faculty.

8. The current methods for knowledge collection and sharing (WorldClass forum, SharePoint, and Track-It!) are sufficient.
9. You know where to find information needed to complete tasks or respond to help desk inquiries.
10. A knowledge map is typically a high-level map, index, list, picture, or database used to point to where specific knowledge or expertise is located. A knowledge map for the knowledge used by the practicum would be effective for locating knowledge more easily.
11. The practicum provides opportunities for spontaneous and unstructured knowledge transfer.
12. The overlap in practicum groups was helpful for sharing knowledge.
13. There are established roles in the practicum for the creation and sharing of knowledge.
14. All participants contribute to capturing and sharing knowledge.

Data collected from the interview and survey were exported electronically from the data collection service and stored electronically on a local file system.

### **Analytic Strategy**

Following the suggestion by Marshall and Rossman (2006), the researcher used the research questions and literature review to organize and guide the data analysis. The researcher organized the data by research question, identified key concepts from the literature review related to each question, and reduced the data through a data immersion strategy to identify trends and outlying data. Using the review of literature as a guide, the researcher interpreted the data to make recommendations for a knowledge sharing strategy, using the survey and interview

responses to gauge the current maturity of knowledge sharing in the practicum, the culture of the practicum, and the suitability of current processes and technology. The gaps between practices recommended in the literature and the current state of knowledge sharing in the practicum demonstrated areas for improvement (Marshall & Rossman, 2006).

### **Reporting**

The last step of the research process was to draw conclusions and make recommendations based on the data analysis. The researcher continued to organize the concepts around the research questions, composing the report to group related issues in the areas of culture, technology, and processes. It was important to consider the outlying data as well as the majority responses, especially in the area of culture, when making recommendations. The results are included in the next chapter, Results.

## Chapter 4 – Results

The review of literature demonstrated the importance of culture and of having an established framework to serve as a foundation for knowledge sharing. The technical aspects of knowledge sharing, such as applications and repositories, are only effective if participants are willing to engage in knowledge sharing. The goal of the research was to assess the current knowledge sharing practices in the Regis University Database Practicum, to suggest a knowledge sharing framework, and to create a foundation for future technical and procedural improvements.

### Analysis and Results

The data collection and analysis were based on and organized by the following research questions.

1. Is the culture of the Regis University Database Practicum conducive to knowledge sharing? What is working well? What areas need improvement?
2. What tools are in place for knowledge sharing in the practicum? How can the tools be improved, and what additional tools might be useful?
3. What processes and methods are in place for sharing knowledge? Are they sufficient? What areas need improvement, and how can they be improved?

**Research question 1.** The first research question was centered on the culture of the practicum. According to Becerra-Fernandez et al. (2004), “Organizational culture reflects the norms and beliefs that guide the behavior of the organization’s members. It is an important enabler of KM [Knowledge Management] in organizations” (Becerra-Fernandez et al., 2004, p. 40). The main challenges for knowledge management are not having enough time for it, having a culture that does not support it, and not understanding its importance. Davenport and Prusak (1998) consider trust the most important factor in knowledge management: “Without

trust, knowledge initiatives will fail, regardless of how thoroughly they are supported by technology and rhetoric” (Davenport & Prusak, 1998, Chapter 2 - The Promise and Challenge of Knowledge Markets, para. 13).

Student participant responses to survey questions about the importance of knowledge management, time allotted, culture, and trust were overall positive. All participants responded positively to the statement “Knowledge sharing is beneficial to the practicum,” with 50% agreeing and 50% strongly agreeing.

<b>Knowledge sharing is beneficial to the practicum.</b>		
<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Strongly disagree	0.0%	0
Disagree	0.0%	0
Neither agree nor disagree	0.0%	0
Agree	50.0%	4
Strongly Agree	50.0%	4
<b><i>answered question</i></b>		<b>8</b>
<b><i>skipped question</i></b>		<b>0</b>

In response to the question “How is knowledge sharing beneficial to the practicum?” all faculty interviewed agreed knowledge sharing is very important, even critical, to the success of the practicum. Responses indicated knowledge sharing is important for successful completion of tasks, problem solving, and being able to learn from mistakes. Two respondents mentioned the need for knowledge sharing in the transition between practicum teams in the form of working together, communicating asynchronously, and using documentation to transfer knowledge. Another reason respondents gave for the importance of knowledge sharing was the parallel with real-world team situations. One faculty member mentioned that technology is not a knowledge sharing solution in itself but an “enabler for a KM [Knowledge Management] strategy,” and pointed out the lack of a formal knowledge management strategy in the practicum.

According to Banks and McGee (1989), “the essence of a culture is not its artifacts, tools, or other tangible cultural elements but how the members of the group interpret, use, and perceive them” (para. 2). Culture is intangible and based on perceptions and therefore difficult to establish and measure. To the statement, “The culture of the practicum encourages knowledge sharing,” 75% of the participants responded positively, with 50% agreeing and 25% strongly agreeing. Twenty-five percent of the participants responded negatively, divided equally between disagreeing and strongly disagreeing (Banks & McGee, 1989).

<b>The culture of the practicum encourages knowledge sharing.</b>		
<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Strongly disagree	12.5%	1
Disagree	12.5%	1
Neither agree nor disagree	0.0%	0
Agree	50.0%	4
Strongly Agree	25.0%	2
<b><i>answered question</i></b>		<b>8</b>
<b><i>skipped question</i></b>		<b>0</b>

In addition to their own lab work, the responsibilities of the student participants in the database practicum include setting up databases and accounts for student labs, monitoring the help email account, doing maintenance and troubleshooting, setting up new environments or applications, and documenting information needed for those tasks for use by both current and subsequent practicum participants. In response to the statement “The practicum allows sufficient time for knowledge management,” 75% of respondents agreed and 25% disagreed.

