

PERCEPTIONS WITHIN A VIRTUAL COMMUNITY OF PRACTICE:

A Q-METHOD STUDY

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PERCEPTIONS WITHIN A VIRTUAL COMMUNITY OF PRACTICE:
A Q-METHOD STUDY

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DEDICATION

I dedicate this dissertation to my wife, Vita, and my two boys, Calixto and Ezra, who have given me the motivation and reasons to continue my journey (my example is yours to follow). I also dedicate this dissertation to my grandmother, Refugia, who gave me the courage to begin the journey.

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TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS.....	vi
LIST OF TABLES.....	xi
LIST OF FIGURES.....	xii
ABSTRACT.....	xiii
CHAPTER	
I. INTRODUCTION.....	1
Background of the Study.....	2
Statement of the Problem.....	5
Purpose of the Study.....	7
Research Questions.....	9
Definition of Terms and Language.....	9
Significance of the Study.....	11
Overview of the Research Method.....	14
Conceptual Framework.....	15
Delimitations.....	17
II. REVIEW OF THE LITERATURE.....	20
Introduction.....	20
Social Networks.....	21
Online Social Networks.....	24
Knowledge Sharing and Communication.....	26
Professional Learning Communities.....	28
Communities of Practice.....	30
Q-Method in Communities of Practice Research.....	36

Chapter Summary	38
III. METHOD	39
Introduction.....	39
The Research Design	40
A History of Q-Methodology.....	42
Overview of the Q-Method Study.....	43
Building a Concourse.....	43
Selecting a Q-Sample.....	44
Selecting a P-Sample	46
The Concourse Theory to Develop the Q-Sample.....	50
Data Analysis.....	62
Chapter Summary	65
IV. RESEARCH FINDINGS.....	66
Introduction.....	66
Correlation Matrix	67
Factor Analysis	67
Factor Loadings	69
Confounding Factor Loadings	71
Research Question One: What are the beliefs or perceptions of Community Learning Exchange participants regarding the use of a virtual community of practice?	72
Consensus Statements.....	84
Distinguishing Statements	87
Research Question Two: How can the promise and mission of the Community Learning Exchange be sustained within the context of a virtual community of practice?	92
Chapter Summary	98
V. CONCLUSIONS, DISCUSSION, AND SUGGESTIONS FOR FUTURE RESEARCH	100
Summary of the Study	100
The Conceptual Framework and Virtual Communities of Practice.....	102
Implications for Researchers.....	106
Implications for Policy Makers.....	108
Implications for Practitioners.....	108
Conclusion	109
APPENDIX A: Correlation Matrix Between Sorts	111

APPENDIX B: Exploratory Online Questionnaire.....	112
APPENDIX C: Q-Assessor Email Templates	114
APPENDIX D: Factor Arrays.....	117
APPENDIX E: Rank Statement Totals within Each Factor	119
APPENDIX F: Descending Array of Differences Between Factors	120
APPENDIX G: Factor Q-sort Values for Each Statement.....	125
APPENDIX E: Institutional Review Board Exemption	130
REFERENCES	131

LIST OF TABLES

Table		Page
Table 2.1	Distinguishing Characteristics of Organizational Units.....	34
Table 3.1	Participant (P-Sample) Age.....	49
Table 3.2	Q-Sample Statements.....	51
Table 4.1	Correlations between Factor Scores.....	69
Table 4.2	Factor Matrix of Participants' Q-Sorts (Loadings).....	70
Table 4.3	Factor One: Normalized Factor Scores.....	72
Table 4.4	Factor One: High Positive and High-Negative Statements.....	75
Table 4.5	Factor Four: Normalized Factor Scores.....	79
Table 4.6	Factor Four: High Positive and High-Negative Statements.....	81
Table 4.7	Differing Statements between Factors One and Four.....	84
Table 4.8	Consensus Statements.....	85
Table 4.9	Distinguishing Statements for Factor One.....	88
Table 4.10	Distinguishing Statements for Factor Two.....	89
Table 4.11	Distinguishing Statements for Factor Three.....	90
Table 4.12	Distinguishing Statements for Factor Four.....	92
Table 4.13	Previous Research on Fostering (Virtual) Communities of Practice.....	93

LIST OF FIGURES

Figure		Page
Figure 1.1	Screenshot of the Community Learning Exchange's Virtual Community.....	9
Figure 1.2	Conceptual Framework.....	17
Figure 3.1	Q-Sort Distribution Grid.....	59
Figure 3.2	Screen Capture of Q-Assessor Web Software.....	62
Figure 4.1	Scree Plot of Eigenvalues.....	69
Figure 4.2	Factor One Model Sort.....	75
Figure 4.3	Factor Four Model Sort.....	82
Figure 5.1	Conceptual Framework.....	104

ABSTRACT

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Incorporating people's values and beliefs into virtual communities is an important component of sustainable communities of practice. The purpose of this study is to better understand the beliefs and perspectives of those virtual community participants who engage in community development in a national network of practitioners. Q-Method, a mixed-methods research design, was utilized to study the subjective opinions of participants within the virtual community of practice. Q-Method was used to identify perspectives on sustainable management and development of a virtual community of practice established by the Community Learning Exchange. Initial interviews, an online questionnaire and literature reviews were conducted to build a concourse of statements. Then, thirty-one participants from the virtual community completed online sorts of the Q-Method cards according to their own beliefs and subjective opinions about virtual communities of practice. Post-sort interviews were also conducted to elicit explanations

about participant sorts. The Q-Sorts were factor analyzed to reveal statistical correlations among the participants. Data analysis indicated four statistically significant factors. Data also emerged as to why these participants choose to engage online (or not) in this particular virtual community of practice.

Finally, a conceptual framework was used to examine participants' beliefs about engagement within a virtual community. The findings of this study generate insights into virtual communities of practice and provide researchers, policy makers, and practitioners information about this rapidly expanding field. The study demonstrates the value of Q-Method in characterizing the views of virtual community participants toward online engagement and accommodating these views and beliefs in a virtual community of practice.

CHAPTER I

INTRODUCTION

Creating a promise that enough people believe in is the basic requirement. The promise creates the basic desire to participate. Then come the tools. After getting the promise right (or right enough), the next hurdle is figuring out which tools will help people approach the promise together. (Shirky, 2008, p. 261)

The notion that people within an organization or community of practice need opportunities to engage with each other in order to access and utilize the intelligence of an organization is not a new one (Wheatley, 2007). Among organizations and new and emerging forms of organizations, interacting face-to-face on a regular basis for the purposes of accessing the communal purpose and intelligence is costly and time-consuming. Modern information and communication technologies can assist those engaged in building virtual communities by removing cost-prohibitive barriers; among those, space and time. Members of various organizations have become increasingly interested in exploiting capabilities of information and communication technologies to support traditional organizations and communities of practice. Virtual communities of practice, without excluding face-to-face meetings, rely primarily on information communication technology (ICT) to connect their members. Participants in a virtual community of practice may use a large array of traditional media and more or less sophisticated technological tools, such as e-mail, videoconferencing, newsgroups, on-line

meeting spaces, common databases, Websites, or intranets to establish a common virtual collaborative space.

Background of the Study

In some organizations, virtual communities of practice are widely used as a knowledge management tool to facilitate knowledge sharing and dissemination. While more traditional communities of practice were previously conceptualized as a phenomenon emerging spontaneously in organizations, it is now believed that organizations play a critical role in nurturing these communities (Wenger & Snyder, 2000). The literature contains organizational contexts in the development and expansion of both traditional and virtual communities of practice. Contained within the literature is the assumption that all communities are similar and that participants within those communities hold similar subjective beliefs. But in order to develop and expand virtual communities of practice to their full potential, members and/or founders of an organization must understand the beliefs of participants in these virtual, social constructs. An examination of existing virtual communities of practice reveals that, while they may share some common features, their various structuring characteristics, such as enrollment and geographic dispersion, make them unique. Moreover, within a particular context, different structural characteristics or configurations of characteristics based on participant subjectivity may be more or less conducive to the success of a virtual community of practice. Despite the increasing number of organizations using virtual communities of practice, little is known about how to best implement and nurture them.

Online social networks such as Twitter, Ning, MySpace, and Facebook are a growing trend in professional/social knowledge building networks (Boyd & Ellison,

2007). According to Facebook (2011) statistics, the Facebook social network had more than 500 million active users, with 50% of its users logging in on any given day. In addition, Facebook had more than five billion pieces of content or connections to information (web links, news stories, blog posts, notes, photo albums, etc.) shared each week and more than three million active Pages. More than 20 million people joined Pages each day, and Pages created more than 5.3 billion fans (Facebook, 2011).

Schlager, Farooq, Fusco, Schank, and Dwyer (2009) noted that, “the popularity of social networking among youth and teachers of the net generation is undeniable” (p. 86). Users are beginning to turn to these networks based on their affiliation and interests to build professional learning communities to support professional development (Scwhartz, 2010). Virtual communities of practice hold great promise for facilitating the development of knowledge and practice as users participate and expand their personal learning communities.

Virtual communities of practice enable members to update their knowledge and practices while accessing organizational intelligence. The use of virtual communities of learning to support professional learning has a number of benefits in terms of flexibility and scalability. Little (2005) stated that professional “networks are effective because they provide a trustworthy way of transmitting knowledge, particularly where this knowledge is unable to be codified. Moreover, new knowledge is typically a result of collaborations between individuals” (p. 23). Liddicoat (2006) and Meiers and Ingvarson (2005) supported the developmental aspect of structured professional learning. Meiers and Ingvarson linked the description of a body of knowledge to actual classroom engagement, including professional renewal and ongoing development.

DuFour (2004) noted that persons engaged in developing a professional learning community recognize that they must work together to achieve their “collective purpose” (p. 6). A virtual community of practice assumes that members engaged in the virtual community of practice are gathered for some collective purpose.

The technology behind a virtual community of practice can take many forms. For matters of definition, the virtual space connects participants electronically and asynchronously, regardless of distance or specialization. The form of that the information communication technology takes should follow the function of improving professional learning for participants within a virtual community. Dufour (2004) cited compelling evidence indicating that “working collaboratively” represents best practice yet many members “continue to work in isolation” (p. 7).

The need for a redefined context for learning, where participants can contribute and share in a virtual community of practice, or “third space” (Hulme, Cracknell & Owens, 2009, p. 537), should facilitate extending community dialogue and reflection past the confines of physical meetings. Hulme et al. (2009), supporters of “third space” theory, reinforce the importance of “spaces for dialogue between participants that is safe, secure and supportive, space that ‘stands in between’ the formal areas of practice” (p. 541). A third space such as a virtual community of practice can be used “to create a community of practice and shared reflection on common experience around what the professionals do together” (Hulme, et al., p. 541).

Once we look beyond the traditional contexts of learning and situations for education (schools, colleges, universities, etc.), we can begin to imagine relationships among people, artifacts, and knowledge mediated through a virtual community of

practice. Within this virtual community of practice, participants can begin to leverage a myriad of social, organizational, and technological factors to support a distributed, borderless education (Cunningham, Tapsall, Ryan, Stedman, Bagdon, & Flew, 1997).

Statement of the Problem

In his book, *Here Comes Everybody: The Power of Organizing without Organizations*, Clay Shirky (2008) asserted the following: “There is no recipe for the successful use of social tools. Instead, every working system is a mix of social and technological factors” (p. 260). This statement reflects the phenomena at the core of organizations and communities of practice that engage in expanding their collective efforts using information communication technologies. The need for opportunities for members of a community to “bump-up” against each other to spawn new information, share a common set of beliefs, or share organizational intelligence is great.

Improvements in technological developments have provided organizations opportunities to operate in improved online environments through increased communication, interactivity among participants, and incorporation of collaborative models, specifically through information communications technologies (ICTs) (Schrum, 1998; Robey, Khoo, & Powers, 2000; Rogers, 2000; Stacey, Smith, & Barty, 2004). Using information communication technologies such as the online platform under investigation affords organizations and communities the potential for the combination of synchronous and asynchronous communication, access to and from geographically isolated communities (Hlapinis & Dimitracopoulou, 2007) and international information sharing.

Critics of virtual communities often argue that, through the use of social tools (information communication technologies), the group becomes the user (Kiesler & Sproull, 1992; Hiltz & Turoff, 1993). They argue that individuals must be convinced that they will not only find the virtual community satisfying and effective, but that others in the community will too. No matter how appealing the promise or mission of the virtual community, it is hardly beneficial to an organization to have unengaged users of the information communication technology.

Although the potential for virtual communities of practice of the various forms of information communication technologies such as e-mail discussion lists (listservs), social websites, and discussion boards should seem obvious, my own experience in setting up and moderating such virtual communities, coupled with comments derived from members within these communities of practice trying to sustain the virtual social community suggests this potential is not being realized. The question of determining which tools to use seems as if it should be easy to answer. Members of virtual communities often are engrossed in the work of trying to decide which information communication technology or web platform would best support their organization's mission.

Shirky (2008) discussed the dilemmas of organizations yearning to use virtual platforms to support face-to-face work; "There is no such thing as a generically good tool; there are only tools good for particular jobs. Technology is not an infinitely elastic piece of fabric that can be stretched to cover any situation" (p. 265). We cannot know which tools would best move the promise and mission of a community forward without researching those who have participated in the use of these tools. We can make

assumptions and conjectures, but without knowing the subjective perceptions of members within a virtual community of practice, we will not understand why the potential of these technologies is not being fully realized.

As members of virtual communities of practice continue to wrestle with choosing the tools (information communication technologies) without a clear understanding of member subjective perspectives, they continue to wrestle with how to engage members in a virtual space. Without an investigation of these members' perspectives, organizations will continue moving forward through cyberspace without a map.

Purpose of the Study

The purpose of this Q-methodological study is to understand the perceptions and experiences of members within a virtual community of practice, and whether or not information communication technologies can be utilized to extend and sustain the face-to-face Community Learning Exchanges organized by the Center for Ethical Leadership, funded by the W. K. Kellogg Foundation. In negotiating the study parameters with the Community Learning Exchange, the leadership team identified some evaluative aspects that they wanted undertaken in the study. This study, proposed to identify factors that facilitate or inhibit the development of this particular virtual community of practice for the Community Learning Exchange's leadership team. Particularly, I examined participants' beliefs about the virtual community of practice using a Q-Method approach. Through this study, I hoped to discover how a community of practice could benefit from information communication technologies to extend face-to-face collaboration. To meet this purpose, I explored how a virtual community of practice can inform the work of

those who share a common interest in the work of the Community Learning Exchange in order to extend ideas, find solutions, and build innovations.

While participant demographics in this study were varied, the participants are affiliated around a common vision, belief or purpose. Specifically, participants in the Community Learning Exchange are “a network of resilient local communities, vibrant organizations, and active change agents who share their local wisdom and collective leadership approaches with each other so that they can be more effective in addressing critical social issues” (CLE, 2011, intro). This study focused on participants in a community of practice. The Community Learning Exchange virtual community was developed to extend face-to-face gatherings throughout the United States. This study utilized a sampling of participants engaged in the Community Learning Exchange’s virtual community of practice who also attended a face-to-face Learning Exchange. One objective of the Community Learning Exchange is sustain its face-to-face work beyond the physical convening and interactions. The Community Learning Exchange organization leadership team has recognized, that without a thriving virtual community of practice, new understandings and knowledge shared are likely to diminish after a face-to-face meetings.

Figure 1.1. Screen Capture of the Community Learning Exchange's Virtual Community

Research Questions

The following research questions guided this study.

1. What are the beliefs or perceptions of Community Learning Exchange participants regarding the use of a virtual community of practice?
2. How can the promise and mission of the Community Learning Exchange be sustained within the context of a virtual community of practice?

Definition of Terms and Language

For the purposes of this study, the following terms are used.

Concourse (a component of the Q-sort method): A collection of subjective statements

that “comprehensively represent the discussion about a particular topic in the participants’ own words and language” (Valenta & Wigger, 1997, p. 502). A concourse can also include artwork, objects, behaviors, photographs, traits, cartoons, and other items (Stephenson, 1953; McKeown & Thomas, 1988; Thompson, 1998; Watts & Stenner, 2005); also known as the Q-Sample.

Online social network (OSN): For the purposes of this study an online social network is defined as a dedicated website or other Internet application which enables users to communicate with each other by posting information, comments, messages, images, video and other artifacts.

P-sample: The participants performing the Q-Sort who become the independent variables. The P-sample may be convenient or theoretically structured depending on the purpose of the study, yet participants should be those who are conversant with the topic (McKeown & Thomas, 1988); also known as Person-sample or P-set.

Q-Sort: The forced normal frequency distribution ranking or scoring of items by participants in the Q-Sample. The participants quantify the statements by ranking “them, relative to one another” (Stephenson, 1953, p. 19).

Social presence: Social presence is viewed by some as a property of media used in communicative exchanges (Daft & Lengel, 1986; Short, Williams, & Christie 1976) and so the demonstration of social presence is explicitly linked to media choices. It is linked to the experience of being there together, related to telepresence, co-presence (Collins & Murphy, 1997) and the notion of co-location in particular places or spaces (McLeod, Baron, & Marti, 1997). Social presence is described as self- projection into a group (Rourke et al., 2001; Garrison, 2007; Caspi & Blau 2008), which emphasizes the

potential for social activity in and amongst distributed and virtual communities.

Virtual community: The virtual community can best be defined as a technology-supported cyber-space, centered upon communication and interaction of participants.

Lee, Vogel, and Limayem (2002) identified four characteristics in defining a virtual community: (1) it is a computer-mediated environment; (2) activities in the community are enabled by information technology; (3) the content and/or topics of the community are driven by its participants; (4) the community relationship evolves through communication among its members.

Virtual community of practice (VCoP): Wenger (2008) defined a community of practice as: “Groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly” (p. 117). A virtual community is one that exists in an online web environment. By combining the ideas of a face-to-face community with that of one that exists in an online environment, the VCoP or Virtual Community of Practice is defined.

Significance of the Study

A clear understanding of why members in a virtual community of practice choose to participate (or not) while geographically dispersed, may help other organizations or communities utilize these virtual spaces. Without an understanding of members’ subjectivity as experienced by participants in a virtual community of practice, we are unable to explain the adjustment required for participation. Findings from this study may help to validate existing studies of inhibitors or critical success factors of extension into online spaces.

Significance for policy makers. On November 13, 2009, The Texas Education Agency (TEA), in collaboration with Epsilen LLC, and The New York Times Company, announced Project Share, an initiative to expand the development and delivery of high quality professional development in an interactive and engaging eLearning environment. The stated purpose of Project Share is to provide access to online resources, online course content, academic networking, and for the development of professional learning communities. The Texas Education Agency announced Project Share as the single online environment to “leverage existing and new professional development resources for teachers across the state and build professional learning communities where educators can collaborate, share, and tailor professional development to meet individual needs” (The New York Times, 2009, press release). With over one million users of Project Share as of September 2012, its possible impact on the educational policy and the future of professional development and curriculum in Texas must be considered. Anita Givens of the Texas Education Agency exclaimed,

It is truly an exciting and innovative time for us, and we look forward to another year of sharing online resources with Texas educators and students. Project Share offers a whole new world of education opportunities, and we feel that we’re just getting started (Texas Education Agency, 2012, press release).

This study can inform policy makers at the state and federal level as they continue to explore this “whole new world of education opportunities” (Texas Education Agency, 2012, press release).

As the Texas Education Agency expands Project Share at a time when education budgets in Texas are being slashed, it is anticipated that the agency will move more TEKS¹-aligned resources for English, math, science, and social studies online.