The practicum allows sufficient time for knowledge management.		
Answer Options	Response Percent	Response Count
Strongly disagree	0.0%	0
Disagree	25.0%	2
Neither agree nor disagree	0.0%	0
Agree	75.0%	6
Strongly Agree	0.0%	0
<b>answered question</b>		<b>8</b>
<b>skipped question</b>		<b>0</b>

Practicum participants may rotate setup tasks to give everyone a chance to get hands-on experience. Participants rely on knowledge shared by others who have done a task previously to complete their tasks correctly and on time. People are more willing to share knowledge when they trust each other and believe they will benefit in return. Orhum and Hopple (2008) stated, “personal beliefs that expected benefits will outweigh the costs of participation in knowledge sharing are likely to be an important determinant of knowledge sharing behaviors.” Of those surveyed, 87.5% responded positively to the statement “Fellow students are willing to share knowledge freely.” 50% agreed, 37.5% strongly agreed, and 12.5% disagreed.

Fellow students are willing to share knowledge freely.		
Answer Options	Response Percent	Response Count
Strongly disagree	0.0%	0
Disagree	12.5%	1
Neither agree nor disagree	0.0%	0
Agree	50.0%	4
Strongly Agree	37.5%	3
<b>answered question</b>		<b>8</b>
<b>skipped question</b>		<b>0</b>

One of the reasons people share knowledge is their expectation of benefiting in return. They expect others to reciprocate by sharing useful knowledge with them. Part of establishing trust is demonstrating that a person has valuable knowledge to share and has a reputation for accuracy. In response to the statement “Knowledge shared by fellow practicum members is



accurate,” 50% of those who responded agreed, 37.5% neither agreed nor disagreed, and 12.5% disagreed (Davenport & Prusak, 1998).

<b>Knowledge shared by fellow practicum members is accurate.</b>		
<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Strongly disagree	0.0%	0
Disagree	12.5%	1
Neither agree nor disagree	37.5%	3
Agree	50.0%	4
Strongly Agree	0.0%	0
<b><i>answered question</i></b>		<b>8</b>
<b><i>skipped question</i></b>		<b>0</b>

Trust must also be established at the highest level to become part of the culture of a group. Davenport and Prusak (1998) stated that “Trustworthiness must start at the top. Trust tends to flow downward through organizations. Upper management’s example can often define the norms and values of the firm. If top managers are trustworthy, trust will seep through and come to characterize the whole firm” (Chapter 2 - The Promise and Challenge of Knowledge Markets, para. 16). Of the student participants who responded, 62.5% strongly agreed with the statement “You trust the practicum faculty.” Another 25% of respondents agreed, and 12.5% strongly disagreed (Davenport & Prusak, 1998).

<b>You trust the practicum faculty.</b>		
<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Strongly disagree	12.5%	1
Disagree	0.0%	0
Neither agree nor disagree	0.0%	0
Agree	25.0%	2
Strongly Agree	62.5%	5
<b><i>answered question</i></b>		<b>8</b>
<b><i>skipped question</i></b>		<b>0</b>

Another reason people are willing to share knowledge is the possibility of gaining recognition or repute. According to Davenport and Prusak (1998), a person who shares to

improve their reputation “usually wants others to know him as a knowledgeable person with valuable expertise that he is willing to share with others in the company. ... Having a reputation as a valuable knowledge source can also lead to the tangible benefits of job security, promotion, and all the rewards and trappings of a company guru” (Chapter 2 - The Promise and Challenge of Knowledge Markets, para. 9). Of the student participants who responded, 62.5% agreed with the statement “Individuals are recognized for their knowledge sharing efforts and contributions.” Twenty-five percent neither agreed nor disagreed, and 12.5% disagreed.

<b>Individuals are recognized for their knowledge sharing efforts and contributions.</b>		
<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Strongly disagree	0.0%	0
Disagree	12.5%	1
Neither agree nor disagree	25.0%	2
Agree	62.5%	5
Strongly Agree	0.0%	0
<b><i>answered question</i></b>		<b>8</b>
<b><i>skipped question</i></b>		<b>0</b>

In response to the question “Are individual practicum participants recognized for their knowledge sharing contributions?” faculty respondents agreed a formal recognition strategy is not in place, and knowledge sharing is not “‘recognized’ in the traditional academic sense” as part of the grade for the practicum work. Participants do receive verbal praise for their contributions, and the effort they put into knowledge sharing is factored into the reference to an employer they receive when they complete the practicum. They may also receive thanks from members of the following practicum group who benefit from their efforts. One faculty member mentioned that students get as much out of the practicum as they contribute to it. Another said knowledge sharing is important enough to the practicum that participants should be recognized to keep them motivated to contribute and also suggested personally addressing participants who were not contributing enough to knowledge sharing.

**Research question 2.** The second research question concerned the technologies used in the database practicum. Knowledge captured in the practicum relates to application setup, support, and resolution of issues as well as knowledge helpful for the lab work required of the participants in the database practicum. Knowledge needed for the setup and maintenance of the lab environment for nonpracticum students was stored and shared in a Microsoft SharePoint document repository. Communication about the setup and maintenance tasks performed by the practicum participants occurred in the WorldClass forum, by email, and in weekly conference calls. Additionally, a help desk email account was available for students to report problems with the lab environment, which practicum participants monitored and responded to. Issue resolution was tracked in Track-It!, a web application for assigning issues to groups or individuals and tracking resolutions and response times. The practicum participants also documented resolved issues in a Frequently Asked Questions (FAQ) document on SharePoint.

Figure 2: SharePoint Document Repository

The screenshot displays the SharePoint interface for the Regis University InSite Database Practicum 2009C. The top navigation bar includes the university logo, user information (Welcome Jorgensen, Martha B.), and links for Home, WebAdvisor, File Space, Email, and Sign Out. Below the navigation bar, the breadcrumb trail reads: Home > School of Computer and Information Sciences > Database Technologies > Database Practicum.