Expansion of these online resources includes the Middle School Students in Texas: Algebra Ready (MSTAR) Universal Screener, Texas SUCCESS resources in reading and math, and the Texas Achievement Items Repository (TxAIR). Before reallocating scarce educational revenues, policy makers might use research on virtual communities of practice to make informed decisions.

Significance for practitioners. Wheatley (2007) reminded us that “relationships are the pathways to the intelligence of the system” (p. 40). Practitioners or users of online technologies must be able to effectively identify and develop relationships while engaged in online endeavors. It is through relationship development that, “information is created and transformed, the organization’s identity expands to include more stakeholders, and the enterprise becomes wiser” (p. 40). Through this study, practitioners wishing to nurture relationships online can better understand the critical success factors that will help to build these virtual communities of practice. By applying concourse theory and analyzing data using a social constructivist lens, readers can judge information and make their own decisions about whether or not the findings that emerge from the research can be applied to their own organizations, institutions, or networks (virtual or otherwise).

Significance for researchers. The findings of this study can be used as a springboard for researchers wishing to investigate how virtual communities of practice add a new dimension to academic research and its communication. Researchers may wish to

¹ The Texas Essential Knowledge and Skills (TEKS) outline the knowledge and skills required of every student by the Texas school accountability system.

investigate the benefits of networking and communication that render physical location of less importance and isolation from the peer group less problematic. Since virtual communities of practice can be cultivated based on interests or common beliefs rather than on physical proximity, researchers may investigate the possibility of these enabled collaborations.

Overview of the Research Method

Q-Method (Brown, 1993; Van Exel, 2005) was utilized here to provide insights into the consciousness and reflective subjectivity of participants in the virtual community of practice. Q-Method was used to inform the questions driving this study through eliciting the subjective opinions of members of a virtual community of practice. Q-Method provides a unique way to model individual viewpoints (McKeown & Thomas, 1988). It is a well-established, scientifically-based approach to the study of opinions, attitudes, discourses and beliefs that allows a participant to systematically express his or her viewpoint by ranking statements according to a condition of instruction.

I chose to utilize Q-Method to assist me in developing a theory about the larger population by examining a few individuals and their subjective points of view. Q-Methods are particularly helpful at uncovering subjective perspectives within the context of the phenomenon under investigation.

Though a discussion of Q-Method is detailed in Chapter 3, I will here briefly describe the method as presented in (Van Exel & De Graf, 2005). Q-method is conducted in five stages: 1) the development of a collection of statements (this study used qualitative methods in the development of the discourse); 2) reducing (or culling) the number of statements to a representative sample called the Q-Set or Q-Sample; 3)

selecting participants (also subjects) called a P-set or P-sample; 4) selecting and facilitating the use of the tools for the Q-Sorts to be conducted by the participants; 5) and finally, analyzing and interpreting the results.

Conceptual Framework

The impetus for this study came about after years of watching educators and community organizers struggle to find a balance between the world of online presence and community building and engaging in communities built to operate in face-to-face modalities. As I read Margaret Wheatley's (2007) book *Finding Our Way: Leadership for an Uncertain Time*, it became apparent to me that, "we live in a world completely revolutionized by information," and that "it is knowledge we are seeking, not information" (p.40). Wheatley suggested, that we stop focusing our efforts on the tools and instead focus on creating meaningful organizations that allow time for reflection.

Later, I read Clay Shirky's (2008) book *Here Comes Everybody: The Power of Organizing without Organizations*, which echoed Wheatley's sentiments. Online social tools, Shirky suggested, allowed groups to form around activities "whose costs are higher than the potential value" for organized institutions (p. 261). Shirky noted how the successful creation of online groups relied on the successful "recipe" of a "plausible promise, an effective tool, and an acceptable bargain for the user" (p. 261). Shirky warned however, that this convergence of a system (bargain and promise) should not be interpreted as a recipe for the successful use of social tools, as the interaction between the components is too complex.

As I stood with one foot in the virtual community and the other planted in the world of face-to-face interaction, the concept of extending a community of practice to the virtual space gelled in my mind.

The conceptual framework (Figure 1.2) pictured below is discussed in Chapter 5, later in this study. After the Q-Method study was conducted, I applied the concepts proposed by Wheatley (2007) and Shirky (2008) to the opinions and sentiments expressed by members of a virtual community of practice. A community of practice, as depicted in the graphic representation of the conceptual framework below, often seeks out the bargain and promise of a virtual space to sustain and sometimes expand its mission.

In the context of the Community Learning Exchange, members of a community of practice have expanded their face-to-face interactions to participation in a virtual community of practice. As information communication technologies lower the cost of transactions for the community of practice in a virtual space, information can more easily and readily be exchanged amongst members of the community. Thus, the knowledge and artifacts shared among members is expanded based on their selection of the tools that assist in the expansion of the community mission. To complement this conceptual framework, Q-Method was used to understand participants' subjective perceptions of the virtual community of practice that supported the Community Learning Exchange initiative. These perceptions coupled with the conceptual framework guide the understanding of participant perspectives engaged in a virtual community of practice.

The conceptual framework presented below in graphic form, though it informed and guided the study, was not used to frame the literature review. The extant literature

and the conceptual framework, along with the findings presented later, differ greatly, as will be explained.

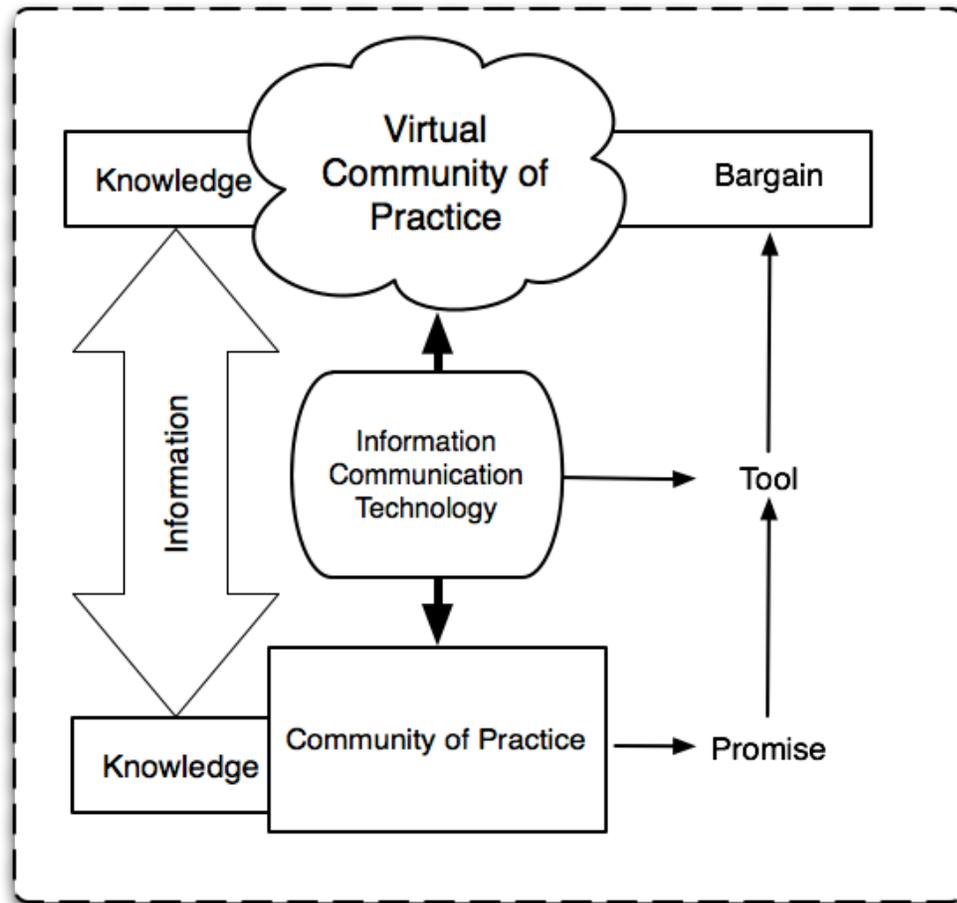


Figure 1.2. Conceptual Framework

Delimitations

Because of the complexity of virtual communities of practice and the technology inherent to social networking sites, the quality of the data gathered depends to what extent and to what degree participants are engaged in and collaborate to develop these networks. In some cases, participants may not be voluntarily engaged in the social networking site. For example, some members are automatically registered to the virtual

community based on their participation in at a Learning Exchange event. Therefore, the contexts for this study (a group of participants participating in a virtual community of practice) may limit the generalizability of the findings. Also, since concourse statements present respondents with pre-determined statements, the full representation of subjective beliefs of participants may be limited.

The sample for this study consisted of 31 members connected to each other through the Community Learning Exchange virtual community of practice (an online social network). The virtual community is formed as a follow-up to face-to-face interactions. The purpose of this study was to determine operant subjectivity in a field where empirical research is sparse. The nature of this study was not designed to prove a general proposition but to seek a better understanding of characteristics of participants within a virtual community of practice that directly relates to the virtual environments necessary for fostering a virtual community of practice. The perception of participants within this community of practice is intended to guide development of virtual communities or online networks that meet organizational goals and objectives. Using students from different institutions and other disciplines can also lead to a replication of the study.

Because of the nature of the Q-Sort, the final concourse of statements may not fully represent the opinions and beliefs of all of the participants in the study or be completely representative of their behaviors. To ensure that participant voices were not lost, I reserved time to conduct post-sort interviews with some in order to elicit an increase in more meaningful, considered responses. The following post-sort interview questions were used “What statement(s) (if any) are missing?”; “Please tell me how you

might phrase the statement and why it would be important to add.; “Would you place this statement(s) under least representative or more representative?” After the development of the concourse, additional questions were added to the post interview. The resultant understandings will be used to inform practice in technology-enhanced environments, particularly in eLearning.

It is important to note that, like other scaled measures, Q-Method relies on the integrity and honesty of participants. And, finally, the number of uncertain responses is limited by the forced distribution required by this method. However, these limitations do not undermine the importance of the findings.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

In this chapter, I review the literature related to this study. The study is centered on understanding the subjective perceptions of member participants in a virtual community of practice. This chapter summarizes studies and the relevant literature that provide the background necessary for understanding the construction of the concourse used in the Q-Method study. Valenta and Wigger (1997) stated that “the goal in instrument development is to comprehensively represent the discussion about a particular topic in the participants’ own words and language” (p. 502). In order to develop a comprehensive concourse instrument to be used in this study, it was necessary to review literature that pertained to the topic under investigation. This chapter provides an analysis of the background literature related to social networks, networks, communities of practice, professional learning, and social efficacy related to knowledge sharing that was reviewed to inform the creation of this study. This review is intended to negotiate an understanding of the conceptual framework used in the study and my ontological perspectives.

In this review, I also identify key terms and concepts relevant to the study. The ideas and theoretical constructs drawn from the literature constitute a complex theoretical concourse from which statements were culled for the Q-Study.

The strategies used for searching the literature included accessing online databases, exploring reference lists, and reviewing professional reference books. Using the ERIC database through EBSCOhost as part of the Texas State University-San Marcos library services, key words such as online community, communities of practice, online sharing, social networking, virtual communities, professional learning, and knowledge sharing were used in a general search of literature from 1990 to 2012. Using reference lists from the journal articles produced in the search, specific key words were entered into various sociology and education databases to find research and articles related to the key words. Google Scholar and dissertation databases were accessed using either the same key words in general requests or specific key words in particular requests. Professional reference books were searched in an effort to define concepts that came up in the journals, dissertations, and research articles. Finally, the Internet was accessed for specific literature and articles not located on databases.

Social Networks

The social network theory approach originated in mathematical graph theory and has a long and distinguished history in the social sciences and psychology, where it has been used to investigate human social organization (Scott, 2000). Its main uses in sociology and social psychology have the potential to address population-level or cross-population-level problems by constructing models of complex social structures from individual-level interactions. Social networks help us discern who is connected to whom in the population and by what relationship. Schlager, Farooq, Fusco, Schank, and Dwyer (2009) defined social networks as “the evolving relationships among members and subgroups and the activities of those members using tools and other artifacts” (p. 97).

Scott (2000) and Wasserman (1994) defined a social network as a set of people or groups of people with some pattern of contacts or interactions among them. As Newman (2003) noted, “one source of copious and relatively reliable data is collaboration networks. These are typically affiliation networks in which participants collaborate in groups of one kind or another, and links between pairs of individuals are established by common group membership” (p. 175).

Granovetter (1973) and Rogers (2003) stated that social networks in general consist of clusters of densely connected individuals with strong ties among them and sparse weak ties connecting such clusters to each other. The research on homophily indicates that people are more likely to have social ties (especially strong ones) with those similar to themselves on socially important attributes such as race, sex, education, and age (Brass, 1995). Brown, Broderick and Lee (2007) discovered that “online homophily is almost entirely independent of interpersonal factors, such as an evaluation of individual age and socioeconomic class, traditionally associated with homophily” (p. 15). They determined instead that other means of evaluating homophily at the level of the online social network took precedence.

However, it is noted in the relevant literature that social networks are good predictors of engagement. McAdam and Paulsen (1993) have pointed out that in order to gauge participation in a social network we must “specify and test the precise dimensions of social ties that seem to account for their role as facilitators of activism” (p. 641). In other words, to reach a better understanding of the dynamics of participation in social networks, the nature, content, and function of networks should be specified. The most recurrent specification found in the literature is the distinction between formal and

informal ties (della Porta, 1988; McAdam & Paulsen, 1993). The former refers to membership in organizations, while the latter is defined as interpersonal ties such as parenthood, friendship, and acquaintance. Formal and informal ties, as established in social network analysis, influence the intensity of participation in and have a varying impact on differential participation. These formal and informal ties have an influence on network externalities.

Network externalities occur when participation in a network benefits others in the network, and the value of the network grows as the number of members in the network increases (Song & Walden, 2007). The literature shows that people use a particular system more when more people also use it, and when more people in their social group use it (Kraut, Rice, Cool, & Fish, 1998). Network externalities occur due to social considerations (Janssen & Mendys-Kamphorst, 2007). One study (Asvanund, Clay, Krishnan, & Smith, 2004) suggested that positive network externalities improve the performance of an increasing network, and are vital for intended future or continued participation in an online community (Chun & Hahn, 2007; Chung & Hossain, 2010; Lin & Lu, 2011).

Based on marketing literature, social interaction is interpersonal action or a relationship between an individual and others (Varey, 2008). Chun and Hahn (2007) suggested that the total network size and the number of active members in the “buddy list” are significant network externality factors. Members tend to seek more accessible and helpful relationships with their friends, family, and/or co-workers (Chu & Chan, 2009). Thus, when participants in an online network perceive that not only numerous people but also their friends and acquaintances are joining and interacting in an online

community, their willingness to interact and communicate within the online community increases.

Online Social Networks

Shirky (2008) asserted that “our social tools are dramatically improving our ability to share cooperate, and act together” (p. 304). Hampton, Sessions, Her, and Rainie (2009) found that “social networking services, such as Facebook, provide new opportunities for users to maintain core social networks” (p. 9). Hampton et al. (2009) discovered that the core social networks users develop through social networking services are highly influential in decision-making and exposure to ideas, issues, and opinions. Boyd and Ellison (2007) defined social network sites as:

Web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. (p. 212)

In the mid 1990s, the worldwide web or “web” began its expansive growth, but publication to the web was an arduous multi-step process. Today’s online social networks and Web 2.0 technologies allow users without technical expertise to easily publish content to the Internet (O’ Reilly, 2005). Inherent in these new online social spaces are, as Schauer (2005) defined, user contributed value and co-creation. Co-creation plays an integral role in the communities of practice that exist in these virtual spaces and contribute to the creation of content. Creation of content in these networks assumes that users contribute in various ways, including, but not limited to, posting to discussion forums, uploading pictures and videos, and commenting on other user-

contributed content. This user-contribution is sometimes collaborative in nature and includes social interaction among contributors.

Participants in the Community Learning Exchange engaged in an affiliation network, where users work collaboratively and contribute to the community of practice. Newman (2003) defined affiliation networks as “networks of individuals joined by common membership of groups. In such networks, the individuals and the groups are represented by the two vertex types with edges between them representing group membership” (p. 204). Social networking websites are virtual communities which allow people to connect and interact with each other on a particular subject or to spend time together online (Murray & Waller, 2007).

Boyd and Ellison (2007) further describe social network sites as web-based services that allow individuals to construct a public or semi-public profile within a bounded system, display a list of other users with whom they share a connection, and view and traverse their list of connections and those made by others within the system (p. 11). Social network sites differ from other forms of virtual and online communities in that they allow users to articulate and make visible their social networks.

Virtual communities, or online social networks, use networked technology, especially the Internet, to establish collaboration across geographical barriers and time zones. In comparison to traditional communities, virtual communities differ in several respects (Palloff & Pratt, 1999). Traditional communities, as have been historically defined, are place-based and consist of a membership developed according to organizational or group norms. In traditional community structures, there is a distinct boundary between membership and differentiation: It is clearly defined within this

community who is a member and who is not. In contrast to traditional communities, virtual communities and online social networks exist according to identification with an idea or task, rather than place. Virtual communities are organized around an activity, and they are formed as a need arises (Squire & Johnson, 2000). Squire and Johnson also noted that virtual communities do not need formal boundaries, for they can be fluid. Because the members are not juxtaposed in physical relation to each other, norms do not provide the main focus of behaviors as in traditional communities, allowing for greater individual control. In these online social networks and virtual communities, the Internet, or the World Wide Web, becomes the “space” for the community. It is this online social network and virtual communication that has increased the parameters of what is known as a community (Palloff & Pratt, 1999).

Palloff and Pratt (1999) described several steps involved in constructing a virtual community. First, one needs to define clearly the community’s purpose and create a gathering place for the group. Subsequently, the participants in the group should promote leadership from within the group, as well as define norms or a code of conduct. This allows community members to resolve conflicts by themselves. In addition, to defining the purpose, creating a code of conduct, and creating a gathering space, a range of member roles should be established, plus there should be a deliberate facilitation of subgroups that may form.

Knowledge Sharing and Communication

The aspect of knowledge sharing and communication in this study is approached through the idea that communication and knowledge are influenced through self-efficacy and subjectivity. That is to say that knowledge and subsequent communication of that

knowledge occur as a series of social interactions. Because social interactions influence knowledge creation and communication, these are processes that are determined in part by subjective interpretations of the participants in the social network. Wasko and Faraj (2005) have found that people share knowledge to a high degree when participating in networks characterized by dense relationships, specifically when knowledge sharing enhances one's professional reputation.

When considering subjectivity as it relates to knowledge creation and communication, it is crucial to define subjectivity for this study. "Subjectivity comprises the conscious and non-conscious conceptions, dispositions and procedures that constitute individuals' cognitive experience" (Billett, 2006, p. 6). It is this subjective interpretation that leads participants in online social networks and communities of practice to construct their own social reality. A major complication that arises out of the construction of these social realities is that subjectivity comprises conscious and non-conscious assumptions, beliefs, and convictions. In the case of participation in online social networks, these subjective beliefs about knowledge and social interaction are influenced by these hidden and unexplored non-conscious beliefs and assumptions. Self-efficacy and the individual within these social contexts also influence knowledge creation and sharing.