The main content area is titled "Database Practicum" and shows the current site as "Database Practicum". A search bar is present with the text "This Site: Database Practicum". The left sidebar contains a "View All Site Content" link, a "Home" link, and a "Database Technologies" link. Below these are "Practicum Sections" for 2008B, 2009A, 2009B, 2009C, 2010A, 2010B, and 2010C. A "Recycle Bin" link is also visible.

The main content area is divided into several sections, each with a dropdown arrow:

- Resumes**
- Contacts**: Contact List for Fall 2009 C Database Practicum
- Organization**: How to add file to DB Practicum Portal Site
- Meetings**: Regis\_Setup\_Intro\_08-13-09.ppt, 2009C\_DB\_Practicum\_Orientation\_08-13-09.ppt
- Project Management Team**: Help Desk September 2009 Schedule, Help Desk August 2009 Schedule
- Support Team**: Linux Setup Guide, DBA Practicum Fall 2009 Latest Version (Dec 12 2009).docx, FAQ Fall 2009 Database Practicum - 120709, DBA Practicum Fall 2009 Latest Version (Dec 6 2009).docx, Video and Audio Demo to Create Oracle 11g Databases on Linux, TortoiseSVN Documentation, Database Shutdown Scripts, DBA Practicum Fall 2009\_Revision.docx, DBA Practicum Fall 2009\_Phong.docx, MSCD\_Course\_Lab\_Manual\_2005, Video and Audio guide to installing and using the Windows Media Converter to build Video and Audio demonstrations - a WinRAR file, Guide to logging into REGIS OEM, Video and Audio guide to installing and using Windows Media Converter to build demonstrations, Video and Audio demonstration on how to delete databases using DBCA
- Development Team**
- Special Projects Team**
- MSCD Course Setup**: Instructor letter Static - 10S8W1\_MSCD610XP40\_Database Concepts - (Glenn Balanoff), Linux Setup Guide Rev 1-2, 8W1 Spring MSCD Course Setup, 2009c FAQ and Setup Guide Website, 8W2 Fall MSCD Course Setup - Updated 20091019, 8W1 Fall MSCD Course Setup - Updated 14 Sept 2009, for each user: connect, create and drop table, disconnect, query to check granted roles. grant statements for missing roles, Instructor letter Static - 09F8W1\_MSCD600XP40\_Database Architecture - (Ernest Eugster), Instructor letter -09F8W1\_MSCD670XP40\_Middleware ArchDbse Apps-(Matt Robinson), Instructor Letter Dynamic - 09F8W1MSCD640XP40\_Oracle Database Administration - (Mike Nims), Instructor letter Static - 09F8W1\_MSCD650XP40\_PLSQL Programming - (George Linehan)

Figure 2. SharePoint document repository for centralized document storage.

Figure 3. Track-It! Work Order

The screenshot displays the 'Track-It! Web' interface for editing work order 2197. The interface is divided into several sections:

- Header:** 'Track-It! Web' with navigation icons and a menu (Page, Safety, Tools, Help, About).
- Tabbed Interface:** 'General' (selected), 'Assignments', 'User-defined Fields', 'History', 'Search'.
- Requestor Section:**
  - Name: Clem Lara
  - Details: <Employee ID>, <Title>, <E-mail>, <Department>
  - Call-back number: [Field]
  - Location: [Field]
- Workstation Information Section:**
  - Workstation ID: [Field]
  - Details: <Workstation ID>, <Computer Name>, <Computer Model>, <Operating System>
- Task Section:**
  - Summary: Disable old Citrix Accounts
  - Work Order No.: 2197
  - Type, Subtype, Category: [Dropdowns]
  - Priority: Medium
  - Lookup #1, Lookup #2: [Dropdowns]
  - Technician Assigned: Tier1
  - Date Assigned: 11/2/2009 11:46 PM
  - Date Due: 11/9/2009 5:45 AM
- Description Section:**
  - Updated 20091123 - I have not received any status of this work order due 2 weeks ago 11/9/2009.
  - Once the old Citrix accounts have been disabled, please email: [Redacted]@regis.edu
  - Updated 20091105
  - Once the old Citrix accounts have been disabled, please email: [Redacted]@regis.edu
  - Thanks
  - Please disable the following Citrix Accounts because they are no longer being utilized:
- Actions Panel (Right):**
  - Requestor details
  - Take control
  - Attach a file
  - Print work order
  - Complete Work Order
  - Assignments: Add Assignment
  - Notify: E-mail requestor, Notify Technician
  - See Also: Search Solutions, Add to Solutions

Figure 3: Work order for tracking issues and resolutions.