Several researchers have utilized knowledge sharing and self-efficacy to examine the effect they have on knowledge sharing intention. Kang, Kim, Gloor, and Bock (2011) have proposed that self-efficacy could be treated as a major factor of self-motivation in the intention to share knowledge. Self-efficacy, as defined by Bandura (1982), is a self-evaluation that provides guidance for decision-making about what a person should do, how much effort they should put forth when faced with adversity, and, ultimately, the

mastery of the intended behavior. The concept of self-efficacy has most recently been applied to the field of knowledge management “to validate the effect of personal self-efficacy belief in knowledge sharing” (Hsu et al., 2006, p. 155). According to Bandura (1993), self-efficacy reflects the confidence learners report in approaching and handling new tasks. Hsu et al. remind us that “social cognitive theory contends that the desire to share knowledge is not enough to carry it out” (p. 155); the participant as knowledge creator must also possess the ability to act as a creator of knowledge. In this case, self-efficacy of the social actor must be such that they can share and create knowledge for others in the social network.

Professional Learning Communities

Professional learning is an important process in enabling participants to update their knowledge and practices (Dufour & Dufour, 2003). The use of online social network technologies to support professional learning has a number of benefits in terms of flexibility and scalability. Little (2005) stated that professional “networks are effective because they provide a trustworthy way of transmitting knowledge, particularly where this knowledge is unable to be codified. Moreover, new knowledge is typically a result of collaborations between individuals” (p. 23). Liddicoat (2006) and Meiers and Ingvarson (2005) support the developmental aspect of structured professional learning. Meier and Ingvarson (2005) link the description of a body of knowledge (a standard) to actual classroom engagement (professional renewal and ongoing development).

The following definition of a professional learning community was developed from the work of Hord (1997), McLaughlin and Talbert (2001), Louis, Marks, and Kruse (1996) and Leithwood and Louis (1998): A professional learning community is

comprised of professionals sharing common goals and purposes, constantly gaining new knowledge through interaction with one another, and aiming to improve practices.

Professional learning is therefore cyclical in nature, where learning is normally embedded into the routine practices and interactions within a community. Members of the community participate interactively by working collaboratively. This cycle of learning is strongly influenced by structural, social, and cultural factors, including beliefs and values.

Through computer-mediated spaces or virtual communities, participants can enhance professional learning. Professional communities may be distinct from general communities in many aspects. Scribner, Cockrell, Cockrell, and Valentine (1999) noted that members of a professional learning community generally share norms and values, participate in critical reflection, and engage each other in professional dialogue.

While there is no universal definition of a professional learning community, in this study the professional learning community is defined within the context of the virtual community of practice. As McLaughlin and Talbert (2001) pointed out, not all strong professional communities have an orientation to practice conducive to change or even concerned with improvement. The literature suggests that professional learning communities may have “shades of interpretation” based upon their context (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006, p. 222). Based on the learning communities’ organizational context, the definition of professional learning community may vary. It is useful to examine definitions of what a learning community is meant to be. According to Chang (2003), a learning community is “a group that shares ideas and information with all members of the community” (p. 28). It is also a place where spontaneous learning and

active knowledge construction takes place by the individual learners within the community. Chang continued defining this community as “a virtual social organization of learners who share knowledge and experiences, exchange information as well as collaboratively solve problems in the pursuit of a common learning objective or interest” (p. 28). Others, such as Sergiovanni (1994) defined community as “a collection of individuals who are bonded together by natural will and who are binded to a set of shared ideas and ideals” (p. xvi). Members of the community, as defined by Sergiovanni (1994) seek membership into their particular group for a common mission or goal.

Vescio, Ross, and Adams conclude that professional learning communities should “honor both the knowledge and experience of teachers and knowledge and theory generated by other researchers” (p. 89). They suggest that through collaborative inquiry, teachers can explore new ideas, current practice, and evidence of learning using processes that respect them as the experts on what is needed to improve their own practice and increase student learning. Vescio, Ross, and Adams, also concluded that learning communities cannot be insular, “focused only on making explicit the practical wisdom teachers already possess about teaching” (p. 89). Instead, these professional learning communities should support teachers in making decisions based on their contexts, their goals, current and new professional knowledge, and the needs of their students.

Communities of Practice

The term community of practice was only recently coined, but the idea behind communities of practice is as old as humanity itself. Communities of practice are defined as groups of individuals that share information and resources around a common interest, thereby generating new knowledge through member interaction (Wenger, McDermott, &

Snyder 2002). The existence of a community of practice, sometimes referred to as a *learning community*, emerges from a common desire among its members to improve existing practices by providing opportunities for collaborative reflection and inquiry through dialogue and discourse. Within communities of practice, knowledge unfolds through a process of mutual engagement and collaboration, allowing for both informal and formal education to occur. As the community undergoes development, members gain knowledge through social interaction. According to Moore (2008), the significance of communities of practice for connecting research and practice is that learning is distributed across a range of participants, and traditional theories of learning and knowledge creation and sharing are challenged. A community of practice model represents a collaborative process in which resources and knowledge can be more freely exchanged across organizations.

Most would argue that communities of practice developed for situated learning predate the development of formal contexts for learning (Lave & Wenger, 1991; Nickols, 2003). Nickols (2003) defined two types of communities of practice: self-organizing and sponsored. Self-organizing communities of practice are initiated by a group of members interested in learning from each other about a certain topic. Sponsored communities of practice differ in that they are often mandated and supported by an existing organization. The topic of interest in a sponsored community of practice is often predetermined by the sponsoring organization.

The concept of communities of practice includes two terms, practice and communities. The concept of practice refers to action, not just action in and of itself. It is action in an historical and social context that gives structure and meaning to what we

do. In this sense, practice is always social practice. Wenger (1998) explained that a community of practice includes the explicit (what is said and what is left unsaid) and the tacit (what is represented and what is assumed) social elements of practice (p. 47).

Therefore, the concept of practice includes the social and negotiated elements of both the explicit and tacit issues in communities of practice. The concept of community refers to the notion that members are organized around a coherent source or idea that forms the basis of a community.

Lave and Wenger (1991) formulated two general principles which apply to all types of situated learning: “community of practice” and “legitimate peripheral participation.” Lave and Wenger (1991) proposed that social interactions form the basis of a community engaged in creating meaning. They wrote:

Briefly, a theory of social practice claims that learning, thinking, and knowing are relations among people in activity, in, with, and arising from the socially and culturally structured world. This world is socially constituted: objective forms and systems of activity, on the one hand, and agents’ subjective and intersubjective understandings of them, on the other, mutually constitute both the world and its experience forms. (pp. 50-51).

Wenger (1998) proposed that social participation is a requirement for learning. According to Wenger, social participation is comprised of four critical components: meaning, or learning as experience; practice, or learning as doing; community or learning as belonging; identity, or learning as becoming. Thus, in a virtual community of practice, learning involves more than knowledge acquisition, because the participant is engaged in a co-constructive, interactive process that intends to develop the expertise of others as

they integrate into the community. Developing a virtual community of practice involves a process that unfolds over time and requires patience and nurturing (Lewis, Koston, Quartley, & Adsit, 2010).

A community of practice is characterized by its informality—the shared interest in a practice, such as engineering, or a topic establishes strong ties among group participants (Gammelgaard, 2010). This is helpful for knowledge transfer, as the group of people within a virtual community of practice typically develops unique domains of knowledge based on a high degree of mutual understanding. In Wenger’s (1998) words “we all have our own theories and ways of understanding the world, and our communities of practice are places where we develop, negotiate, and share them” (p. 48).

St. Clair (1998) described community as a form of relationships between people rather than a collection of things. Since many communities are created around common interests and bonds, the viewpoint of relationship as the interaction among community thorough discourse is critical to our understanding of community. The core principles of communities of practice are simple: learning is socially occurring in communities, and learning happens as close to practice as possible.

Given the nature of communities of practice, it is essential for the community to declare its outcomes and norms in order for it to succeed. The common purpose and outcomes for the community are made collaboratively so all participants, newcomers to veteran members, have the opportunity to participate in the process of constructing, negotiating, implementing, and revising expectations. In addition, distributed expertise empowers everyone in the community to understand the purpose and value of their particular expertise as well as the expertise of others. Overall, the design and

development of efficient communities of practice requires the combined wisdom and inclusion of all participants. Communities of practice, formal work groups, teams, and informal networks are useful in distinct and complementary ways. The following table (Table 2.1) distinguishes characteristics of communities of practice from formal work groups, teams, and informal networks.

Table 2.1

Distinguishing Characteristics of Organizational Units

	What's the purpose?	Who belongs?	What holds it together?	How long does it last?
Community of practice	To develop members' capabilities to build and exchange knowledge	Members who select themselves	Passion, commitment, and identification with the group's expertise	As long as there is interest in maintaining the group
Formal work group	To deliver a product or service	Everyone who reports to the group's manager	Job requirements and common goals	Until the next reorganization
Informal network	To accomplish a specified task	Employees assigned by senior management	The project's milestones and goals	Until the project has been completed

(Wenger & Snyder, 2000, p.142)

Wenger, McDermott, and Snyder (2002) described three structural elements to guide development of a community of practice: The community must negotiate the shared topics and issues of concern, community roles and organizational components,

and practice (learning activities and knowledge to share). They described seven principles for cultivating a community of practice (CoP):

- Design for evolution;
- Open a dialogue between inside and outside perspectives;
- Invite different levels of participation;
- Develop both public and private community spaces;
- Focus on value and combine familiarity and excitement; and
- Create a rhythm for the community. (Wenger, McDermott, & Snyder, 2002, p.51)

Wick (2000) defined collaborative teams and communities of practice as entities that help solve authentic problems. Wick defined communities of practice in a more concrete way than Wenger (1998), that is, as groups of professionals with similar task responsibilities. Collaborative teams should quickly form and dissolve to promote cross-pollination of ideas among different groups. This practice enables interdisciplinary knowledge and practice. In this framework, communities of practice exist to promote learning via communication among their members.

Wenger (1998) discussed the importance of locality in communities of practice. However, his research showed that it does not depend on geographic proximity. Instead the community engages in the learning and it is this aspect that takes precedence. Online social networks and the virtual community allow for remote collaboration. The concept of a virtual community creates a vast area of research in which the application of remote collaboration and online social networks can be explored with respect to how it both supports and hinders the emergence of communities of practice.

Wick (2000) observes that knowledge itself has limited value because it becomes obsolete very quickly; therefore, an organization needs to value its employees as an intangible asset. Knowledge needs to be recognized as an asset, and knowledge management needs to be recognized as a skill. However, it is not knowledge itself that is so valuable, rather it is the ability of an organization's members to generate knowledge and innovate using that knowledge.

Individual knowledge and collective knowledge should support each other (i.e., common knowledge vs. diversity). Rather than performance goals, learning communities produce artifacts and histories that aid in the transfer of knowledge and the increase of understanding (Wenger, 1998). Knowledge is expanded through discussion (Bielaczyc & Collins, 1999); hence, a main function of a community of practice is to help establish discussion.

Within the context of the virtual community of practice, personal outcome expectations focus on participants' individual expectations, such as gaining more recognition or respect. On the other hand, in community-related outcome expectations, the individual participant contributes to the community goals and enriches the knowledge store of the social networking site.

Q-Method in Communities of Practice Research

Previous research on communities of practice has utilized Q-method to explore participant subjectivity. In their study, Valaitis, Akhtar-Danesh, Brooks, Binks, and Semogas (2011) explored community health nurses' viewpoints about a Canadian online community of practice to support their practice with homeless or under-housed populations. In this Q-method study, sixty-six statements about the community of

practice were collected from an online survey and focus groups, refined and reduced to 44 statements. Sixteen participants completed the Q-sort activity, rating each statement relative to the others. Scores for each participant were subjected to by-person factor analysis. Valaitis et al. (2011) concluded, that virtual communities of practice can be valuable to nurses in specialized fields with limited peer support and access to information resources.

In another study based on identifying the value types of virtual communities, Liu (2011) found that Q-method was particularly suited for exploring the value types of virtual communities based on the perspectives of the participants. In this study, data were accumulated and analyzed based on in-depth interviews and Q-method technique. Twenty-nine participants were selected in this study where the values of virtual communities were categorized into three types: knowledge platform, aficionado networking, and problem solution. Results of this study identified the value types of virtual community participants and significantly contributed to the efforts of virtual community managers to enhance online social interaction (Liu, 2011).

Q-method is appropriate for situations where the number of people involved is small. In a Q-study, the statements are the sample drawn from the population of things that people are saying about the issue being studied, while the variables are the Q-sorts. In other words, surveys are good for examining the relationships among different ideas, while Q-method examines relationships between people (e.g., do Juan, Lupe, and Tomas have similar or different views about the community?).

Chapter Summary

This chapter summarized studies and relevant literature that provided the background necessary for understanding the construction of the discourse used in the Q-method study. In the previous pages, I synthesized the current theoretical, conceptual and empirical literature about online social networks, communities of practice, and knowledge-sharing. A shift in the technological spaces provided to social networks and communities of practice have a profound impact on the future of many organizations.

CHAPTER III

METHOD

Introduction

This study explores the perceptions and experiences of members within a virtual community of practice and how information communication technologies can be utilized to extend and sustain the Community Learning Exchange's regular face-to-face meetings. The Community Learning Exchange is engaged in community development using a virtual community. In addition, the Community Learning Exchange hosted a three-day meeting in San Marcos and Austin, Texas in January of 2012. In 2002, the W. K. Kellogg Foundation launched an innovative leadership development program in response to communities that have become increasingly diverse. The Community Learning Exchange is working within the changing demographics, to meet the need for leaders who could work collectively across boundaries – of race, culture, age, class, faith, and so on – became more pressing. The Kellogg Leadership for Community Change in partnership with the Center for Ethical Leadership seeks to actively engage residents in working together to address community issues and improve the quality of life in their community. Leadership, as defined by the Kellogg Leadership for Community Change and the Community Learning Exchanges it hosts, is not the purview of an individual leader or of those who hold formal leadership positions, but is rather the collaboration of what leaders and followers do together for the common good.

Q-Method was used as the primary means of studying the Community Learning Exchange's members' subjective opinions about participation in a virtual community of practice.

The Research Design

Q-Methodology or Q-Method is a well-established, scientifically based approach to study opinions, attitudes, discourses and beliefs (Brown, 1980). Operationally, *Q technique* presents participants with a series of statements, opinions, or other stimuli, which they rank on a positive-to-negative scale. Sophisticated factor analysis of the correlated rankings from all participants then reveals and quantifies underlying viewpoints held by the subjects. Q-Methodology thus looks for similarities of subjective assessments in a population — attitudes, opinions, and preferences. The Q technique test procedure involves presenting participants with a set of items that represent the full range across the topic of interest (in this study, perceptions of participants in the online virtual community) and asking the participants to rank the statements according to provided instructions. The ranking proceeds in two stages: a rough grouping, according to the positive, negative, and neutral points on a scale; followed by a finer-grained distribution of the items on the scale. Instructions for the participants in the study usually do two things: they provide participants with a situation or context (as you are now, or as you want to be ideally, for example) and a description of the ranking scale (most to least like you are now, or most to least like how you would be ideally).

Collected subject responses (the Q-Sorts) are then analyzed via some complex arithmetic algorithms that detect factors that help the investigator detect and interpret

what patterns the sorts hold. The Q-Study includes additional post-sort interview questions that help with the interpretation and analysis.

Q-Method provides a unique way to model individual viewpoints (McKeown & Thomas, 1988). Q-Method allows a participant to systematically express his or her viewpoint by ranking statements according to a condition of instruction. A correlation matrix is generated based on the results of these Q-sorts. The structure of the matrix is then analyzed through factor analysis. Measures of subjectivity have proven both important and difficult to measure (Stephenson, 1953). Understanding subjectivity is important because of the importance of human factors in most scientific examinations. Specifically, regardless of control mechanisms (e.g., pre-intervention development and training), a person's beliefs cannot be isolated from their behavior(s). Subjectivity is also difficult to ascertain and quantify. Traditionally, efforts to do so have relied on either highly qualitative, and often not generalizable, methods or R-methods (e.g., correlations from surveys employing Likert scaling) that are used to objectify, reduce, and explain data derived from a population.

In contrast, Q-Method solicits participants' subjective views, allows them to be expressed idiosyncratically, and fosters closer proximity between researcher and participants, further drawing out the subjective opinions of participants (Brown, Durning, & Selden, 1999). As a result, this method has been used to obtain and quantify perspectives of participants in a number of fields, including medicine (e.g., Barbosa, Willoughby, Rosenberg & Mrtek, 1998), education (e.g., Militello & Janson, 2007), law (e.g., Marshall, 1991), business (e.g., Lee & Synn, 2001), and journalism (e.g., Singer, 1999), to name a few. Additionally, a number of Q studies have investigated viewpoints

of specific timely issues including the Kent State shooting (Brown & Unga, 1970), the O.J. Simpson trial (Thomas, McBride & Baas, 1996), Internet adoption (Lee & Anderson, 2001), and the Clinton impeachment (Rhoads & Brown, 2002). McKeown and Thomas (1988) stated that “given the ubiquity yet elusiveness of subjectivity, [Q-Method] has promise and relevance to disciplines as diverse as psychology, social psychology, sociology, and political science” (p. 7).

A History of Q-Methodology

The original Q-Sort was developed by William Stephenson as a means to examine subjectivity (Brown, 1980). Q-Methodology was developed from factor analytic theory in order to provide a systemic means for scientifically examining human subjectivity (Brown, 1993, 1996). McKeown and Thomas (1988) defined subjectivity in regard to its use in Q-Method as “nothing more than a *person's communication of his or her point of view*. Subjectivity is always anchored in *self-reference* . . . but this does not render it inaccessible to rigorous examination” (p. 12, emphasis in original). Q-Sort methodology creates an exercise in forced choice; respondents must prioritize their beliefs (by sorting statements), despite a desire to rate most practices as highly valued (or devalued) in their belief system. A set of statement cards is used as the starting point for prioritization. The study participants sort each statement into a category based on the degree to which these statements are representative or unrepresentative of their views. The resulting Q-Sort is a reflection of each participant’s subjective beliefs with regard to the topic under investigation, such as participation in a virtual community of practice.

A central aspect of this methodology is to “ensure that self-reference is preserved rather than compromised, or confused with, an external frame of reference brought by an investigator in seeking to measure subjective phenomena” (p. 7).

Q-Method, as outlined by Van Exel (2005), provides a foundation for the systemic study of subjectivity. In this Q-Method study, the participants were presented with a sample of statements about the Community Learning Exchange as it exists in the virtual community of practice. This set of statements is called the Q-set. Respondents, also known as the P-set, were asked to rank-order the statements from their individual points of view, according to preference, judgment, or feeling in a quasi-normal distribution.

Overview of the Q-Method Study

The Q-Method includes seven phases: building a concourse, selecting a Q-Sample, running a pilot study, selecting a P-sample, gathering the Q-Sorts, completing data analysis, and providing interpretation of the data. This chapter includes an overview of each section. Descriptions for the current study of building the concourse, selecting the Q-Sample, and running the pilot appear under the instrumentation and materials section. P-sample information for the current study appears under the setting and sample selection heading. Q-Sort information for the current study appears under the data collection and procedures heading. Finally, presentation of the data, their analysis, and interpretation appear under the data analysis heading.

Building a Concourse

A concourse is a set of subjective universal statements, or assertions, about a topic (Stephenson, 1953) that can be neither proved nor disproved scientifically (Brown,

1998). A concourse consists of subjective opinions. According to Brown (1998), “concourse is the common coinage of societies large and small, and is designed to cover everything from community gossip and public opinion to the esoteric discussions of scientists and philosophers” (p. 6). A concourse could be opinionated statements, artwork, music, or any other construct from the human mind. The concourse could also comprise “art objects, descriptions of behavior, personality traits” (Stephenson, 1953, p. 63), “and even musical selections” (Valenta & Wigger, 1997, p. 502). The current study included the use of statements. Statements can be derived from theory (Stephenson, 1953), “television and radio talk shows” (McKeown & Thomas, 1988), interviews, “editorials, publications, essays, or any other sources germane to the issue” (Valenta & Wigger, p. 502). Brown (2004) indicated that “the primary point is that the collection of items in the concourse should reflect the range of perceptions on a particular topic of interest” (p. 4). The concourse in the current study derived from a review of the literature.