Figure 4. WorldClass Forum

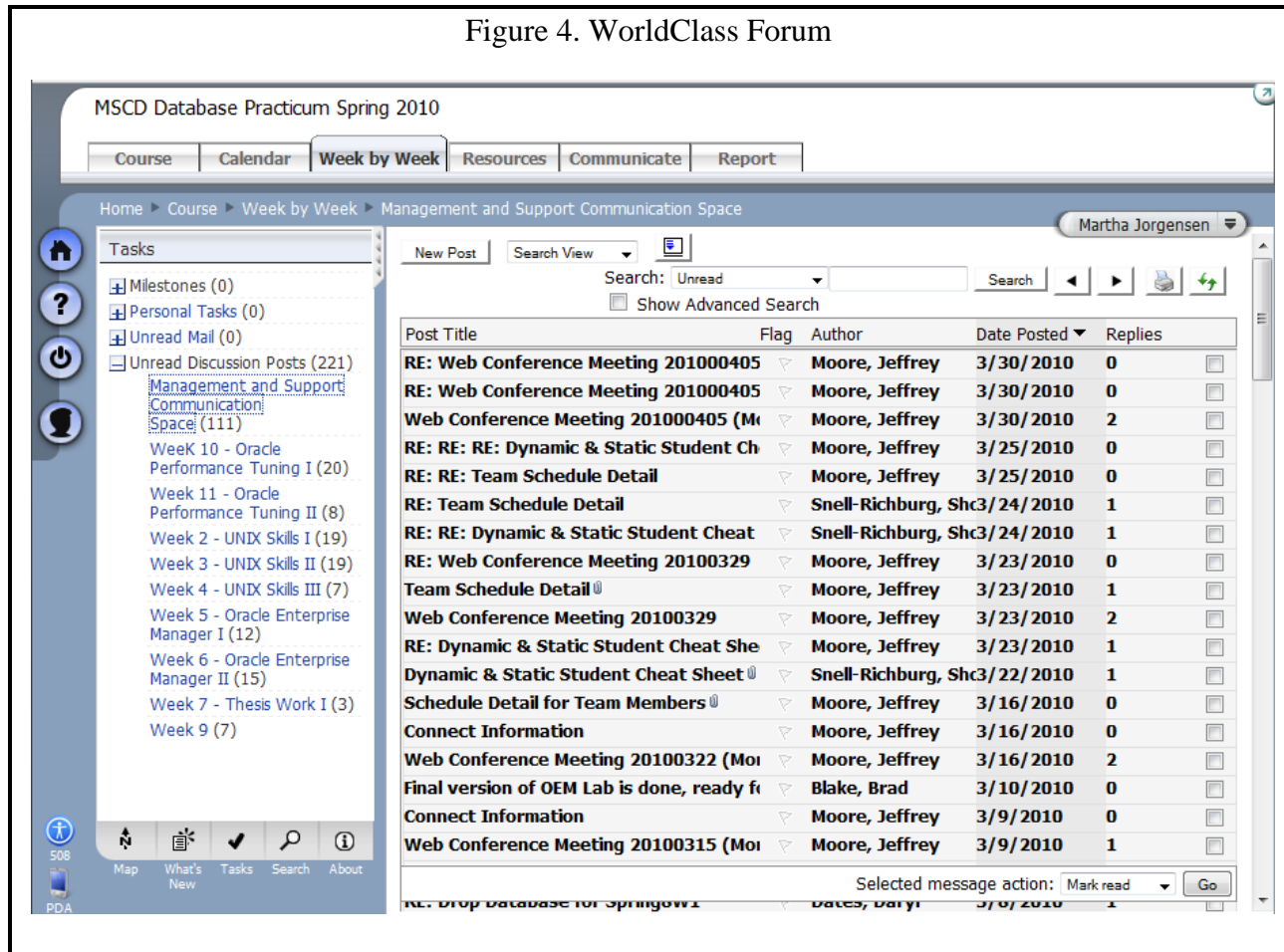


Figure 4. Discussion forum for setup, support, and lab topics.

When asked if the tools were sufficient, the student participants responded negatively overall. Fifty percent of respondents disagreed, 12.5% strongly disagreed, and 37.5% agreed with the statement “The current methods for knowledge collection and sharing (Worldclass forum, SharePoint, and Track-It!) are sufficient.”

The current methods for knowledge collection and sharing (Worldclass forum, sharepoint, and TrackIT) are sufficient.		
Answer Options	Response Percent	Response Count
Strongly disagree	12.5%	1
Disagree	50.0%	4
Neither agree nor disagree	0.0%	0
Agree	37.5%	3
Strongly Agree	0.0%	0
<b>answered question</b>		<b>8</b>
<b>skipped question</b>		<b>0</b>

Captured knowledge is only useful if it is shared and can be located. With four locations for knowledge capture plus email communications, was knowledge accessible? In response to the statement “You know where to find information needed to complete tasks or respond to help desk inquiries,” 62.5% of participants disagreed, 12.5% neither agreed nor disagreed, and 25% agreed.

<b>You know where to find information needed to complete tasks or respond to help desk inquiries.</b>		
<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Strongly disagree	0.0%	0
Disagree	62.5%	5
Neither agree nor disagree	12.5%	1
Agree	25.0%	2
Strongly Agree	0.0%	0
<b><i>answered question</i></b>		<b>8</b>
<b><i>skipped question</i></b>		<b>0</b>

In response to the questions “Are the current methods and environments for knowledge sharing (WorldClass forum, SharePoint, and Track-It!) sufficient? If no, what is lacking?,” there was consensus among faculty members that each technology is beneficial in its own way but lacking in cohesiveness. Track-It! is useful for logging issues and tracking resolutions, but it is also older software, and something newer might be better. SharePoint is a good central repository for documents. WorldClass forum is a recent addition used to centralize communication that had previously occurred by emails. It has been a big improvement over email trails that were inefficient and that made it hard to locate information. The main problems mentioned with the technology in place are that information is in multiple unrelated places with separate logins and URLs, communication is mainly asynchronous, and the technology is only a component of a knowledge management strategy, not a strategy by itself. Multiple locations for knowledge make it hard to find, and there may be multiple versions of the same information in different places. One respondent mentioned that asynchronous communication may be inefficient because it is

slower than synchronous communication. Several faculty members suggested a wiki for centralization of knowledge.

Knowledge management experts suggest a knowledge map as a way to make knowledge more accessible. A knowledge map is a single starting location for finding knowledge in multiple repositories. Responses to the statement “A knowledge map is typically a high-level map, index, list, picture, or database used to point to where specific knowledge or expertise is located. A knowledge map for the knowledge used by the practicum would be effective for locating knowledge more easily” were positive, with 62.5% strongly agreeing and 37.5% agreeing (Alavi, 1999; Sağsan, 2006).