Selecting a Q-Sample

According to Valenta and Wigger (1997), “from the concourse, a subset of statements is selected to form the Q-sample” (p. 502). The Q-Sample should include anywhere from 20 to 100 statements and cover the comprehensiveness of the concourse (M. Brown, 2004; S. R. Brown, 1996; McKeown & Thomas, 1988; Valenta & Wigger; Watts & Stenner, 2005). Because the “focus is on capturing a wide array of perceptions, the rigor that is often associated with identifying the target sample is redirected toward identifying the [Q-sample]” (M. Brown, 2004, p. 4). Various methods exist for the selection of a Q-Sample. The methods for selecting a Q-Sample can be structured,

unstructured, naturalistic, or ready-made (Stephenson, 1953; McKeown & Thomas, 1988). Structured samples are planned and prepared in a systematic fashion and function to promote the use of theory testing (McKeown & Thomas, 1988; Stephenson, 1953). Unstructured samples are chosen at random without ensuring coverage of all issues of the topic. McKeown and Thomas contended that “The risk with unstructured samples is that some issue components will be under or oversampled” (p. 28). Naturalistic samples derive directly from the source, such as statements made during interviews. Ready-made samples are not naturalistic and can be either quasi-naturalistic, standardized, or hybrid. Quasi-naturalistic Q-Samples derive from prior research, surveys, or other sources beside direct contact with individuals. Standardized Q-Samples include the incorporation of conventional rating scales from previous surveys, checklists, or research. Hybrid Q-Samples include a combination of both naturalistic and ready-made methods (McKeown & Thomas, 1988). The current study included the use of structured, readymade, and quasi-naturalistic methods to create the Q-Sample.

To ensure the Q-Sample was “comprehensive, balanced, and representative” of the topic (M. Brown, 2004, p. 4), domain experts reviewed the statements in the Q-Sample (Valenta & Wigger, 1997; M. Brown, 2004). Each individual statement appeared on a separate card for Q-Sorting (Stephenson, 1953; Valenta & Wigger, 1997; McKeown & Thomas, 1988).

The individual rankings were then subjected to a factor analysis. In Q-Method, the correlation is between persons instead of tests. This method was especially practical in this study, where I anticipated a small number of respondents and a large set of statements. By correlating the respondents, the Q-Factor analysis yielded information

about similarities or differences in viewpoint on participation in the virtual community of practice. The correlation between respondents indicated similarity of points of view (Brown, 1993).

Q-Method was used to understand participants' subjective perceptions of the virtual community of practice that supported the Community Learning Exchange initiative. These subjective perceptions help us understand the meaning and significance of participants engaged in a virtual community of practice. Q-Method provides me, and participants, in the Community Learning Exchange virtual community of practice with a practical (time efficient) and applicable (quantitative) tool in order to develop a deeper, richer account of a virtual community of practice.

Selecting a P-Sample

The P-sample (or person-sample or P-set) comprised the selected group of participants categorizing the Q-Sample statements. In Q-Method, the variables are the people performing the Q-Sort, rather than the items they are sorting (McKeown & Thomas, 1988; Watts & Stenner, 2005). The purpose of Q-Method is to find patterns of thought among people (Valenta & Wigger, 1997; M. Brown, 2004). People “significantly associated with a given factor, therefore, are assumed to share a common perspective” (McKeown & Thomas, 1988, p. 17). McKeown and Thomas explained the rationale:

It is not the purpose of Q-method to explore idiosyncrasy at the expense of general principles. Subjectivity and idiosyncrasy are not functional equivalents. Just as subjectivity is amenable to empirical analysis, so too can small P-sets and single case studies sustain meaningful generalizations about behavioral dynamics.

The purpose is to study intensively the self-referent perspectives of particular individuals in order to understand the lawful nature of human behavior. Specific sampling principles and techniques important in mainstream behavioral research are not necessarily relevant to person sampling in Q given the contrasting research orientations and purposes. (p. 36)

Because the variables are people performing the Q-Sort, the number of respondents remains at a minimum (McKeown & Thomas, 1998). Watts and Stenner (2005) noted that “large numbers of participants in a Q methodological context can itself be problematic. Indeed, such an approach can easily negate many of the subtle nuances, complexities, and hence many of the essential qualities contained in the data” (p. 79). The goal in Q-Method is to find patterns of thought, not how many people think a particular way (Valenta & Wigger, 1997). A small P-sample is “psychometrically acceptable since the observational perspective is the respondent’s own” (McKeown & Thomas, p. 45). Stephenson (1953) contended that the P-sample could be as small as one participant. Other researchers provided varying P-sample size suggestions, from a 1:1 correspondence of people to statements (Watts & Stenner, 2005) to a 1:2 correspondence of people to statements (S. R. Brown, 1998), noting, however, that the numbers are arbitrary (Watts & Stenner, 2005). McKeown and Thomas (1988) indicated that the P-sample size simply “depends upon the nature and purpose of the study” (p. 37). The P-sample size is typically small (Valenta & Wigger, 1997; Watts & Stenner, 2005). The current study included thirty-one participants from the Community Learning Exchange.

The participants for this study were selected based on whether they had a dedicated online profile within the virtual community of practice, and if they had

participated in at least one face-to-face meeting. Participants or the P-Sample in this study (N=31) were of diverse ages as described in Table 3.1. Preliminary conversations with some participants revealed that they believed in the value of creative collaboration, and the power of visual and verbal storytelling. One participant indicated that she had worked with various non-profit organizations to help them tell their stories and connect with their communities. Another participant shared, “I’m passionate about creating the space for people to explore their passions and do the work and live in a way that fosters love and compassion over mistrust and competition.” Other participants shared that they had been drawn to the Center for Ethical Leadership and subsequently the Community Learning exchange because of the organizational commitment to supporting people who want to “do the right thing,” and think about a greater good beyond themselves.

The selection of P-samples can be theoretical and random, with extensive or intensive considerations in mind (McKeown & Thomas, 1988). The theoretical considerations perspective includes the selection of individuals who know the subject well and fit “the goals of the study” (p. 36). Random selection is convenience sampling, including the selection of individuals who are available and willing to participate. Extensive considerations entail striving to locate a variety of person types to explore the possible patterns in the population; intensive considerations entail searching for a few select persons to study with a variety of conditions or for increased understanding of a certain person type (McKeown & Thomas, 1988). In the current study, considerations based on the conceptual framework that guides this study were used to select diverse participants from the virtual community of practice. Demographic data and geographic location served to reveal diversity within the sample. Random sampling and extensive

selection criteria were used to construct the P-sample. The study was emailed to 133 participants that met the above criteria, from the 133 invitations; thirty-one participants completed the online sorting procedure. Because the statistical power of Q-Method does not depend on a large number of participants, authors of Q-Method studies often reference thirty as a representative number. Brown (1980) suggested that:

How is it possible, the question is asked, to generalize to the population when employing a sample of 30 or so? In Q-technique studies however, the subjects have the status of variables rather than of sample elements; the term ‘sample’ refers to the set of items. As will be shown, all that is required are enough subjects to establish the existence of a factor for purposes of comparing one factor with another. (pp. 191-192)

A sample in Q-Method, unlike R-methodology, does not have to be statistically large enough to produce descriptive or enlightening data. Q-Method has been used with as few as one participant. Individuals or small groups of participants may do an additional Q-Sort with another guiding question or proposition that may allow for further insight into different perspectives (Brown, 1996; Brown, 2006).

Table 3.1

Participant (P-Sample) Age

	N	Minimum	Maximum	Mean
Age	31	20	64	42.94
Valid N (listwise)	31			

The Concourse Theory to Develop the Q-Sample

The concourse in Q-Method is a population of statements gathered about a topic of study. The concourse should be representative of the full spectrum of opinions on a given subject (McKeown & Thomas, 1988). As opposed to factual statements, these subjective statements used in the concourse can be pulled from varied sources (Brown, 2006). For purposes of this study, a naturalistic approach to developing the concourse was undertaken. As a professional educator, with over 18 years experience, and over six years working with adult learners in the implementation of information communication technologies to enhance teaching and learning, I have extensive knowledge of subjective opinions regarding virtual communities. The pedagogical and androgogical awareness of these technologies guided the development of a semi-structured interview. In addition, a questionnaire (Appendix A) was circulated using Facebook to further gather a diversity of perspectives. By utilizing these approaches, a representation of viewpoints regarding online social networks and virtual communities was gathered.

From this concourse of subjective opinions, a group of statements, called a Q-Sample, was developed. The Q-Sample is comprised of representative statements culled from the concourse. The Q-Sample was developed using unstructured sampling. In Q-Method, persons, not statements, undergo a factor analysis; thus it was important to have a sufficient number of statements to assist in factoring the participant perspectives. The number of participants need not be statistically significant, since the analysis is concerned with highlighting the factors that emerge (Brown, 1980; Newman & Ramlo, 2010).

To develop the concourse, I interviewed four members of the Community Learning Exchange at a meeting in January 2012. The interviews were conducted in the

hotel lobby where members of the Community Learning Exchange were lodged for two days. From the four interviews and the online questionnaire, 60 statements emerged. The statements were selected based on their mention of virtual community or interacting face-to-face versus online.

After selecting the 60 statements, I arranged them into thematic groups. Within each group, I consolidated redundant statements. I sent the statements via email to Dr. Matt Militello at North Carolina State University, who served as an advisor in the development of the Q-Sample. Dr. Militello has conducted multiple published Q-Studies and has served as an evaluator on various programs where he has utilized the Q-Methodological approach. Dr. Militello provided feedback and advised me to cull the statements to 36 for a smoother distribution during the online sorts.

Table 3.2, below, lists the Q-Sample statements derived from participant interviews and extant literature on virtual and online communities.

Table 3.2

Q-Sample Statements

No.	Statement	Source
1	The CLE online environment (website) facilitates collaboration.	Wenger, McDermott, Snyder, 2002
2	Online communication can help support the work of the CLE.	Lee, Vogel, Limayem, 2002
3	Working with team members online is time consuming.	Participant interviews, 2011
4	I am an active user of social media (Facebook, Twitter, etc.).	Media, Facebook questionnaire, 2011

Table 3.2 Continued

5	The CLE online environment (website) is easy to use.	Lee, Vogel, & Limayem, 2002
6	I benefit from my interaction with others during online collaboration.	Bandura, 1993
7	I prefer face-to-face meetings to online communication.	Media and Facebook questionnaire, 2011
8	I prefer online communication to face-to-face meetings.	Participant interviews, 2011
9	The CLE online environment (website) provides information I can use.	Media and Facebook questionnaire, 2011
10	I seek out social interactions on the CLE online environment.	Bandura, 1993
11	The CLE online environment (website) gives me the opportunity to interact with others who share common beliefs.	Wenger, McDermott, & Snyder, 2002
12	I can use the online CLE environment (website) to help solve issues in my community.	Wenger, McDermott, & Snyder, 2002
13	I contribute to online environments (websites).	Lee, Vogel, & Limayem, 2002
14	I share my knowledge and expertise on the CLE online environment (website).	Wenger, McDermott, & Snyder, 2002
15	I seek out the knowledge and expertise of other members in the CLE online environment (website).	Wenger, McDermott, & Snyder, 2002
16	The CLE online environment (website) is a relevant space that increases interaction among its members.	Shirky, 2008 Facebook questionnaire, 2011

Table 3.2 Continued

17	The CLE online environment (website) is learner-centered (focused on users' needs, abilities, and interests).	McCombs , B., Vakili, 2005
18	The CLE online environment (website) is knowledge-centered (expert-centered; expert as resource).	McCombs , B., Vakili, 2005
19	The CLE online environment (website) is community-centered (collaborative work focuses on projects/issues that are of value or concern to the community).	Wheatley, 2007
20	The CLE online environment (website) engages its members in rich discussion.	Caspi & Blau, 2008
21	Working with team members face to face is time consuming.	Participant interviews, 2011
22	I avoid social interactions while on the CLE online environment (website).	Bandura, 1993
23	I share my knowledge and expertise in face-to-face meetings.	Bandura, 1993
24	I do not benefit from online interactions on the CLE online environment (website).	Bandura, 1993
25	The CLE online environment (website) promotes a sense of "being there with others."	Wheatley, 2007 Shirky, 2008
26	The CLE online environment provides me an opportunity to express my perspective.	Bandura, 1993
27	The CLE online environment (website) provides me an opportunity to share my accumulated experiences (experience gained over a number of years).	Wenger, McDermott, & Snyder, 2002
28	Online communication can help support the work of community leaders (e.g., resources and strategies).	Wenger, McDermott, & Snyder, 2002 Wheatley, 2007 Shirky, 2008
29	The CLE online environment (website) allows for intergenerational exchanges of knowledge and ideas.	Wheatley, 2007

Table 3.2 Continued

30	My interactions in the CLE online environment (website) have led to off-line communication.	Participant interviews, 2011
31	The CLE online environment (website) has surfaced similarities of problems across multiple contexts (e.g., city to city, community to community).	Garrison, 2007 Shirky, 2008
32	The CLE online environment (website) provides me with a national network of support of like-minded individuals.	Shirky, 2008
33	I use the CLE online environment (website) to post stories, videos, and begin threaded discussions.	Bielaczyc & Collins, 1999
34	The CLE online environment (website) responds to the diverse needs of its users.	Wheatley, 2007
35	The CLE online environment (website) is equally suitable as face-to-face settings for supporting collaboration.	Shirky, 2008
36	I require specialized training to better utilize the CLE online learning environment (website).	Participant interviews, 2011 Bielaczyc & Collins, 1999

After the Q-Sample of 36 statements was culled from the concourse of 60 statements, I entered them into the Q-Assessor statement bins for use in the online sorts. These statements were piloted to six volunteers to check for understanding of language and to ensure that the Q-Assessor online method and instructions functioned as intended. Upon creation of the Q-Sample, the use of a pilot test served to ensure validity of the items (Brown, 2004; Valenta & Wigger 1997); reduce “semantic duplication” (Watts & Stenner, 2005, p. 87); and provide clarity, balance, and comprehensiveness of the issue (Watts & Stenner, 2005). Pilot tests usually do not include the use of actual sorts, but rather a reading of the statements for “general comments on the construction of the Q-

set” (Watts & Stenner, p. 87). The pilot test in the current study included the use of specific directions of checking the statements for semantics, clarity, balance, and comprehensiveness. Feedback from the pilot study indicated that some statements contained typographical errors, but that otherwise the online format did not present users with any difficulty.

Sample and Procedure

Traditionally, Q-Technique has required in-person one-on-one interviews between researcher and participant. For some Q-Applications, this works well if the aim of the study is served by “talk out loud” interactions during the study. For this Q-Study, such interviews were logistically difficult and financially prohibitive to do, due to the geographical diversity of the participants.

The setting and participants for this research was a purposive sample (Patton, 2002), in which I aimed to select groups that displayed varying perspectives on the phenomena under investigation. Participants were selected based on their membership in the virtual community of practice, as well as their participation in a face-to-face gathering.

In these face-to-face gatherings, called Community Learning Exchanges, a focus topic to engage members in active participation is selected and grantees, called the host organization, are selected to host the convening. The host organization identifies diverse teams to undergo a series of experiences designed to build their collective leadership skills as well as to prepare a group of leaders who know how to collaborate effectively to bring about change in their communities. The Community Learning Exchange then utilizes a virtual community of practice (the setting for this study) that leverages social

networking technology to sustain and extend the learning and knowledge created at the face-to-face convening.

Utilizing the Q-Assessor software provided a powerful system to communicate with the participants by providing a means to invite, remind, and thank them for their participation in the study. When the study was configured in Q-Assessor, the wording for the invitation, reminder, and thank you emails were entered into the online management system (Appendix C). Q-Assessor automatically inserted the written text into the invitation and sent reminder emails with special customized links particular to each individual subject. The respondent clicked the link in the invitation and/or reminder to get back to the Q-Assessor web site to complete the study. I designated where in the emails I wanted these links inserted simply by including the word “LINK” (all caps, no quotes) in the email text. Links to the study were included at the end of the emails. Q-Assessor generated two kinds of links: 1) the link that respondents clicked in order to participate, and 2) the link that respondents could click to refuse participation. (When participants refused to participate, their enrollment was updated accordingly and they are given a simple “thank you anyway” message.) All emails the Q-Assessor software sent out for the study were archived for review. The “Email Archive” section at the bottom of the study’s main enrollment page archives how many emails were sent. The “Email Archive” link lists the emails and information about how many recipients received each one and when they were sent. Clicking on a specific archived email shows the text sent in an email as well as the specific recipients.

The Q-Set was edited and each statement was assigned a random number using a web-based software package, Q-Assessor, which provides many features and capabilities.

Q-Assessor allows for the creation of a study. A *Study*, in Q-Assessor is the fundamental organizing unit within the Q-Assessor system. It encompasses and manages all the components of a Q-Methodology project — the statement samples, the “bins” into which they are sorted, data management, and all the participant-related features (enrollment, email reminders, etc).

In this Q-Method study, I first decided upon the number of statements to use in the study (36). This number is dependent on various factors including the subject matter of the study, the number and types of views the study was investigating, and the literature available. More statements yield more granularity to the analysis, but this must be balanced against a reduced subject compliance if the task is perceived as too long and is too burdensome. Relying on the expertise of researchers that have conducted multiple studies, the number of statements was chosen to be thirty-six (36).

The Q-Assessor web-based software makes no prescriptions as to the number of statements in a study, though it defaulted to 10. What Q-Assessor allowed for was the assurance that the study actually did have the correct number of statements it is configured to have, and that this number matches with the number of “bins” into which the subjects will sort the statements.

Any statement in Q-Assessor is initially created in the context of a study. The statements in the concourse were developed by clicking the “create a new statement” link in the left column of the study’s main concourse page, above the user’s or the group’s statement library listing. When the statement is created, it is automatically added to the study as well as to the appropriate library. At this point, Q-Assessor only supported

textual statements, but the developers of the software are considering adding images and other types of appended files, such as audio clips.

In Q-Method, participants rank the statements in the study according to how they feel about the statements along a most positive to least positive axis. Traditionally, participants would accomplish this by physically placing small index cards, each of which contained one statement, into an inverted pyramid shape built from the one or two statements most negative on the left, through increasing numbers of statements leading to a central peak of indifference, then down to the one or two statements most positively regarded. Q-Technique thus has participants sort statements into discrete levels of, say, agreement and disagreement. For example, from “+3 Agree” to “+2 Agree” to “+1 Agree” to “Uncertain” to “-1 Disagree” to “-2 Disagree” to “-3 Disagree.” Each of these levels has a numerical value equivalent to the labels above; in this example, +3, +2, +1, 0, -1, -2, -3. And each level has a number of statements to be assigned to it; for a 15-statement study using these example levels, participants would place 1, 2, 3, 4, 3, 2, and 1 statement in each level, respectively (see Figure 3.1).