<b>A knowledge map is typically a high-level map, index, list, picture, or database used to point to where specific knowledge or expertise is located. A knowledge map for the knowledge used by the practicum would be effective for locating knowledge more easily.</b>		
<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Strongly disagree	0.0%	0
Disagree	0.0%	0
Neither agree nor disagree	0.0%	0
Agree	37.5%	3
Strongly Agree	62.5%	5
<b><i>answered question</i></b>		<b>8</b>
<b><i>skipped question</i></b>		<b>0</b>

**Research question 3.** The third research question was focused on the effectiveness of the knowledge sharing processes and methods used in the database practicum. The WorldClass discussion forum provided a place for centralized, asynchronous, unstructured knowledge sharing. Participants could post questions for the group and browse other postings for information. A weekly conference call provided an opportunity for synchronous exchange of explicit and tacit knowledge. An agenda provided structure, and each participant reported on their area of knowledge. The team lead directed the discussion and posted notes in the discussion



forum after each call. The calls were also recorded for later reference. The team lead assigned each person an area of knowledge for which to create or maintain documentation.

The knowledge sharing literature stresses the additional challenge in capturing and sharing tacit knowledge. Becerra-Fernandez et al. (2004) described tacit knowledge as “difficult to express and formalize, and therefore difficult to share” (p. 20). Verbal or in-person interactions are effective ways to share explicit knowledge because of the difficulty in converting it to explicit knowledge to store in documents and databases. According to Davenport and Prusak (1998), “spontaneous, unstructured knowledge transfer is vital to a firm’s success. Although the term ‘knowledge management’ implies formalized transfer, one of its essential elements is developing specific strategies to encourage such spontaneous exchanges” (Chapter 5 - Knowledge Transfer, para. 1). In response to the statement “The practicum provides opportunities for spontaneous and unstructured knowledge transfer,” 25% of respondents disagreed, 50% neither agreed nor disagreed, 12.5% agreed, and 12.5% strongly agreed (Becerra-Fernandez et al., 2004; Davenport & Prusak, 1998).

<b>The practicum provides opportunities for spontaneous and unstructured knowledge transfer.</b>		
<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Strongly disagree	0.0%	0
Disagree	25.0%	2
Neither agree nor disagree	50.0%	4
Agree	12.5%	1
Strongly Agree	12.5%	1
<b><i>answered question</i></b>		<b>8</b>
<b><i>skipped question</i></b>		<b>0</b>

Davis (2008) suggested an overlap in practicum sessions “to promote continuity between practicums, and also to facilitate the sharing of tacit knowledge” (p. 60). At the beginning of each of the 2009C and 2010A practicum sessions, there was some overlap between the incoming and outgoing participants in the form of conference calls as well as availability by some outgoing

participants for questions as the new participants assumed their responsibilities. Additionally, during the transition to the 2010A practicum, some participants worked together using Skype to share screens and demonstrate how tasks were handled. In response to the statement “The overlap in practicum groups was helpful for sharing knowledge,” 12.5% of respondents disagreed, 12.5% neither agreed nor disagreed, 50% agreed, and 25% strongly agreed (Davis, 2008).

<b>The overlap in practicum groups was helpful for sharing knowledge.</b>		
<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Strongly disagree	0.0%	0
Disagree	12.5%	1
Neither agree nor disagree	12.5%	1
Agree	50.0%	4
Strongly Agree	25.0%	2
<b><i>answered question</i></b>		<b>8</b>
<b><i>skipped question</i></b>		<b>0</b>

When asked “Was the overlap in practicum sessions helpful for sharing knowledge between practicum groups? Did it help the new practicum group reduce the amount of time it took to assume their support role?” two out of three faculty members agreed the overlap between practicum sessions was helpful, and one had not received feedback from the students on the subject. The two people who agreed it was helpful stated it would be ideal to have an official period of knowledge transfer, training, and working together, followed by a period where some previous participants are available for questions. Opinions on the ideal time frame ranged from one to three months, although respondents acknowledged such a long period of overlap is not feasible. One person also mentioned the importance of having good documentation to pass on to the next group.

Davenport and Prusak (1998) described a set of roles for knowledge management as “crucial” while acknowledging how important it is for everyone to participate in knowledge

management. Roles are needed for direction, vision and organization, but each person has an area of expertise in which to contribute knowledge. The faculty interviewed all agreed there are no established roles for knowledge management when asked, “Are there roles in place in the practicum for promoting and ensuring knowledge capture and sharing activities?” Student practicum participants were divided in response to the statement “There are established roles in the practicum for the creation and sharing of knowledge.” Of the respondents, 12.5% strongly disagreed, 12.5% disagreed, 25% neither agreed nor disagreed, and 50% agreed (Davenport & Prusak, 2008).

<b>There are established roles in the practicum for the creation and sharing of knowledge.</b>		
<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Strongly disagree	12.5%	1
Disagree	12.5%	1
Neither agree nor disagree	25.0%	2
Agree	50.0%	4
Strongly Agree	0.0%	0
<b><i>answered question</i></b>		<b>8</b>
<b><i>skipped question</i></b>		<b>0</b>

In response to the statement “All participants contribute to capturing and sharing knowledge,” 12.5% of respondents strongly disagreed, 37.5% disagreed, 12.5% neither agreed nor disagreed, 25% agreed, and 12.5% strongly agreed.

<b>All participants contribute to capturing and sharing knowledge.</b>		
<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Strongly disagree	12.5%	1
Disagree	37.5%	3
Neither agree nor disagree	12.5%	1
Agree	25.0%	2
Strongly Agree	12.5%	1
<b><i>answered question</i></b>		<b>8</b>
<b><i>skipped question</i></b>		<b>0</b>

When asked “Is knowledge sharing each person's responsibility? How is that responsibility communicated?” all faculty members interviewed agreed that knowledge sharing should be part of the students’ responsibility. Only one out of four agreed it is communicated by the practicum faculty and project manager and acknowledged roles are a strong component of a knowledge management strategy and should be part of a knowledge management strategy. A formal strategy would make it clear to students they should be sharing knowledge, since it appears that most only share knowledge when asked. One person suggested that it should be clearly communicated at the beginning of the practicum and advocated by the team lead in weekly meetings. Another mentioned the more students contribute, the more they will benefit.

## Chapter 5 – Conclusions

The goal of this research was to assess knowledge sharing methods and processes in the Regis University database practicum and make recommendations for a knowledge sharing framework. The knowledge management literature frequently warns that technology is not a knowledge sharing strategy, but an enabler of knowledge sharing and support for a knowledge management infrastructure. Becerra-Fernandez et al. (2004) included organizational culture and structure, infrastructure, and information technology in the components of a knowledge management infrastructure. This research assessed the current maturity of these components in the database practicum to recommend a formal knowledge sharing framework (Becerra-Fernandez et al., 2004; Davenport & Prusak, 1998).

A belief that knowledge sharing is valuable is key to creating a culture supportive of knowledge sharing. All faculty and student participants interviewed or surveyed agreed knowledge sharing is important to the practicum, indicating to the researcher that a foundation exists for more formal knowledge sharing practices. A framework for knowledge sharing presented at the beginning of the practicum would formalize knowledge sharing as an expected part of the practicum. The framework should express the importance of knowledge sharing, set expectations for participation in knowledge sharing, and outline how participation will be evaluated and rewarded or enforced.

A culture conducive to knowledge sharing cannot be mandated, but a framework can support it by formalizing expectations, roles, and feedback or recognition. Becerra-Fernandez et al. (2004) described creating an environment for knowledge sharing: “attributes of an enabling organizational culture include understanding of the value of KM practices, management support for KM at all levels, incentives that reward knowledge sharing, and encouragement of interaction

for the creation and sharing of knowledge” (p. 42). The data collected by this study indicated the majority of the study participants had a favorable impression of the culture of knowledge sharing in the practicum.

The researcher does not discount the negative survey responses to statements regarding trust, willingness to share, and recognition. Experience of culture is subjective and highly personal. One of the faculty responses stated, “a student gains as much from their contributions as he or she puts into it.” If a student is not participating fully, or if others have the impression he or she is not participating enough, willingness to share with that student will decrease. As Alavi (1999) stated, “because knowledge is personalized, in order for an individual’s or a group’s knowledge to be useful for others, it must be expressed and communicated in such a manner as to be interpretable by the receivers” (p. 14). Communication is especially critical in a virtual team environment where personal interaction is infrequent and much of the communication is asynchronous. Without the context of tone and facial expression, differences in communication style, language, and culture may be an added challenge to knowledge sharing. According to Malhotra (2000), “it may be extremely difficult to build a sense of personal connection and trust in [virtual teams.] ... Technology allows for the electronic connection of geographically spread out individuals, but it does not necessarily lead to effective personal connection, communication and creativity” (Chapter VI: The Glue That Binds Creative Virtual Teams, para. 4). Malhotra suggested that the solution is in creating relationships, “connections between team members” (Chapter VI: The Glue That Binds Creative Virtual Teams, para. 5), and supportive work environments (Malhotra, 2000).

In the 2009C practicum session, students paired up to work on various projects. In the transition between the 2009C and 2010A practicum sessions, incoming and outgoing students

were also paired up for knowledge transfer. As tasks are rotated to different students during the practicum, also changing who works together would give individuals opportunities to make more personal connections with other participants. Personal connections can build trust, which is essential for knowledge sharing.

Davenport and Prusak (1998) stated, “Trust must be visible. The members of the organization must see people get credit for knowledge sharing. They must directly experience reciprocity. There must be direct evidence of trust; a declaration of the importance of trust in the corporate mission statement is not sufficient” (Chapter 2 - The Promise and Challenge of Knowledge Markets, para. 16). Students in the database practicum were commended or thanked during conference calls or by emails for their knowledge sharing contributions, but there is no formal requirement of knowledge sharing, such as a graded component or recognition strategy, in place. Since the practicum is designed to parallel an IT organization where teamwork and knowledge sharing are important, it would be appropriate to formalize requirements and expectations to some extent, even if it is not a major component of the students’ grade for the practicum. Knowledge sharing is also critical for an incoming practicum team to be able to assume their responsibilities.

The workload for students in the practicum is sometimes more focused on setup and support activities, and when production demand is lower, practicum participants work on their own lab activities. The faculty seemed conscious of the demands on students’ time, sometimes asking about the pacing of the support and labs and adjusting lab deadlines when students needed more time to complete them. Seventy-five percent of the students surveyed thought the time allotted for knowledge management was sufficient. Given the lack of formal requirements for knowledge management, participation in knowledge sharing could take a lower priority when

support time or lab work increases. Continued sensitivity to workload combined with more formal requirements for knowledge sharing would be likely to help keep the balance between priority and workload. A high percentage of the students surveyed expressed trust in the practicum faculty. Clear requirements and a demonstrated understanding of students' workload should continue to result in trusting relationships.

While the use of technology is not itself a knowledge sharing strategy, it plays an important role in effective knowledge sharing. Student survey responses indicated that existing technology used for knowledge sharing in the practicum is not sufficient, and knowledge is not easy to locate when it is needed. The faculty interview responses clarified that the existing technologies in use have their strengths, but multiple locations for knowledge storage are not ideal. Given the unlikelihood of drastically changing the existing technology, the researcher recommends the following strategies for using each technology appropriately and minimizing the drawbacks.

The strength of the WorldClass forum website is central, public, asynchronous discussion. Since each practicum session has a new WorldClass environment, it is not suitable for transferring knowledge between practicum sessions. Documents posted in the WorldClass forum can introduce multiple versions of knowledge, introducing the risk of using outdated information. The WorldClass forum should be limited to discussion and lab work. Captured knowledge such as support and setup documents that will be maintained and used repeatedly and by multiple practicum sessions should be stored in SharePoint. Links can be posted in the WorldClass forum and included in emails, making it easy to access documents being discussed.

One of the faculty responses indicated the WorldClass forum has been an improvement over the previous method: communication by email. Email should be limited to individual



discussions or communication that needs more immediate attention than what is posted in the WorldClass forum. Emails can be difficult to search for specific information, it is easy to leave people out of communications, and contradicting versions of information can easily be introduced. Email should be used sparingly, with public information being posted to the WorldClass forum and documents shared on SharePoint.