Q-Assessor uses a construct called *Sort Bins* to capture the structure of a study in this fashion. Sort Bins were set up when creating the study to work behind the scenes to configure the user interface subjects see when doing a Q-Assessor session and to process their sort responses. The number of statements added to the study and how the subjects were to sort them into these levels or bins were considered when creating the statements in Q-Assessor. The Q-Assessor software keeps track and warns the researcher if the statements do not add up correctly. To successfully create the study an understanding of Q-Method was essential in arriving at the symmetry of the pyramid described above. The

were uncertain by clicking on the appropriate button. Each button then moved the statement over to its respective section on the right side of the page. The participant could reassign any statement at any time simply by clicking the “Reassign” button next to the statement, which returned it to the evaluation box so the participant could assess it again. Q-Assessor updated the number of remaining statements so that the participants could continually monitor progress through the study. Once participants had assigned all of the statements, they were able to click the “Done” button to move to the next step, or were given the opportunity to back up and reassign as many statements as they wanted to.

The second level of the sort was initiated when the participant clicked the “Done” button of the first phase. The first sort created the ranking structure for the statements on the left side, from which the participant then sequentially moved the statements from the right side back to the left. The participant was then directed to pick the top “agree” statements followed by the bottom “disagree” statements. Participants then clicked a “Move Here” button at some point in the structure (here there was only one choice because this is the first step) to move the statement. Once the agree and disagree statements were been assigned, the rest of the ranking structure opened up. Participants could then place all the remaining statements along the continuum of agree-disagree in any order they chose. Each move was made via the “click to select then click to move” interface which the developers of the Q-Assessor software have found to be more reliable and understandable than the drag-and-drop interface, given the complex topography of the sorting grid.

When all of the statements had been ranked in the sort bin structure on the left, the participant was then directed to click the “Done” button to submit the final sort

results, or they were given the option to click on “Remove” buttons to reassign statements. At any point in this process, participants could revise their choices simply by clicking the “Remove” buttons by a statement they wanted to reassign. This placed the statement back in the general categories on the right side, and opened up the slot on the left where a new statement could be selected and moved. Clicking the “Done” button sent the participant’s final sort results back to Q-Assessor, where they were saved into the database. Additional questions to inform the study were added to the Q-Assessor Study so that the participant was automatically taken to the next “interview” phase. The interview phase allowed me to ask participants questions to expand the interpretation of the results. Some of the questions asked were about why the participant made choices they did during the sort. The Q-Assessor software presented the participant with the choices on the left and the additional questions on the right. The participant then answered as many of those questions as they desired, and then clicked the “Submit Answers” button at the end of the questions. When the participant submitted the interview question form back to Q-Assessor, the results were also added into the Q-Assessor’s database, and the participant was directed to a simple “thank you” page. The Q-Assessor software also sent out an automatic thank you email (as it was previously configured) when enrolled participants are being studied. Figure 3.1 below shows a screen-capture of the Q-Assessor interface.

Gregory Rodriguez's Workspace Logout Search

Q-ASSESSOR BETA Objectively Quantifying Subjectivity

Home » Gregory Rodriguez » Studies » Dissertation Data Collection: Quantifying Online User Subjectivity

Dissertation Data Collection: Quantifying Online User Subjectivity

Congratulations! Your study is correctly configured! You can **test it**. *You have already collected data, though, so be sure you know what you're doing!*

Concourse	Enrollment	Data
<p>Concourse Statements</p> <p>"Dissertation Data Collection: Quantifying Online User Subjectivity" is configured to use 36 statements. There are currently 36 statements in the concourse. <i>The statement concourse is correctly configured!</i> Review statements.</p> <p>Q Sort Bins</p> <p>There are currently 11 bins that hold 36 statements. <i>The qsort bins correctly configured!</i> Review bins.</p>	<p>There are currently 133 subjects enrolled in Dissertation Data Collection: Quantifying Online User Subjectivity.</p> <p>Manage enrollment.</p>	<p>Users have submitted 31 active sorts. This study has a response rate of 23.31%. Review Sorts.</p> <p>Users have submitted 31 interviews. Review Interviews.</p> <p>All submitted sorts have been analyzed. Review analysis.</p>
General Configuration	Subject Emails	Ancillary Questions
<p>Description</p> <p>This is a study to determine the subjectivity of users within an online virtual community of practice.</p> <p>Categories / Poles</p> <ul style="list-style-type: none"> ▪ Agree ▪ Uncertain ▪ Disagree <p>Sort Layout</p> <ul style="list-style-type: none"> ▪ Drag and Drop Grid Interface <p>Initial Sort</p> <ul style="list-style-type: none"> ▪ Randomize Statements <p>Timing</p>	<p>Default Emails</p> <p>Default sender of all emails: Gregory Rodriguez</p> <p>Invitation</p> <div style="border: 1px solid #ccc; padding: 5px; background-color: #f0f0f0;"> <p>Subject: Online Community Dissertation Study of the Community Learning Exchange (CLE)</p> <p>Hello!</p> <p>Thank you for taking the time to participate in the study. The purpose of this research is to assess the attitudes held among participants in the online CLE website regarding factors which inhibit or increase participation online.</p> <p>You were chosen to participate in this study because you are a member of the CLE online community and you have also attended a face-to-face meeting of the Community Learning Exchange in the past. Your participation in this study is completely voluntary. If you</p> </div>	<p>There are currently 5 questions configured for this study. Manage questions.</p>

Figure 3.2 Screen Capture of Q-Assessor Web Software

Data Analysis

According to Brown (1980):

Q technique is a set of procedures whereby a sample of objects is placed in a significant order with respect to a single person. In its most typical form, the sample involves statements of opinion (Q-sample) that an individual rank-orders in terms of some condition of instruction. The items so arrayed comprise what is called a "Q sort." Q sorts obtained from several persons are normally correlated and factor-analyzed by any of the available statistical methods. Factors indicate clusters of persons who have ranked the statements in essentially the same fashion. Explanation of factors is advanced in terms of commonly shared attitudes or perspectives (p. 5).

Q-Factor Analysis is considered a type of inverse factor analysis in which the cases (subjects) rather than statement variables (features) are clustered. A review of relevant literature and participant interviews and questionnaires were used to extract the following statement variables relating to criteria for assessing subjectivity relating to the virtual community of practice in this study.

Data were analyzed in two phases; in the first phase, the initial semi-structured interviews were recorded to digital files. The digital files were played back at half-speed using Quicktime software. The semi-structured interviews captured on the digital files were analyzed and salient statements were transcribed for use in the Q-Sort. Data were also taken from the online questionnaire (Appendix A) to assist in the development of the concourse.

After the pilot and development of the Q-Sorts using Q-Assessor, the data were analyzed using PQ-Method software developed for factor analysis of Q-Studies, while SPSS was used to generate descriptive statistics. Q-Assessor's procedures automatically processed data deposited into its database by participants performing their online sorts and delivered instant results.

Following the Q-Sort and subsequent interview questions, the analysis of the Q-Sorts followed an objective procedure (Brown, 1980, 1993). First the correlation matrix of all Q-Sorts was calculated using PQ-method. This matrix represented the level of agreement (or disagreement) between the individual sorts. This degree of similarity/dissimilarity will show the difference or sameness of points of view among respondents. The Q-Assessor software re-implemented the algorithms described by Brown (1980) and instantiated in the PQ-Method statistical software package.

Next, the correlation matrix was subjected to a factor analysis to identify the number of natural groupings of Q-sorts by similarity or dissimilarity to one another (Brown, 1980, 1993). People with similar views share the same factor. A factor loading was determined for each Q-sort that expressed the extent that each Q-Sort was associated with each factor. The set of factors was rotated to arrive at a final set of factors. By rotating the factors they can be examined from a variety of perspectives. The theoretical rotation helped to confirm theories regarding virtual communities of practice.

The final step before describing and interpreting the factors was the calculation of factor scores and difference scores. A statement's factor score is the (Z-score) of respondents that define that factor. Based on their Z-scores, statements can be attributed to the original quasi-normal distribution, which results in a composite Q-sort for each factor. The composite Q-sort of a factor represented how a hypothetical respondent with a 100% loading on that factor would have ordered all of the statements contained within the Q-Set. When a respondent's factor loading exceeded a certain limit ($p < 0.01$), it was defined as a variable.

The difference score is the magnitude of difference between a statement's score on any two factors that is required for it to be statistically significant. A distinguishing or distinctive statement is identified when a statement's score on two factors exceeds the difference score. A consensus statement, on the other hand, is identified when there is no distinguishing difference between any of the identified factors.

Factor scores on a factor's composite Q-Sort and difference scores helped me arrive at the most salient statements which aided me in describing and interpreting that

factor. Finally, I used follow-up interviews in ex-post verification of the interpretation and to bring life to the quantitative data within my study.

Chapter Summary

In this chapter, I summarized my use of Q-Method and outlined the methods used to conduct the study. Included in this chapter was the Q-Method process that includes concourse-building, development of the Q-Set, and the Q-Sorts themselves. The techniques to gather and analyze data were described. In Chapter 4, the statistical results of the study are discussed.

CHAPTER IV

RESEARCH FINDINGS

Introduction

The purpose of this Q-Method study is to understand the perceptions and experiences of members within a virtual community of practice, and to explore how information communication technologies can be utilized to extend and sustain the face-to-face meetings. The research questions guiding this study were: 1) What are the beliefs or perceptions of Community Learning Exchange participants regarding the use of a virtual community of practice? 2) How can the promise and mission of the Community Learning Exchange be sustained within the context of a virtual community of practice?

To answer these research questions, this chapter provides a discussion regarding the results of the factor analysis that emerged from the online Q-Sorts and any pertinent qualitative data resulting from the post-sort interview questions. The statistical results of this study will be shown and analyzed in the following discussion.

After a preliminary analysis of the real time statistical analysis in Q-Assessor software, I entered all resulting Q-Sort data into the PQ-Method statistical software package. In PQ-Method, Q-Sorts are processed and analyzed using algorithms specifically designed to handle Q-Data (Schmolck, 2011). PQ-Method statistically computes factors, variances, and relationships between and among groups based on the Q-Sort data entered.

After running the statistical analysis using PQ-Method, I used the post-sort interview questions entered into Q-Assessor to glean data that helped illuminate the statistical analysis.

This chapter is organized into nine sections to discuss the findings: 1) Correlation Matrix; 2) Factor Analysis and Eigenvalues; 3) Factor Loadings; 4) Confounding Factor Loadings; 5) Research Question One; Factors One and Four: A High Correlation; 6) Consensus Statements; 7) Distinguishing Statements; 8) Research Question 2; and 9) Chapter Summary.

Correlation Matrix

The first step in analyzing Q-Sorts in PQ-Method is to calculate a correlation matrix. The PQ-Method software creates a matrix that displays the extent to which each participant's sort is similar or dissimilar to all other participants (Brown, 1980). Principal component analysis (PCA) is used to generate a correlation matrix among and between the different Q-Sorts (Militello & Benham, 2010). The correlation matrix in this study (Appendix A) measured 31X31 based on the number of participants ($N=31$). The matrix shows correlation coefficients that range from -1.0 to +1.0. The correlation coefficient indicates how well each participant's sort agrees or disagrees with each other sort. A correlation of +1.0 would indicate an exact or perfect match, while a correlation coefficient of -1.0 would indicate a completely oppositional sort.

Factor Analysis

The second step in the PQ-Method data analysis process is factor analysis. Using the correlation matrix above, PQ-Method software clusters the sorts into eight unrotated factors. Factor analysis organizes Q-Sort data into meaningful groupings based on type,

according to factor loadings. As opposed to traditional R-method studies, where survey questions are grouped, Q-Method factor analysis groups participants (McKeown & Thomas, 1988). A factor emerges when highly corresponding sorts are clustered.

After running an initial examination of the unrotated factors generated by the Q-Assessor online software package, I consulted with Dr. Militello to discuss the unrotated factor loadings. Utilizing Dr. Militello's expertise and experience with conducting Q-Studies, we determined the factors that emerged by examining the eigenvalues (Militello & Benham, 2009). After an examination of the eigenvalues, it was determined that a four-factor solution accounted for 64% of the variance. Twenty-three of the N=31 participants' factor loadings fell on one of the four factors. The remaining eight participant sorts were confounded. The four factors were significant enough to warrant further examination and rotation. Factors 5-8 contained a variance below the threshold of an eigenvalue less than 1.0. According to McKeown and Thomas (1988) eigenvalues lower than 1.0 produce inconclusive results. In Figure 4.1 below, the y-axis represents the eigenvalues and the x-axis represents the factors.

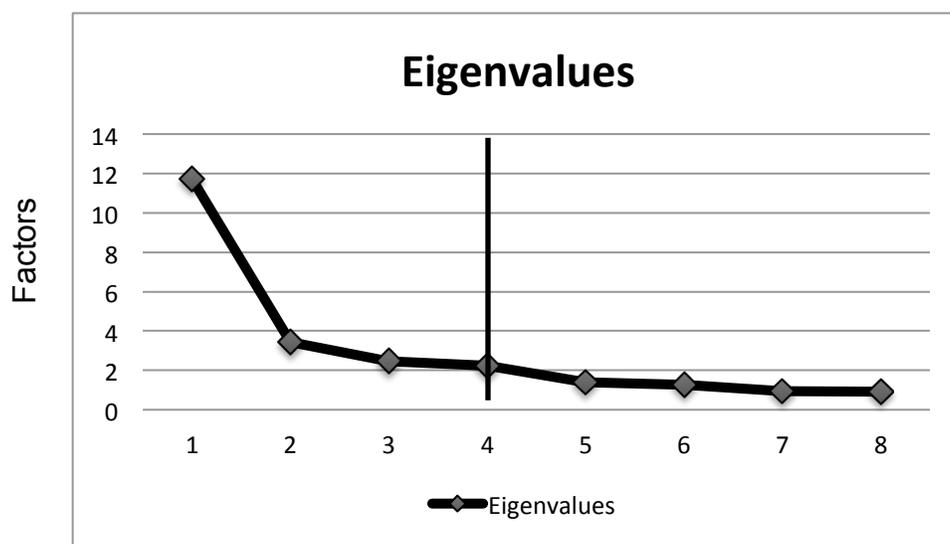


Figure 4.1. Scree Plot of Eigenvalues

Factor 1 represented 38% of the variance; factor 2 represented 11%; factor three represented 8%; and factor 4 comprised 7% of the variance, for a total of 64% variance across the four factors. Table 4.1 below depicts the relation of the four factors.

Table 4.1

Correlations between Factor Scores

	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1	1.0000	0.4341	0.2739	0.5819
Factor 2	0.4341	1.0000	0.3419	0.3436
Factor 3	0.2739	0.3419	1.0000	0.4470
Factor 4	0.5819	0.3436	0.4470	1.0000

Factor Loadings

To further analyze the data, a four-factor Varimax rotation was conducted to highlight and distinguish the four factors as they emerged. Varimax rotation allows for

each Q-Sort to be loaded on a factor with a correlation score. Table 4.2 details how participants loaded on the four factors.

A forced-choice, normal distribution was used to complete the Q-Sorts. Each Q-Sort had a mean of 0, a standard deviation of 2.449, and a standard error of 0.356. Upon completion of the correlation matrix, the correlation coefficients were determined.

McKeown and Thomas (1998) noted, “The standard error for a zero-order factor loading is given by the expression $SE = 1/\sqrt{N}$, where $N =$ the number of items in the Q-sample” (p. 50). The Q-Sample included 36 statements, which would indicate $SE = 1/\sqrt{36}$ or $SE = 0.17$. McKeown and Thomas (1998) noted that statistical significance is indicated by loadings 2.58 in excess of the standard error. A correlation coefficient of $p < .01$ or 99% accuracy would be .430, as indicated by $1/\sqrt{36} \times 2.58 = .430$.

Table 4.2

Factor Matrix of Participants' Q-Sorts (Loadings)

Participant	Factor 1	Factor 2	Factor 3	Factor 4
gmiq	0.5075	0.0981	0.5397**	0.0015
tryn	0.0944	0.8009**	-0.0930	0.0314
mpyv	-0.1512	0.1046	0.1402	0.7505**
bdem	0.5766**	0.1959	-0.1019	0.5151
pibf	0.7152**	0.3926	-0.1417	0.0830
uwaz	0.4752	0.3040	0.3728	0.1568
bdtn	0.3048	0.5897	0.0539	0.5047
uyco	0.0324	0.2792	0.7194**	0.0277
nwhn	0.0288	0.7975**	0.1778	0.2619
jyrw	0.3153	-0.2836	-0.0093	0.5720**
iopq	0.7477**	0.2583	0.0276	0.0131
klke	0.8349**	0.1192	0.1751	0.1422
lyde	0.0927	0.7401**	0.0836	-0.0225
kziz	0.3129	0.3929	0.1370	0.5368**
nnci	0.6094**	-0.2086	0.4975	0.1455
urjk	-0.1284	0.1700	-0.4254	0.4254
htyh	0.4178	-0.0436	0.1334	0.6297**
qcpk	0.5805	0.3322	0.0964	0.4800
wkar	0.0956	-0.0664	0.6645**	0.4507

Table 4.2 Continued

Participant	Factor 1	Factor 2	Factor 3	Factor 4
coaz	0.3321	0.2837	0.4996	0.5473
tcpo	0.4028	0.2291	0.0457	0.6157**
nqno	0.5306**	0.3724	0.1873	0.2155
iuic	-0.1190	0.1973	0.7874**	0.3129
wodv	0.2418	0.8678**	0.1510	0.0620
la\xf	0.4693	0.0030	0.1886	0.6148**
oryb	0.5515	0.2310	0.2947	0.4328
fxkq	0.2460	0.4293	0.3095	0.5206
oyzv	0.1898	0.4802	0.4831	-0.3932
lkqp	0.3795	0.3620	0.2026	0.6028**
jlwu	0.7056**	0.0123	0.0032	0.3683
gisd	0.3098	0.8060**	0.1985	0.2107

% explained

Variance

19

17

11

17

** for .01 significance $1/\sqrt{36} \times 2.58 = .4300$ at or above sig. $p < .01$ 99% confidence

The rotated factors represent 64% of the variance with Factor one representing 19%. Factor two representing 17%, Factor three representing 11%, and Factor four representing 17%. For Factor one, seven participants loaded with a significance level of $p < .01$. On Factor two, five participants loaded with a significance level of $p < .01$. Factor three had four participants with loading of a significance level of $p < .01$ and Factor four had seven participants with a loading with a significance level of $p < .01$. No one participant loaded on more than one factor.

Confounding Factor Loadings

When participants load significantly on two or more factors confounding factor loadings occur. Twenty-three of the $N=31$ participants fell on one of the four factors. The remaining eight participant sorts were confounded. Factors One and Four had the highest correlation (0.58), but did not have any participants load on both factors.

Research Question One: What are the beliefs or perceptions of Community Learning Exchange participants regarding the use of a virtual community of practice?

The section below is organized by the four factor groupings that emerged from the statistical analysis and factor reduction. The factors are given descriptive titles and used qualitative and post-sort questions to better understand what beliefs or perceptions the participants had regarding the virtual community of practice.

Factor one: high self-efficacy and technology-competent. Table 4.3 details the sequence of statements for participants loading on factor one. The rankings progress from a range of agree (z-score of 2.208) to disagree (z-score of -2.038). The z-score is a measure of how far and in what direction a statement deviates from the distribution's mean.

Table 4.3

Factor One: Normalized Factor Scores

Card	Statement	z-score
7	I prefer face-to-face meetings to online communication.	2.208
23	I share my knowledge and expertise in face-to-face meetings.	1.652
28	Online communication can help support the work of community leaders (e.g., resources and strategies).	1.539
33	I use the CLE online environment (website) to post stories, videos, and begin threaded discussions.	1.426
2	Online communication can help support the work of the CLE.	1.108
26	The CLE online environment provides me an opportunity to express my perspective.	1.067
6	I benefit from my interaction with others during online collaboration.	0.874

Table 4.3 Continued

4	I am an active user of social media (Facebook, Twitter, etc.).	0.842
9	The CLE online environment (website) provides information I can use.	0.722
27	The CLE online environment (website) provides me an opportunity to share my accumulated experiences (experience gained over a number of years).	0.648
13	I contribute to online environments (websites).	0.607
5	The CLE online environment (website) is easy to use.	0.349
11	The CLE online environment (website) gives me the opportunity to interact with others who share common beliefs.	0.337
3	Working with team members online is time consuming.	0.31
32	The CLE online environment (website) provides me with a national network of support of like-minded individuals.	0.276
21	Working with team members face-to-face is time consuming.	0.218
14	I share my knowledge and expertise on the CLE online environment (website).	0.053
29	The CLE online environment (website) allows for intergenerational exchanges of knowledge and ideas.	-0.007
1	The CLE online environment (website) facilitates collaboration.	-0.015
18	The CLE online environment (website) is knowledge-centered (expert-centered; expert as resource).	-0.105
5	I seek out the knowledge and expertise of other members in the CLE online environment (website).	-0.111
16	The CLE online environment (website) is a relevant space that increases interaction among its members.	-0.267
12	I can use the online CLE environment (website) to help solve issues in my community.	-0.327
34	The CLE online environment (website) responds to the diverse needs of its users.	-0.461

Table 4.3 Continued

19	The CLE online environment (website) is community-centered (collaborative work focuses on projects/issues that are of value or concern to the community).	-0.463
31	The CLE online environment (website) has surfaced similarities of problems across multiple contexts (e.g., city to city, community to community).	-0.484
30	My interactions in the CLE online environment (website) have led to offline communication.	-0.595
17	The CLE online environment (website) is learner-centered (focused on user's needs, abilities, and interests).	-0.653
25	The CLE online environment (website) promotes a sense of "being there with others".	-0.896
10	I seek out social interactions on the CLE online environment (website).	-1.004
22	I avoid social interactions while on the CLE online environment (website).	-1.159
24	I do not benefit from online interactions on the CLE online environment (website).	-1.184
36	I require specialized training to better utilize the CLE online environment (website).	-1.23
20	The CLE online environment (website) engages its members in rich discussion.	-1.24
8	I prefer online communication to face-to-face meetings.	-2.038

Figure 4.1 illustrates a model sort for those participants who loaded significantly on Factor One. Participants who sorted in this fashion were classified as high-intrapersonal and technology competent.

Disagree		Uncertain					Agree			
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
10	20	8	12	1	3	9	2	4	23	7
	35	22	24	17	6	11	5	21	28	
		25	31	19	15	14	13	33		
			36	30	16	18	26			
				34	29	27				
					32					

Figure 4.2 Factor One Model Sort

Table 4.4 demonstrates the highest and lowest sorted cards for participants loaded on Factor One. The statements placed at the farthest extremes of the sorting grid are indicative of a participant falling in the Factor One model as shown through a significant loading. These extremes are most representative of participants with a higher intra-personal interactions and self-efficacy who possess technology aptitude.

Table 4.4

Factor One: High Positive and High-Negative Statements

Score	Cards	Statements
+3	33	I use the CLE online environment (website) to post stories, videos, and begin threaded discussions.
+2	4	I am an active user of social media (Facebook, Twitter, etc.).
+1	3	Working with team members online is time consuming.
+1	32	The CLE online environment (website) provides me with a national network of support of like-minded individuals.

Table 4.4 Continued

-1	19	The CLE online environment (website) is community-centered (collaborative work focuses on projects/issues that are of value or concern to the community).
-1	31	The CLE online environment (website) has surfaced similarities of problems across multiple contexts (e.g., city to city, community to community).
-3	36	I require specialized training to better utilize the CLE online environment (website).
-4	20	The CLE online environment (website) engages its members in rich discussion.
-5	8	I prefer online communication to face-to-face meetings.

Seven of the 31 participants (22.5%) loaded significantly on Factor One. These “High self-efficacy and Technology-competent” participants placed, as the top for cards in the sort, statements that showed that they felt they possessed a high level of technology use and believed that they had spent time engaging in online communications. The strongest statement, “I use the CLE online environment (website) to post stories, videos, and begin threaded discussions,” showed the group’s familiarity with publishing and creating content for other users. While the other two highest ranked statements (Four and Three) showed that these participants believed that they had engaged in communication online and actively participated in other online social networks. According to Bandura (1993), self-efficacy reflects the confidence learners report in approaching and handling new tasks. Hsu et al. remind us that, “Social cognitive theory contends that the desire to share knowledge is not enough to carry it out” (p. 155). The participant of a virtual community of practice as knowledge creator must also possess the ability to take action. These participants expressed a level of self-efficacy that may indicate their confidence with using information communication technologies. Participant *iopq*, when speaking of the role of technology in community purpose states, “I think our work is social, and this

is best done in person. Yet, I do not dismiss the importance and potential of online systems.” This participant went on to elaborate on the implications for technology use: “face-to-face engagement and pedagogy can not be replaced with tech, yet.” This statement sheds light on the openness to technology this participant felt, but highlights their need for face-to-face interaction.

Participant *pibf* placed Card Seven at the highest position with Cards Three and 33 in the next highest positions. The participant was asked why the Seven Card was placed in the highest position. They responded that Card Seven (I prefer face-to-face meetings to online communication) was selected in the highest sort position by stating, “I don't find online communication through social media sites to be as natural or easy for me as in-person communication.” This participant also selected statement 33 (I use the CLE online environment (website) to post stories, videos, and begin threaded discussions.) in the next highest sort position. Even though this participant preferred face-to-face interactions, she still demonstrated the self-efficacy, knowledge and desire to share information in the virtual community of practice.

Those members who fell into the The High Interpersonal and Technology-Competent category sorted cards 19, 31, 36, 20, and Eight in the negative to high negative range of the sort. These cards address two differing topics. A prevalent idea that surfaced in this category first overarching topic is that of the virtual community's commitment to fulfilling the mission of the organization. The high self-efficacy and technology-competent virtual community of practice members did not perceive the virtual community as a space to address the community and organizational issues that they support in their mission. Statements 36 and eight, however, addressed the subjective

opinions of this grouping of participants regarding technology usage and adoption. Overall, statement 36, “I require specialized training to better utilize the CLE online environment (website),” received a high negative rating from participants in the Factor One group, suggesting the notion that these were the technology-competent users in the virtual community of practice. In regards to fulfilling the organizational mission, participants who loaded on Factor One may have fewer opportunities to engage in authentic problem solving while in the virtual community. Wick (2000) defined collaborative teams and communities of practice as entities that help solve authentic problems. Members who loaded on Factor One may feel that opportunities to solve authentic problems may not present themselves within this specific virtual community of practice.

Factor four: the offline-collaborative knowledge-sharers. Seven of the 31 participants (22.5%) loaded significantly at the $p < .01$ level on Factor Four. Factors One and Four showed the highest correlation (0.58), without any participant loading on both factors. These “offline-collaborative knowledge-sharers,” held similar views and perceptions about participation in a virtual community of practice. Table 4.5 details the sequence of statements for participants loading on factor four. The rankings progress from a range of agree (z-score of 1.771) to disagree (z-score of -2.068). Again, the z-score is a measure of how far and in what direction a statement deviates from the distribution’s mean.

Table 4.5

Factor Four: Normalized Factor Scores

Cards	Statements	Z-scores
19	The CLE online environment (website) is community-centered (collaborative work focuses on projects/issues that are of value or concern to the community).	1.771
4	I am an active user of social media (Facebook, Twitter, etc.).	1.416
29	The CLE online environment (website) allows for intergenerational exchanges of knowledge and ideas.	1.235
23	I share my knowledge and expertise in face-to-face meetings.	1.233
28	Online communication can help support the work of community leaders (e.g., resources and strategies).	0.928
32	The CLE online environment (website) provides me with a national network of support of like-minded individuals.	0.855
2	Online communication can help support the work of the CLE.	0.853
7	I prefer face-to-face meetings to online communication.	0.851
20	The CLE online environment (website) engages its members in rich discussion.	0.790
9	The CLE online environment (website) provides information I can use.	0.734
6	I benefit from my interaction with others during online collaboration.	0.680
27	The CLE online environment (website) provides me an opportunity to share my accumulated experiences (experience gained over a number of years).	0.665
26	The CLE online environment provides me an opportunity to express my perspective.	0.558
11	The CLE online environment (website) gives me the opportunity to interact with others who share common beliefs.	0.467

Table 4.5 Continued

12	I can use the online CLE environment (website) to help solve issues in my community.	0.297
18	The CLE online environment (website) is knowledge-centered (expert-centered; expert as resource).	0.259
16	The CLE online environment (website) is a relevant space that increases interaction among its members.	0.211
13	I contribute to online environments (websites).	0.178
31	The CLE online environment (website) has surfaced similarities of problems across multiple contexts (e.g., city to city, community to community).	0.147
5	The CLE online environment (website) is easy to use.	0.040
1	The CLE online environment (website) facilitates collaboration.	0.023
14	I share my knowledge and expertise on the CLE online environment (website).	-0.044
25	The CLE online environment (website) promotes a sense of “being there with others”.	-0.153
17	The CLE online environment (website) is learner-centered (focused on user’s needs, abilities, and interests).	-0.217
30	My interactions in the CLE online environment (website) have led to offline communication.	-0.270
34	The CLE online environment (website) responds to the diverse needs of its users.	-0.309
15	I seek out the knowledge and expertise of other members in the CLE online environment (website).	-0.430
33	I use the CLE online environment (website) to post stories, videos, and begin threaded discussions.	-0.484
10	I seek out social interactions on the CLE online environment (website).	-0.547

Table 4.5 Continued

8	I prefer online communication to face-to-face meetings.	-1.472
35	The CLE online environment (website) is equally suitable as face-to-face settings for supporting collaboration.	-1.525
21	Working with team members face to face is time consuming.	-1.566
22	I avoid social interactions while on the CLE online environment (website).	-1.591
3	Working with team members online is time consuming.	-1.643
24	I do not benefit from online interactions on the CLE online environment (website).	-1.872
36	I require specialized training to better utilize the CLE learning environment (website).	-2.068

Table 4.6 lists the highest and lowest placed cards in the sorts for factor four.

These statements placed at the two extremes, or poles, are most representative of factor four and the participants that loaded significantly on this factor.

Table 4.6

Factor Four: High Positive and High-Negative Statements

Score	Cards	Statements
+4	4	I am an active user of social media (Facebook, Twitter, etc.).
+4	29	The CLE online environment (website) allows for intergenerational exchanges of knowledge and ideas.
+2	7	I prefer face-to-face meetings to online communication.
+2	20	The CLE online environment (website) engages its members in rich discussion.
-2	33	I use the CLE online environment (website) to post stories, videos, and begin threaded discussions.
-3	21	Working with team members face-to-face is time consuming.
-4	3	Working with team members online is time consuming.
-4	24	I do not benefit from online interactions on the CLE online environment (website).

Table 4.6 Continued

-5	36	I require specialized training to better utilize the CLE online environment (website).
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Figure 4.3 represents a model sort of participants loading significantly on factor four.

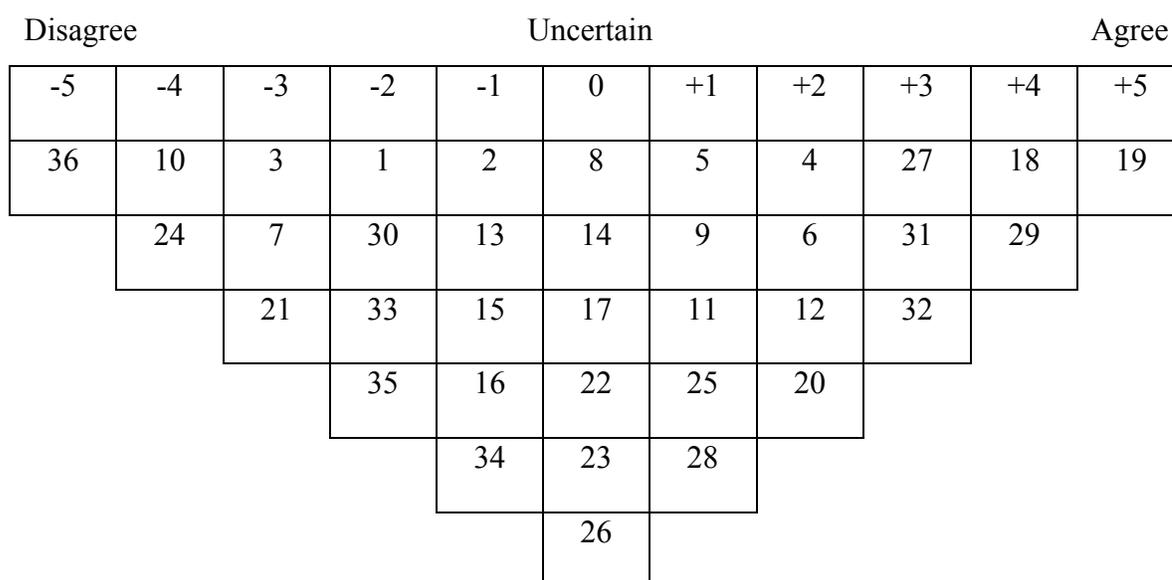


Figure 4.3 Factor Four Model Sort

Participants who loaded significantly on Factor Four rated those statements highly that expressed a subjective opinion about the sharing of knowledge and ideas. These “offline-collaborative knowledge-sharers” sorted statements four, 29, seven, and 20 on the +4 and +2 side of the distribution curve. Participants in this group shared common beliefs that the virtual community of practice did hold potential to meet the collaborative needs of its members. Participant *mpyv* sorted card 29 with a score of +4, card four with a score of +2, card 20 with a +2. Card seven was ranked with a score of -3. When

participant *mpyv*, was asked why statement 29 was ranked at +4, he responded, “It has to do with what CLE is all about and how the knowledge that is learned can be taken back into individual communities. Experiences from each community whether bad or good can help other communities to grow.” Participant *jyrw* sorted statement 29 into the highest (+5) position. *Jyrw* elaborated on statement 29: “I felt those particular cards spoke to me and the person I am. I value those as very important.” Statement 29, “The CLE online environment (website) allows for intergenerational exchanges of knowledge and ideas,” is one that as Moore (2008) explained, relates to the significance of communities of practice, where learning is distributed across a range of participants, and traditional theories of learning and knowledge creation and sharing are challenged. While participants who loaded on Factor Four indicated a desire to share knowledge and participate in an exchange, they sorted statement 36 in the lowest position, much like those participants in the Factor One group.

Factors one and four: a high correlation. As noted above, Factors One and Four share a .58 correlation. To analyze the differences between these groups, I compared the model sorts of both factors. Several of the statements were placed similarly on the sorting grid. Even though most of these statements were similarly placed among Factors One and Four, some distinct differences in placement of cards between the model sorts occurred. The table below outlines the statements that were most in disagreement (four or more columns apart on the forced distribution) between the Factor One High Interpersonal and Technology-Competent group and the Factor Four Offline-Collaborative Knowledge-Sharers. All other statements fell within three or fewer columns on the forced distribution.

Table 4.7

Differing Statements between Factors One and Four

Card	Statement	Factor One Values	Factor Four Values
29	The CLE online environment (website) allows for intergenerational exchanges of knowledge and ideas.	0	+4
20	The CLE online environment (website) engages its members in rich discussion.	-4	+2
19	The CLE online environment (website) is community-centered (collaborative work focuses on projects/issues that are of value or concern to the community).	-1	+5
3	Working with team members online is time consuming.	+1	-4
33	I use the CLE online environment (website) to post stories.	+3	-2

Consensus Statements

Statements common among participants loading on all four factors are called consensus statements. These consensus statements are those statements that do not distinguish between any pair of factors. Table 4.8 outlines the consensus statements.

Table 4.8

Consensus Statements

Statement	Factor One		Factor Two		Factor Three		Factor Four	
	Value	z-score	Value	z-score	Value	z-score	Value	z-score
2*	3	1.11	3	0.98	4	1.35	2	0.85
9*	2	0.72	2	0.88	2	1.12	2	0.73
11*	1	0.34	0	0.23	1	0.64	1	0.47
12	-1	-0.33	1	0.30	-1	-0.39	1	0.30
15	0	-0.11	-2	-0.60	-2	-0.72	-2	-0.43
16	-1	-0.27	0	0.00	-1	-0.55	0	0.21
18*	0	-0.10	0	0.00	0	0.05	0	0.26
23*	4	1.65	4	1.75	3	1.22	3	1.23
28	4	1.54	3	1.26	4	1.29	3	0.93
34*	-1	-0.46	-1	-0.05	0	0.05	-1	-0.31

Note. All listed statements are non-significant at $p > .01$, and those flagged with an * are also non-significant at $p > .05$.

Participants across the four factors selected statement two and agreed that online communication could help support the work of the virtual community of practice (The Community Learning Exchange), indicated by the +3, +3, +4, and +2 values it received across factors. One participant took a utilitarian approach to the virtual community. The participant wrote in the post-sort interview questions that “the CLE website is designed to help communities to gain information and resources to better themselves, it is not to be used as a means for social interactions,” making a delineation between the social and the utilitarian purposes of the website to move the work of the organization along.

The next highest scoring statements were on cards 23 and 28, with 28 non-significant at $p > .05$. One participant supported the statement 28 theory that “online communication can help support the work of community leaders (e.g., resources and strategies)” by writing in the post sort interview that “I believe that on-line communication can help collaboration and community work.” She continued “I do try to

engage with people on the web-site, and while I prefer face-to-face meetings, I think the on-line environment can be helpful to maintaining connections.” This validates the theme of statement 23, which reads: “I share my knowledge and expertise in face-to-face meetings.”

Some of the highest levels of disagreement across the four factors, and listed in the consensus statements above, was statement 15 “I seek out the knowledge and expertise of other members in the CLE online environment (website).” This was an unexpected outcome. The extant literature supports the theory that virtual communities of practice enable members to update their knowledge and practices while accessing organizational intelligence. The use of virtual communities to support learning has a number of benefits in terms of flexibility and scalability. Little (2005), when writing about off-line communities stated “networks are effective because they provide a trustworthy way of transmitting knowledge, particularly where this knowledge is unable to be codified.” This presents an area for continued research in online and virtual communities. Policy-makers may wish to investigate the use of virtual communities as information communication technologies continue to increase the number opportunities for engaging in the use of virtual communities.

Participants also rated statement 34 in a mildly negative way with rankings of 0, -1, -1, and -1. While only mild disagreement with the statement “The CLE online environment (website) responds to the diverse needs of its users” appeared across the four factors. This may indicate that some users may feel that this virtual community does not respond to the diverse needs of its users.

In conclusion, the four factor groups represent the different perspectives and beliefs among the members of the Community Learning Exchange about the virtual community of practice. There are some commonalities across the factor groups, yet there are diverse participants within this community of practice with different ideas about the exchange of knowledge and artifacts as well as the manner of communication.

Distinguishing Statements

Distinguishing statements are those that rank highly on a given factor in comparison their relative ranking in the other factors. Distinguishing statements allow the researcher another perspective to aid in understanding the factor or factors. Factor One had nine distinguishing statements; Factor Two had seven distinguishing statements; Factor Three had nine distinguishing statements; and Factor Four had nine distinguishing statements. Tables 4.9, 4.10, 4.11, and 4.12 show the distinguishing statements for each factor. A short description of the data precedes each table.