Track-It! is useful for issue and resolution tracking and for assigning issues to other groups. It is less useful as a knowledge repository. The duplication of issue resolution in the FAQ documentation indicates Track-It! is not easy to use to find out how issues were resolved. One of the faculty members interviewed described Track-It! as an old technology and suggested that a newer version or different system might be worth investigating. Track-It! also had to be monitored because there were no notifications in place to announce when issues were past due or newly assigned from another group or resolved by another group. Email notifications would eliminate the need to regularly check Track-It! and could reduce response time.

Several faculty respondents suggested using a wiki. A wiki is a website where multiple users can collaboratively edit content. Content can be typed directly on a page, or attachments can be uploaded. A wiki would be a centralized place for discussion, notes, and attachments, which could eliminate the separate WorldClass forum and SharePoint sites for discussion and documents. A wiki allows easy editing and collaboration, and tracks all revisions. The lack of structure can be both a benefit and a disadvantage. Without someone imposing structure and organization, a wiki can become sprawling and disorganized. The researcher believes the idea merits exploration but a wiki would need guiding policies and oversight to be an effective tool (Stafford & Webb, 2006).

A knowledge map, which is a high-level graphic and textual knowledge locator, would be another way to tie together the separate knowledge repositories (WorldClass forum, SharePoint, Track-It!) without introducing new technology or changing the systems in use. A knowledge map would contain pointers to key information such as contact lists, FAQ documents, setup and maintenance documents, and other resources with little overhead for implementation. Davis (2008) recommended a central SharePoint folder for knowledge shared across practicum groups. Such a folder would also help with the maintenance of a knowledge map if the location of support, maintenance, and other key knowledge documents does not change with each practicum session (Davis, 2008).

One of the challenges of knowledge sharing is how to share tacit knowledge which is not easily codified or documented. Experts recommend synchronous, personal, spontaneous, and unstructured communication for sharing tacit knowledge. This is especially challenging for virtual teams, which may have time differences and cultural or language differences. Student participant survey results were neither largely negative nor overwhelmingly positive about opportunities for exchanging explicit knowledge. The weekly conference calls are an opportunity to exchange tacit knowledge using demos and discussions, but they are a structured activity in that they are scheduled and led according to an agenda. Becerra-Fernandez et al. (2004) suggested socialization as a mechanism for transfer of explicit knowledge: “socialization is the synthesis of tacit knowledge across individuals, usually through joint activities instead of written or verbal instructions” (p. 33). The previously suggested pairing or grouping of students for tasks could provide the personal interaction needed to initiate spontaneous knowledge transfer knowledge (Becerra-Fernandez et al., 2004; Davenport & Prusak, 1998).

The most critical time for the exchange of tacit knowledge is during the transition between practicum teams, when a new team needs to quickly assume its support role. The majority of both student and faculty respondents agreed that the overlap in teams during this transition period, as suggested by Davis (2008), was helpful for the exchange of knowledge. The period of overlap should be an explicit part of the practicum schedule, if it is not already (Davis, 2008).

Knowledge management experts suggest assigning roles to support knowledge management initiatives. In such a small organization as the database practicum, a few key roles should be sufficient, mainly serving to advocate and provide guidance for knowledge sharing. All faculty should encourage knowledge sharing, but the manager of the practicum could also serve as the chief knowledge officer, setting expectations for knowledge sharing practices and participation. The team lead or another student could be a knowledge manager or advocate, promoting knowledge sharing and good practices and helping organize and locate captured knowledge. All student participants should be “knowledge workers,” participating in capturing and sharing knowledge, an expectation that should be set at the beginning of the practicum as part of the formal requirements for knowledge sharing. A study by Marks, Polak, Galletta, and McCoy (2008) found managerial prompts about sharing knowledge increased participation by about 8%. The chief knowledge officer and knowledge manager should regularly remind participants to capture and share knowledge (Becerra-Fernandez et al., 2004; Burk, 1999; Davenport & Prusak, 1998; Markset al., 2008).

The database practicum has a strong foundation with a culture supportive of knowledge sharing as a basis for implementing a framework. Formalizing knowledge sharing requirements and providing continued support, guidance, and encouragement for knowledge sharing are key

components of implementing the framework. The existing technology has its strengths, and minor changes to formalize the use of this technology and introduce a knowledge map could solidify the framework for knowledge sharing and aid in locating knowledge.

### **Chapter 6 – Areas for Further Research**

This study focused on the analysis of current knowledge sharing culture, technology, and processes, and made recommendations for implementing a knowledge sharing framework. With a knowledge sharing framework in place, further research into solutions for multiple locations for sharing knowledge would be a natural step. Future investigations might include suggesting a replacement for the Track-It! system, implementation of a knowledge map, or explorations into how a wiki could be structured and administered.

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## Appendix A

## IRB Approval



Academic Affairs  
Academic Grants

3333 Regis Boulevard, H-4  
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303-458-4206  
303-964-3647 FAX  
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## IRB – REGIS UNIVERSITY

January 5, 2010

Martha Jorgensen  
2013 South Ridge Drive  
Coralville, IA 52241

**RE: IRB #: 085-09**

Dear Martha:

Your application to the Regis IRB for your project “Inquiry in support of the Knowledge Sharing Lifecycle within a Higher Education Database Practicum: a Case Study at Regis University,” was approved as exempt on December 28, 2009.

The designation of “exempt,” means no further IRB review of this project, as it is currently designed is needed.

If changes are made in the research plan that significantly alter the involvement of human subjects from that which was approved in the named application, the new research plan must be resubmitted to the Regis IRB for approval. It is the responsibility of the investigator to maintain signed consent documents for a period of three years after the conclusion of the research. The Office of Academic Grants does not retain copies of individual IRB documentation, including approval letters, past three years from approval date.