Distinguishing statements: factor one. Factor One contained four statements that were significant at the $p < .01$ level; five were significant at the $p < .05$ level. The top two positively ranked distinguishing statements for Factor One discussed the participants' role as an active user of online social networks. Also, participants within Factor One were publishers of content, producing pictures, videos, stories and/or online discussions. The lower three negative distinguishing statements for factor one reported the participants' capacity to engage using information communication technologies while still having a preference for face-to-face communication. Participants that fell on Factor One also indicated a perspective of disengagement with the virtual community. Although

these participants were technology-savvy, they were not actively engaged with the virtual community, according to their sorts.

Table 4.9

Distinguishing Statements for Factor One

Statements	Factor One		Factor Two		Factor Three		Factor Four	
	Q-Sort Value	z-score						
33	3	1.43*	-4	-1.63	-4	-1.63	-2	-0.48
4	2	0.84	-5	-2.29	5	2.32	4	1.42
3	1	0.31	3	1.05	-2	-0.73	-4	-1.64
32	1	0.28	4	1.31	3	1.16	3	0.85
19	-1	-0.46*	2	0.95	3	1.20	5	1.77
31	-1	-0.48	0	0.09	1	0.55	0	0.15
36	-3	-1.23*	0	-0.02	2	0.94	-5	-2.07
20	-4	-1.24*	-1	-0.07	0	0.00	2	0.79
8	-5	-2.04	-3	-1.45	-3	-0.88	-2	-1.47

Note. $p < .05$; * indicates significance at $p < .01$

Distinguishing statements: factor two. Factor Two had four statements that were significant at the $p < .01$ level, while the remaining three of the seven distinguishing statements for Factor Two were significant at the $p < .05$ level. The two highest scored statements for Factor Two indicated that participants who loaded on this factor were more engaged online, but felt that participating in the virtual community was time

consuming. They neither agreed nor disagreed with the need for specialized training for using the tools available in the online community, as indicated by the score for statement 36.

Table 4.10

Distinguishing Statements for Factor Two

Statements	Factor One		Factor Two		Factor Three		Factor Four	
	Q-Sort Value	z-score						
3	1	0.31	3	1.05	-2	-0.73	-4	-1.64
25	-2	-0.90	2	0.65*	-2	-0.61	-1	-0.15
36	-3	-1.23	0	-0.02*	2	0.94	-5	-2.07
6	2	0.87	-1	-0.41*	2	0.69	1	0.68
14	0	0.05	-2	-1.18*	-5	-2.26	-1	-0.04
13	1	0.61	-3	-1.26*	0	-0.10	0	0.18
4	2	0.84	-5	-2.29*	5	2.32	4	1.42

Note. $p < .05$; * indicates significance at $p < .01$

Distinguishing statements: factor three. For Factor Three, eight distinguishing statements were significant at $p < .01$ and one distinguishing statement out of nine was significant at $p < .05$. One statement was three columns above all others in the forced distribution on the positive side of the sort. Participants placed statement four in the highest ranking indicating their active use of social media. This perspective is not too surprising considering that Facebook alone has more than five billion pieces of content or

connections to information (web links, news stories, blog posts, notes, photo albums, etc.) shared each week and more than three million active Pages (Facebook, 2011).

The most negatively-ranked distinguishing statement for Factor Three was inversely related to the usage of popular social media such as Facebook and Twitter. Participants who loaded on factor three most negatively rated their participation within the virtual community, while still using social media for other informal networks.

Table 4.11

Distinguishing Statements for Factor Three

Statements	Factor One		Factor Two		Factor Three		Factor Four	
	Q-Sort Value	z-score	Q-Sort Value	z-score	Q-Sort Value	z-score	Q-Sort Value	z-score
4	2	0.84	-5	-2.29	5	2.32*	4	1.42
24	-3	1.18	-2	-0.69	2	0.94*	-4	-1.87
36	-3	1.23	0	-0.02	2	0.94*	-5	-2.07
7	5	2.21	5	2.13	0	-0.19*	2	0.85
27	2	0.65	1	0.37	-1	-0.31	1	0.67
21	0	0.22	2	0.57	-1	-0.57*	-3	-1.57
3	1	0.31	3	1.05	-2	-0.73*	-4	-1.64
5	1	0.35	0	0.06	-3	-1.23*	0	0.04
14	0	0.05	-2	-1.18	-5	-2.26*	-1	-0.04

Note. $p < .05$; * indicates significance at $p < .01$

Distinguishing statements: factor four. For Factor Four, eight out of nine distinguishing statements were significant at $p < .01$ and one statement of the nine distinguishing statements was at a significance level of $p < .05$. As previously noted, usage of Facebook and other popular social media sites are commonplace with most Americans. This phenomenon may have contributed to the distinguishing statement for Factor Four to have a value of +4, but not be ranked at the highest level. The next distinguishing statement rated at +4 for factor four is statement 29. These distinguishing statements discuss the engagement and exchange of ideas of the members of the virtual community, regardless of age. Like the technology-savvy participants who loaded on Factor One, participants who loaded on Factor Four expressed that they did not require specialized training to use the virtual community. The next higher negatively-rated distinguishing statement (+4) for participants in the Factor Four group suggests a level of the higher engagement for these participants in contrast to the benefits of online interactions within the virtual community.

Table 4.12

Distinguishing Statements for Factor Four

Statements	Factor One		Factor Two		Factor Three		Factor Four	
	Q-Sort Value	z-score	Q-Sort Value	z-score	Q-Sort Value	z-score	Q-Sort Value	z-score
4	2	0.84	-5	-2.29	5	2.32	4	1.42
29	0	-0.01	1	0.28	1	0.33	4	1.23*
7	5	2.21	5	2.13	0	-0.19	2	0.85*
20	-4	-1.24	-1	-0.07	0	0.00	2	0.79*
33	3	1.43	-4	-1.63	-4	-1.63	-2	-0.48*
21	0	0.22	2	0.57	-1	-0.57	-3	-1.57*
3	1	0.31	3	1.05	-2	-0.73	-4	-1.64*
24	-3	-1.18	-2	-0.69	2	0.94	-4	-1.87*
36	-3	-1.23	-0	-0.02	2	0.94	-5	-2.07*

Note. $p < .05$; * indicates significance at $p < .01$

Research Question Two: How can the promise and mission of the Community Learning Exchange be sustained within the context of a virtual community of practice?

Although the larger question regarding this study lends itself particularly to Q-Method as it aims to uncover the subjective beliefs and perspectives members of the Community Learning Exchange virtual community of practice, I also wanted to determine how the work that engages these participants could be sustained within a

virtual community. The answer to this question is of particular importance to the Community Learning Exchange and many other non-profit and educational organizations that are moving towards information communication technology and virtual communities of practice as a means to augment their work. In post-sort interviews regarding the 36 statements comprising the concourse, members of the Community Learning Exchange expressed reasons why they chose or chose not to participate in the virtual community of practice.

In the following section of this chapter, I will use data from post-sort interviews to elucidate reasoning of some members of the virtual community. I will compare previous findings (Table 4.13) regarding online engagement and inhibitors to virtual communities of practice.

Table 4.13

Previous Research on Fostering (Virtual) Communities of Practice

Researchers	Critical Success Factors
Wenger (1998)	<p style="text-align: center;">Mutual Engagement</p> <ul style="list-style-type: none"> • Structuring activities so that each member has the possibility to assume an active and central role. • Structuring activities to tap into the background/experience/knowledge of the participants. • Build on the core values of the organization.

Table 4.13 Continued

Rogers (2000)

Joint Enterprise

- Encouraging reflection on the mission of the organization.
- Encouraging development of multiple viewpoints.
- Develop systems for sharing information.

Wenger et al. (2002)

Shared Enterprise

- Encouraging exploration and evaluation of the artifacts within the community.
- Bringing in knowledgeable members.
- Create dialogue about important issues.
- Considering how one goes about “doing things” in this community (the processes)? What is the shared culture (values, identities, roles)?

The members of the Community Learning Exchange, and more specifically those with an online profile within the virtual community of practice, have posted this message on the landing page of the online community²:

² <http://www.communitylearningexchange.org/>

The Community Learning Exchange is a national network of people, organizations, and communities who share their wisdom and collective leadership approaches in order to better address critical social issues. Through face-to-face gatherings and an online network, the CLE breaks the isolation people working on community change often feel and provides time and space for deep conversations less possible in the busyness of daily schedules (CLE, 2012).

It is the statement above that drives the exploration of the second question that guided this research study. Through the Community Learning Exchange, members have an opportunity to engage in a national network sharing knowledge. The virtual online community is an extension of that objective. As stated in the quote above, the CLE works to break the isolation that its members may encounter while working on the various issues their communities face. This virtual community holds the promise of bridging the gap from face-to-face gatherings to help overcome the “busyness” that the members experience in their daily lives.

In follow-up conversations with members of the Community Learning Exchange’s virtual community, the strategies above regarding fostering virtual community were presented to further inquiry into subjective opinions about the virtual community.

In particular, I asked participants the following question: “Are there benefits that the CLE provides face-to-face that cannot be reproduced in a virtual community of practice?” Some thoughts on this question regarding the virtual community of practice versus face-to-face interaction were presented by one participant in the following statement: “There are critical components that frame the learning processes within a face-

to-face meeting that I feel cannot be reproduced in a virtual community of practice.” The participant continued with comments regarding the structure of a face-to-face Community Learning Exchange: “These processes often promote significant moments between two or more individuals or teams that influence the quality of the interactions over the course of a three-day exchange.”

When prompted about the significance of the processes of a face-to-face exchange, this participant noted her desire for physical presence: “The groundwork that is nourished through the application of Gracious Space, for instance, creates the trust necessary to hold, at times, unpleasant or difficult conversations. This requires a certain level of commitment that is, at best, challenging to accomplish without the physical presence of the community members.” This level of commitment, as noted by the participant, is accomplished through a physical engagement.

This desire for a commitment to the Community Learning Exchange surfaced from a conversation with another participant regarding inhibitors to fostering a virtual community. The participant noted that “all other work and obligations are set aside in order to be fully present. Subsequently, the option to opt out of the dialogue or the work becomes much less likely than within a virtual community.”

When asked about fostering multiple perspectives within the virtual community, one participant remarked: “I go back to the learning processes that guide the face-to-face exchanges. These processes require the time and presence necessary to take the work in depth, into spaces that organizations rarely occupy because of the busyness of divergent schedules and goals. How do we commit ourselves to dedicate that quality of time and presence online? Though virtual communities ameliorate the challenges of distance, I’m

not convinced that they have the same effect regarding the quality of time and presence of its members.” While the participants of this study were purposely selected for having attended a face-to-face meeting and for also being members of the virtual community, one participant commented on the participation of members of the virtual community who have not been to a face-to-face meeting of the Community Learning Exchange that “without having attended a CLE some might find the experience of deciphering the online network difficult. It is a conglomeration of several data sets that require not only a connecting framework in which all the components contribute to making sense of the whole, but also to be illustrated through the same learning processes that guide the face-to-face meetings, like strong and trusting relationships, dialogue, commitment to the work, and accountability for yourself and others.”

Although the post-sort data collected indicates a strong leaning towards face-to-face interactions versus virtual exchanges, there are particular needs that the virtual community can meet. In particular, regarding the exploration and exchange of community artifacts, a participant highlighted the need for a virtual space: “I think this is an area that could be maximized in order to not only illustrate the work that was accomplished in the face-to-face exchange, but also the work that the face-to-face exchange helped promote back in members’ respective communities. How the artifacts are presented on the online site should give indication of their importance within particular learning processes, whether it’s how to facilitate an opening/closing circle, ground the work in Gracious Space, connect the learning to people and place, or facilitate critical dialogue, among others.”

Regarding the appropriateness of the information communication technology required foster the virtual community and the exchange of artifacts this same participant said, “one of the greatest benefits of the Ning as a discussion tool for our organization is that it affords users the ability to upload video, images, and files within the posting itself. This allows users to expand and enhance their postings with additional technological tools. Also, unlike other discussion forums, all users can create a new forum. A person could create a forum based on personal needs or interests.”

Chapter Summary

The data analysis process presented in Chapter Four included an analysis of the correlation matrix, factor analysis, and emergent factors from the Q-Study. The use of PQ-Method 2.20 software (Schmolck, 2011) helped to create a 31 X 31 array correlation matrix to demonstrate how each participant's' (Q-Sort) sort correlated with each other participants' sort. The correlation matrix resulted in the data used for the factoring process.

Factor analysis consisted of creating an un-rotated factor matrix with eigenvalues identified, Varimax rotation to further clarify defining sorts, correlation between factor scores, and emergent factors. Seven centroids from the un-rotated factor matrix were extracted with eigenvalues greater than 1.00. The top seven eigenvalues accounted for 76% of the variance. Varimax orthogonal rotation was used on the seven factors with eigenvalues greater than 1.00, resulting in four factors with significant loadings representing 64% of the total variance. Standard errors and factor characteristics indicated valid and reliable results. Completion of correlation between factor scores

indicated participant Q-sorts that loaded on one factor identified most with that factor and no other factor.

The four emergent factors, with eigenvalues greater than 1.00, helped to elucidate the research questions under investigation in this study. The analysis included a written summary and factor array for each emergent factor.

Chapter Four included the results of the distinguishing statements from the four factors correlated with the research questions. Finally, Chapter Four included a presentation of the specific characteristics of each factor with distinguishing agreement statements, distinguishing disagreement statements, and consensus statements.

In addition, Research Question Two: “How can the promise and mission of the Community Learning Exchange be sustained within the context of a virtual community of practice?” was explored through post-sort interviews and conversations presented through strategies for fostering virtual community.

Chapter Five will provide a discussion of the results through the lens of the conceptual framework presented earlier. I will examine the findings based on the conceptual constructs that guide this study. Implications of this study on practice, policy, and future research will be discussed.

CHAPTER V
CONCLUSIONS, DISCUSSION, AND SUGGESTIONS FOR FUTURE
RESEARCH

In this chapter, I will utilize the conceptual framework introduced in Chapter One to discuss the perceptions of members of the Community Learning Exchange's Virtual Community of Practice. I will also frame questions to bring about other possible areas of exploration for the Community Learning Exchange. Finally, I will discuss recommendations for future research studies, policy decisions, and practices for organizations that hope to expand their work into virtual communities of practice.

Summary of the Study

Thirty-one members of the Community Learning Exchange community of practice participated in the study. The participants represented a range of backgrounds and were geographically dispersed throughout the United States. The use of Q-method gave me an organized technique for uncovering the participants' opinions regarding their participation in a virtual community and their beliefs regarding virtual community. Q-sort statements were developed using interviews, an online questionnaire, and a review of the literature. In addition to participating in the Q-sort, the members of the Community Learning Exchange (community of practice) answered open-ended questions and a few participated in a post-sort interview. The research questions for this study were:

1. What are the beliefs or perceptions of Community Learning Exchange participants regarding the use of a virtual community of practice?
2. How can the promise and mission of the Community Learning Exchange be sustained within the context of a virtual community of practice?

Research Question One: What are the beliefs or perceptions of Community Learning Exchange participants regarding the use of a virtual community of practice?

The study identified four factor groupings that emerged from the statistical analysis and factor reduction. The factors were combined and given descriptive titles and qualitative and post-sort questions were used to better understand what beliefs or perceptions the participants had regarding the virtual community of practice. Members of the Community Learning Exchange who participated in this study fell into one of the following categories high-intrapersonal or technology competent or offline-collaborative knowledge-sharers. The high-intrapersonal and technology competent participants tended to agree more with statements that showed they possessed a higher level of technology use and believed that they had spent time engaging in online communication with other members of the Community Learning Exchange. Statements the high-intrapersonal or technology competent group tended to agree with showed the group's familiarity with publishing and creating content for other users. Followed by an agreement with statements that showed that these participants believed that they had engaged in communication online and actively participated in other online social networks. The offline-collaborative knowledge-sharers, on the other hand, were less focused on the information communication technology tools and more interested in the mission of the community. More often than not, members of the Community Learning

Exchange who fell into this group tended to agree with statements that showed a propensity for sharing knowledge with other members. These members were more likely to favor interactions that occurred offline and in a more traditional face-to-face setting.

Research Question Two: How can the promise and mission of the Community Learning Exchange be sustained within the context of a virtual community of practice?

While members of the Community Learning Exchange who participated in post-sort interviews seemed to indicate a strong desire to continue the mission of the Community Learning Exchange in a virtual community, they expressed a desire to continue the work of the Community Learning Exchange in a face-to-face modality. Many of the members had participated in a Gracious Space framework that outlined a means for communication among members in a face-to-face configuration. The physical presence of the members gave them time to reflect and focus solely on the issues at hand during a learning exchange. The conceptual framework below can provide some guidance to members of the Community Learning Exchange to frame conversations on how to best sustain the work of the group in a virtual community. The promise and mission of the Community Learning Exchange is one that cannot be wholly sustained in a virtual community, but can benefit from some of the bargain that the information communication technologies can offer.

The Conceptual Framework and Virtual Communities of Practice

Having interviewed and interacted with members of the Community Learning Exchange at face-to-face gatherings, it became apparent that the one of the driving forces behind the members of this community is that of intensity and purpose. In apparent opposition to the Community Learning Exchange's passion and energy, and in line with

what Wheatley's (2007), "we live in a world completely revolutionized by information," that, "it is knowledge we are seeking, not information (p. 72)." Members of this community seem to be in search of knowledge, but less focused on the technology to acquire it. As Wheatley suggested, organizations such as the Community Learning Exchange must stop focusing efforts on the tools and begin focusing on creating shared meaning and structure that allows time for reflection. The Community Learning Exchange's structure allows time for reflection, but the community must also grapple with issues of geography and economy, and therefore must focus its energies on the tools to assist in the work of the organization.

Shirky (2008) described a mix of social and technological factors that work together to create a viable online community. He wrote of the *promise*, *tool*, and *bargain* inherent in the system(s) of online communities. The *promise*, Shirky wrote, "is the basic 'why' for anyone to join or contribute to a group (p. 260)". The *tool* helps with the "how" of implementing the virtual community. And, finally, the *bargain* governs the rules of the community. If a member becomes interested in the promise, and uses the tool, then they expect a return, the *bargain*. Shirky noted how, "the order of promise, tool, and bargain is also the order in which they matter to the success of any given group" (p. 261).

Wheatley (2007) also discussed the complexity of self-organizing systems. She described the need for meaning as "both individual and organizational change start from the same need: the need to discover what's meaningful" (p.108). In describing the how of an organization, Wheatley wrote: "a living network will only transmit what it decides is meaningful" (p. 109). And finally, Wheatley described the returns from systems (what

we can expect) as ones where the system contains the solutions, but we should find the most efficient means of accessing them.

The conceptual framework representing these ideas is depicted in Figure 5.1 as pictured below. This framework helps in the discussion of the major factors that emerged from this inquiry.