Sincerely,

Edwin May  
Director  
cc: Charles Thies

## Appendix B

### Faculty Interview

Knowledge Sharing in the Regis University DB Practicum, Faculty Interview

[Exit this survey](#)

#### 1. Survey Questions

Inquiry in Support of the Knowledge Sharing Lifecycle within a Higher Education Database Practicum: a Case Study at Regis University.

You are invited to participate in a study that will measure knowledge sharing and communications activities in the 2009C database practicum. The results of the study will be used to evaluate the practical methodologies that support the development of an methodology to support knowledge sharing between temporary virtual teams. In addition, this study is being conducted to fulfill the requirements of a Thesis Project. The study is being conducted by Martha Jorgensen. Martha Jorgensen can be reached at 319-530-7027 or e-mail mbjorgen@gmail.com. This project is supervised by the student's Thesis Advisor, Charles Thies, Regis University, 3333 Regis Boulevard, Denver, Colorado 80221-1099, cthies@regis.edu, (719) 310-9887.

Participation in this study should take about 30 minutes of your time. Participation will involve responding to 6 open-ended questions about knowledge sharing and communications activities. Participation in this project is strictly voluntary. The risks associated with this project are minimal. If, however, you experience discomfort you may discontinue the interview at any time. We respect your right to choose not to answer any questions that may make you feel uncomfortable. Refusal to participate or withdrawal from participation will involve no penalty or loss of benefits to which you are otherwise entitled.

##### 1. How is knowledge sharing beneficial to the practicum?

##### 2. Are individual practicum participants recognized for their knowledge sharing contributions? How?

##### 3. Are the current methods and environments for knowledge sharing (Worldclass forum, sharepoint, and TrackIT) sufficient? If no, what is lacking?

4. Was the overlap in practicum sessions helpful for sharing knowledge between practicum groups? Did it help the new practicum group reduce the amount of time it took to assume their support role?

5. Are there roles in place in the practicum for promoting and ensuring knowledge capture and sharing activities?

6. Is knowledge sharing each person's responsibility? How is that responsibility communicated?

Next

## 2. Informed Consent

Your responses will be anonymous and will be kept separate from information that could identify you. This is done to protect the confidentiality of your responses. Only the researcher will have access to your individual data and any reports generated as a result of this study will use only group averages and paraphrased wording. However, should any information contained in this study be the subject of a court order or lawful subpoena, Regis University might not be able to avoid compliance with the order or subpoena. Although no questions in this interview address it, we are required by law to tell you that if information is revealed concerning suicide, homicide, or child abuse and neglect, it is required by law that this be reported to the proper authorities.

If you have any concerns or complaints about how you were treated during the interview, please contact Mr. Bud May, the director of the Regis University Institutional Review Board at (303-458-4206). You may keep this page for your records. Please sign below if you understand and agree to the above. If you do not understand any part of the above statement, please ask the researcher any questions you have.

**7. I have read and understood the foregoing descriptions of the study called Inquiry in Support of the Knowledge Sharing Lifecycle within a Higher Education Database Practicum: a Case Study at Regis University. I have asked for and received a satisfactory explanation of any language that I did not fully understand. I agree to participate in this study, and I understand that I may withdraw my consent at any time. I have received a copy of this consent form.**

**Note: If this document is being sent electronically, your typed signature will be considered your signature.**

Signature

Phone Number

Date

## Appendix C

### Student Participant Survey

Knowledge Sharing in the Regis University DB Practicum, Student Survey

[Exit this survey](#)

#### Survey Questions

Inquiry in Support of the Knowledge Sharing Lifecycle within a Higher Education Database Practicum: a Case Study at Regis University.

You are invited to participate in a study that will measure knowledge sharing and communications activities in the 2009C database practicum. The results of the study will be used to evaluate the practical methodologies that support the development of an methodology to support knowledge sharing between temporary virtual teams. In addition, this study is being conducted to fulfill the requirements of a Thesis Project. The study is being conducted by Martha Jorgensen. Martha Jorgensen can be reached at 319-530-7027 or e-mail [mbjorgensen@gmail.com](mailto:mbjorgensen@gmail.com). This project is supervised by the student's Thesis Advisor, Charles Thies, Regis University, 3333 Regis Boulevard, Denver, Colorado 80221-1099, [cthies@regis.edu](mailto:cthies@regis.edu), (719) 310-9887.

Participation in this study should take about 30 minutes of your time. Participation will involve responding to 14 likert scale questions about knowledge sharing and communications activities. Participation in this project is strictly voluntary. The risks associated with this project are minimal. If, however, you experience discomfort you may discontinue the interview at any time. We respect your right to choose not to answer any questions that may make you feel uncomfortable. Refusal to participate or withdrawal from participation will involve no penalty or loss of benefits to which you are otherwise entitled.

**1. The culture of the practicum encourages knowledge sharing.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**2. The practicum allows sufficient time for knowledge management.**

- ☐ Strongly disagree
- ☐ Disagree

**2. The practicum allows sufficient time for knowledge management.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**3. Knowledge sharing is beneficial to the practicum.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**4. Fellow students are willing to share knowledge freely.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**5. Individuals are recognized for their knowledge sharing efforts and contributions.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**6. Knowledge shared by fellow practicum members is accurate.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**7. You trust the practicum faculty.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**8. The current methods for knowledge collection and sharing (Worldclass forum, sharepoint, and TrackIT) are sufficient.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**9. You know where to find information needed to complete tasks or respond to help desk inquiries.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**10. A knowledge map is typically a high-level map, index, list, picture, or database used to point to where specific knowledge or expertise is located. A knowledge map for the knowledge used by the practicum would be effective for locating knowledge more easily.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**11. The practicum provides opportunities for spontaneous and unstructured knowledge transfer.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**12. The overlap in practicum groups was helpful for sharing knowledge.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**13. There are established roles in the practicum for the creation and sharing of knowledge.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

**14. All participants contribute to capturing and sharing knowledge.**

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly Agree

Next