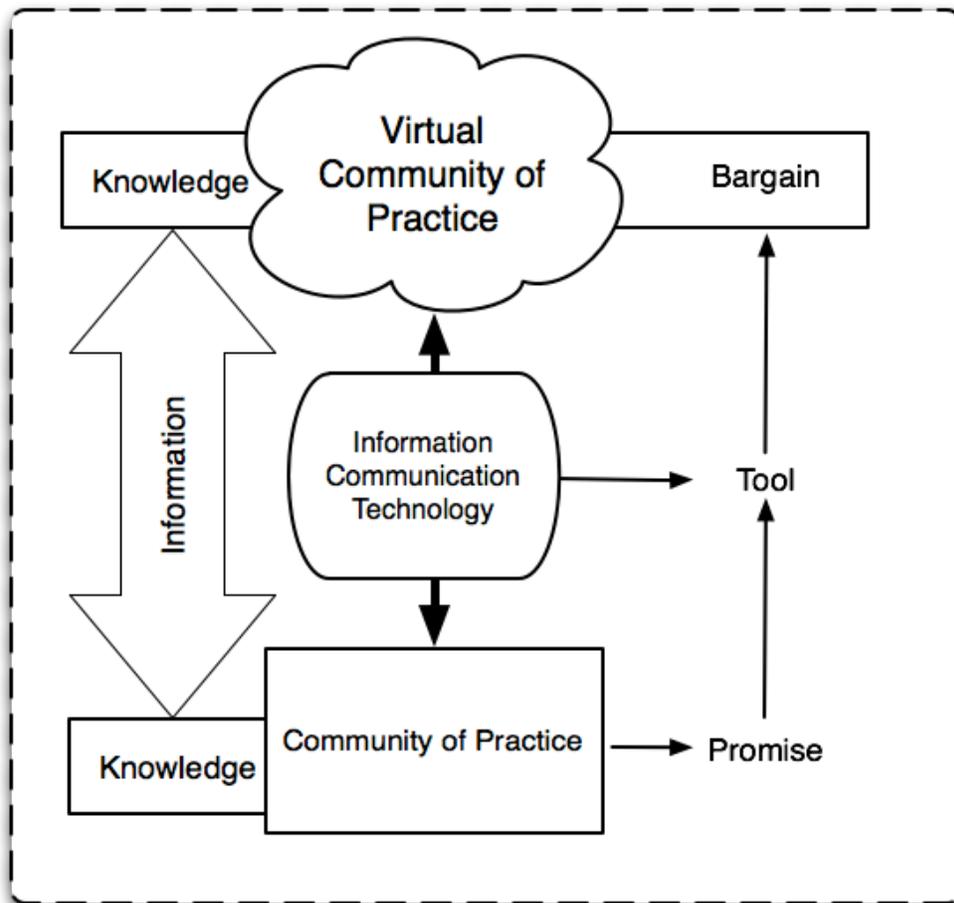


Figure 5.1. Conceptual Framework

Virtual communities do not happen in random fashion, but instead must be systematically organized and expanded. The creation and existence a virtual community of practice will not thrive unless it is intentionally planned and opportunities for interaction are specifically built into the virtual community. A person who is surfing the

Internet for information but not dialoguing with others is not a member of a community as defined in the literature on communities. The space must be fostered for a community to develop. Within a virtual community of practice, the possibility exists for members of that community to in engage one another to increase their awareness of learning strategies, knowledge-sharing and reflection. The planning of such opportunities, according to critical success factors, should be taken into account and be deliberately designed as an integral part of a virtual community to create opportunities for an awareness of learning strategies, knowledge-sharing by community members and time for reflection on the community purpose.

Researchers have noted that just as it can be especially difficult to establish a community of practice in distance education (Brook & Oliver, 2003; Selwyn, 2000), communities of practice cannot be forced, even through media and information technologies that lend themselves to high levels of engagement. In addition to needing the time to feel comfortable using a social networking site for collaborative and educational purposes, participants may need sufficient time to feel themselves a part of the virtual community of practice. Participants may feel themselves part of the virtual community by revisiting the organizational mission and provide members opportunities to engage one another based on the critical success factors.

Information communication technologies to create virtual communities continue to receive increased attention as economic pressures move organizations towards online spaces to counter the costs of collaborative transactions (Shirky, 2008). People from academia, K-12 schooling, training, and business are using the Internet to foster collaborative learning through community building. As is often the case, not all

communities are effective in carrying out their tasks; some communities work together effectively while others splinter and struggle to accomplish their goals. Attempts at creating a cohesive virtual community often result in creating a group of isolated learners. In such situations, the goals of the community disappear, as each learner must grapple with the isolation of moving within a virtual community of practice. Members already isolated by geographical location, become further isolated from each other without opportunities to engage in the organizational work.

The findings from this study have implications for researchers, practitioners, and policy makers, but must be taken as part of a larger discussion. As McKeown and Thomas (1998) reminded us regarding the use of Q-Method:

Matters of meaning and significance are fundamentally self-referential. What a statement or a concept is supposed to signify a priori may vary considerably from the meanings of other parties to the conversation. In Q methodology, this is not a problem. Because the data are “public”—that is, others are free to examine the factor arrays and arrive at their own independent conclusions—our interpretations are open to debate. (p. 66).

We are reminded that the open debate is a virtue of employing Q-Method in a study, that we cannot argue the quality of the data, but we can quarrel over the significance and implications and of their meanings.

Implications for Researchers

For those researching virtual communities of practice, the choices of evaluation, measures, and techniques are linked not only to the particular goals of the virtual community and/or researchers but also to the researchers' theoretical and conceptual

assumptions. Hence the idea of creating a one-size-fits-all “good virtual community indicator” evaluation model may be problematic. Because, this study presents a Q-Method approach that seeks to understand the subjective beliefs of participants within a virtual community, it provides future researchers with comparative data that may illuminate their own findings and provide a means to triangulate their data when forming conclusions. Clearly, it is unlikely that any one study can investigate the beliefs of participants within a virtual community of practice and likewise determine the effectiveness of fostering virtual community. This study does, however, investigate the perspectives of users within a larger community that give insight into how members interact (or not) while working towards organizational mission.

While Q-Method proved an appropriate means of answering the research questions under investigation, researchers wishing to build upon the conceptual framework presented above may wish to investigate other means of evaluating virtual communities. Personally, Q-Method provided an easy and effective means of understanding the subjective beliefs of participants engaged in the Community Learning Exchange’s virtual community of practice. Q-Method and the subsequent interviews afforded an opportunity to explore subjectivity using statistical methods and qualitative research.

During post-sort interviews, participants expressed a strong opinion regarding face-to-face processes that underlie the Community Learning Exchange’s mission. Future researchers may choose to investigate the face-to-face experiences and subjective opinions regarding those experiences by using Q-Method techniques. Future researchers

may wish to explore the dimensions or factors that inhibit the growth and practice of virtual communities using quantitative R-methods as well.

Implications for Policy Makers

As the Texas Education Agency continues to expand projects such Project Share at a time when education budgets in Texas are being cut, there is little research on the experiences and beliefs of participants thrust into these online virtual communities. As educational policy makers move towards a continued expansion of virtual communities for educators and students including Algebra Ready (MSTAR) Universal Screener, Texas SUCCESS resources in reading and math, and the Texas Achievement Items Repository (TxAIR), the opinions that emerged from this study should be considered when a continuing to fund such projects. If we have a clearer understanding of why members in a virtual community of practice choose to participate, then we may be able to extend these understandings to other organizations or communities in these virtual spaces. This study highlights the factors that suggest that more research needs to be conducted on the possibilities of combining face-to-face instruction with virtual community. This hybrid approach to fostering virtual community may have implications for policy-makers as they explore information communication technologies for lowering the cost of teaching and learning.

Implications for Practitioners

As the Community Learning Exchange seeks to sustain the face-to-face convening of its members, the findings of this study can help guide the decisions of members in developing a virtual community of practice. In order to create a virtual community of practice, practitioners, participants, or users of information communication

technologies should identify opportunities for members to interact in the virtual community and strategically develop those relationships. By exploring the emergent factors of this study, the Community Learning Exchange can use these data to further explore how they can sustain their work in a virtual space.

The factors and subjective opinions expressed by members of the Community Learning Exchange should be taken into account when planning for and developing the virtual community. Community members with high self-efficacy and technology competency should be tapped into as key participants in developing the virtual community. For example, members of the community who are technology competent can mentor or tutor other members who struggle with information communication technologies. Factors that emerged in this study also highlighted the need for the community to focus less on the technology being used, or time spent teaching members to use it, and more importance on relationship building in the virtual space.

Conclusion

Some conclusions are evident from the findings of this study. Many subjective opinions and beliefs surfaced during this study and were further elucidated with post-sort interviews. The results of the study indicate that Community Learning Exchange participant beliefs surfaced in four main factors as a result of the Q-sorts. The study found that of these four emergent factors, two factors warranted exploration: Factor One: High Interpersonal and Technology-Competent, Factor Four: The Offline-Collaborative Knowledge-Sharers. As the conceptual framework analyzed in this study, the relationship between bargain and tool is one that should not be ignored. Virtual community is more than an economic transaction, according to the subjective opinions of

the Community Learning Exchange. As one participant cautioned us about the future of the Community Learning Exchange's virtual community "if this becomes a free-for-all, it will lose the intentions and purpose. In short, the concept of safe space for exploring and imagining must be present and I do not know how one creates this online, especially when people are looking for spaces to shock others or soap boxes that are void of conditions for conversation." This member's belief may very well encapsulate the subjective opinion of participants engaged in other virtual communities.

APPENDIX A: Correlation Matrix Between Sorts

SORT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1 gmiq	100	8	17	21	46	51	19	32	20	7	32	54	20	24	57	-1	15	49	34	48	13	35	41	26	38	58	27	34	30	23	29
2 tryn	8	100	19	21	47	11	34	30	60	-7	33	20	48	23	-14	12	-5	24	-14	35	25	36	10	76	-3	34	25	23	46	9	60
3 mpyv	17	19	100	25	10	15	34	7	27	34	-11	6	4	31	18	36	25	40	33	51	50	17	38	8	24	39	35	-17	42	14	15
4 bden	21	21	25	100	47	40	60	8	31	44	55	49	11	57	37	23	50	60	18	41	57	54	14	37	64	40	37	1	57	49	35
5 pibf	46	47	10	47	100	50	46	6	28	29	59	57	32	31	15	9	23	56	6	33	37	51	-10	46	32	60	30	19	45	45	49
6 uwaz	51	11	15	40	50	100	40	29	37	18	32	50	37	49	35	5	30	49	31	47	25	54	37	32	38	44	50	37	36	37	51
7 bden	19	34	34	60	46	40	100	23	61	17	36	34	53	64	22	22	48	72	35	45	64	45	21	60	50	48	57	30	52	36	68
8 uyco	32	30	7	8	6	29	23	100	28	5	18	11	18	22	32	-30	12	11	42	50	24	22	54	40	13	29	29	40	33	7	39
9 nwhn	20	60	27	31	28	37	61	28	100	-2	19	30	56	49	1	15	15	42	21	52	31	41	31	76	30	28	55	39	42	8	68
10 jryw	7	-7	34	44	29	18	17	5	-2	100	27	25	-25	30	24	5	53	25	24	38	36	25	8	-17	41	30	20	-22	40	24	-3
11 iopq	32	33	-11	55	59	32	36	18	19	27	100	58	14	29	30	-18	32	53	11	31	44	34	7	43	37	47	36	32	51	44	50
12 kike	54	20	6	49	57	50	34	11	30	25	58	100	21	38	68	4	38	59	28	60	44	51	8	35	49	66	35	20	42	67	38
13 lyde	20	48	4	11	32	37	53	18	56	-25	14	21	100	30	-3	3	16	34	0	29	20	39	16	54	0	26	38	36	22	6	57
14 kziz	24	23	31	57	31	49	64	22	49	30	29	38	30	100	31	17	42	53	40	50	45	52	24	51	50	42	56	7	55	45	61
15 mnei	57	-14	18	37	15	35	22	32	1	24	30	68	-3	31	100	-15	35	49	41	50	36	43	25	7	34	40	21	23	26	53	14
16 urjk	-1	12	36	23	9	5	22	-30	15	5	-18	4	3	17	-15	100	-2	24	-13	7	11	-4	-8	6	12	5	1	-26	8	2	11
17 htyh	15	-5	25	50	23	30	48	12	15	53	32	38	16	42	35	-2	100	52	42	40	57	36	25	14	62	48	58	-8	55	60	28
18 qepk	49	24	40	60	56	49	72	11	42	25	53	59	34	53	49	24	52	100	36	51	66	46	20	42	54	66	51	18	57	48	57
19 wkar	34	-14	33	18	6	31	35	42	21	24	11	28	0	40	41	-13	42	36	100	55	30	14	55	13	45	41	41	11	34	24	23
20 coaz	48	35	51	41	33	47	45	50	52	38	31	60	29	50	50	7	40	51	55	100	60	47	52	42	57	67	56	16	72	47	51
21 tepo	13	25	50	57	37	25	64	24	31	36	44	44	20	45	36	11	57	66	30	60	100	40	19	32	48	48	46	8	57	58	45
22 nqno	35	36	17	54	51	54	45	22	41	25	34	51	39	52	43	-4	36	46	14	47	40	100	31	43	36	46	49	24	44	46	48
23 hinc	41	10	38	14	-10	37	21	54	31	8	7	8	16	24	25	-8	25	20	55	52	19	31	100	28	32	40	47	36	42	0	33
24 wodv	26	76	8	37	46	32	60	40	76	-17	43	35	54	51	7	6	14	42	13	42	32	43	28	100	26	41	47	50	48	27	82
25 laxf	38	-3	24	64	32	38	50	13	30	41	37	49	0	50	34	12	62	54	45	57	48	36	32	26	100	58	50	-4	61	53	26
26 oryb	58	34	39	40	60	44	48	29	28	30	47	66	26	42	40	5	48	66	41	67	48	46	40	41	58	100	49	3	70	49	47
27 ftkq	27	25	35	37	30	50	57	29	55	20	36	35	38	56	21	1	58	51	41	56	46	49	47	47	50	49	100	13	62	50	71
28 oyzv	34	23	-17	1	19	37	30	40	39	-22	32	20	36	7	23	-26	-8	18	11	16	8	24	36	50	-4	3	13	100	8	-5	45
29 lkqp	30	46	42	57	45	36	52	33	42	40	51	42	22	55	26	8	55	57	34	72	57	44	42	48	61	70	62	8	100	49	60
30 jhwu	23	9	14	49	45	37	36	7	8	24	44	67	6	45	53	2	60	48	24	47	58	46	0	27	53	49	50	-5	49	100	40
31 gisd	29	60	15	35	49	51	68	39	68	-3	50	38	57	61	14	11	28	57	23	51	45	48	33	82	26	47	71	45	60	40	100

APPENDIX B: Exploratory Online Questionnaire

1. Average hours of active Internet use per day (please enter number):
2. Do you have a profile or account on any the following social networking services?
3. If you are NOT participating with social networking websites, what is the main reason why?
4. How much time (on average) do you spend on your favorite social networking site(s) per session?
5. How often do you usually log on to your favorite service(s) each day?
6. I use my social network service(s) to find information
7. I use my social network service(s) to get opinions
8. I use my social network service(s) to entertain myself
9. I use my social network service(s) to socialize
10. I use my social network service(s) to share information
11. I use my social network service(s) to play games
12. What is the key reason(s) for you to join a community/group on a social networking service?
13. How often do you participate in professional community (formal group) discussions?
14. Do you trust information obtained via online professional communities?
15. Do you trust information you obtain via social networking websites?
16. Why do you use (OR NOT USE) social networking websites (services)?

17. Anything other information you would like to share regarding your social networking experiences?

APPENDIX C: Q-Assessor Email Templates

Default Emails

Default sender of all emails: **Gregory Rodriguez**

Invitation

Subject: **Online Community Dissertation Study of the Community Learning Exchange (CLE)**

Hello <<Name>>,

Thank you for taking the time to participate in the study. The purpose of this research is to assess the perspectives held among participants in the online CLE website regarding factors which inhibit or increase participation online.

You were chosen to participate in this study because you are a member of the CLE online community and you have also attended a face-to-face meeting of the Community Learning Exchange in the past. Your participation in this study is completely voluntary. If you choose to participate and encounter any difficulty completing the assessment, please let me know. Also, there will be an optional open-response section at the end of the sort where you can provide additional thoughts or insights.

By participating in this study, you are consenting to take part in research conducted by Greg Rodriguez, a doctoral student at Texas State University-San Marcos (email: gr24@txstate.edu, phone: 210-860-8989). Your participation is completely

voluntary and you do not need to answer any of the questions. You are free to withdraw from the study at any time. Your identity will be kept confidential.

To participate in my study, click here:

Here is the link to participate. Simply click on this link and your browser should open to the page. If for some reason it doesn't, simply copy and paste *the entire link* into your browser's location bar:

<http://q-assessor.com/studies/632/responses/new?code=XXXX>

We hope that you want to participate, but if you do not, **here is the link to refuse.** Simply click on this link and your browser should open to the page. If for some reason it doesn't, simply copy and paste *this entire link* into your browser's location bar:

<http://q-assessor.com/studies/632/responses/refuse?code=XXXX>

Reminder

Subject: **REMINDER: Online Community Dissertation Study of the Community**

Learning Exchange (CLE)

Hello <<Name>>,

This is reminder email to participate in the Online Community Dissertation Study of the Community Learning Exchange (CLE).

Your participation is completely voluntary. If you choose to participate, please let me know if you have issues with any statements. Also, let me know what statements you think are missing.

To participate in the study, click here:

Here is the link to participate. Simply click on this link and your browser should open

to the page. If for some reason it doesn't, simply copy and paste *the entire link* into your browser's location bar:

<http://q-assessor.com/studies/632/responses/new?code=XXXX>

We hope that you want to participate, but if you do not, **here is the link to refuse**. Simply click on this link and your browser should open to the page. If for some reason it doesn't, simply copy and paste *this entire link* into your browser's location bar:

<http://q-assessor.com/studies/632/responses/refuse?code=XXXX>

Thank You

Subject: **Thank you for your participation!**

Hello <<Name>>,

Thank you for taking the time to participate in the Online Community Dissertation Study of the Community Learning Exchange (CLE). Your participation will help provide valuable information in regards to the CLE online community.

APPENDIX D: Factor Arrays

Factor Q-Sort Values for Each Statement		Factor Arrays				
No.	Statement	No.	1	2	3	4
1	The CLE online environment (Websitete) facilitates collaborat	1	0	1	-1	0
2	Online communication can help support the work of the CLE	2	3	3	4	2
3	Working with team members online is time consuming	3	1	3	-2	-4
4	I am an active user of social media (Facebook, Twitter, etc	4	2	-5	5	-4
5	The CLE online environment (Websitete) is easy to use	5	1	0	-3	0
6	I benefit from the my interaction with others during online	6	2	-1	2	1
7	I prefer face-to-face meetings over online communication	7	5	5	0	2
8	I prefer online communication over face-to-face meetings	8	-5	-3	-3	-2
9	The CLE online environment (Websitete) provides information I	9	2	2	2	2
10	I seek out social interactions on the CLE online environme	10	-2	-4	-3	-2
11	The CLE online environment (Websitete) gives me the opportun	11	1	0	1	1
12	I can use the online CLE environment (Websitete) to help sol	12	-1	1	-1	1
13	I contribute to online environments (Websitetes)	13	1	-3	0	0
14	I share my knowledge and expertise on the CLE online enviro	14	0	-2	-5	-1
15	I seek out the knowledge and expertise of other members in	15	0	-2	-2	-2
16	The CLE online environment (Websitete) is a relevant space t	16	-1	0	-1	0
17	The CLE online environment (Websitete) is learner-centered C	17	-2	-1	1	-1
18	The CLE online environment (Websitete) is knowledge-centered	18	0	0	0	0
19	The CLE online environment (Websitete) is community-centered	19	-1	2	3	5
20	The CLE online environment (Websitete) engages its members t	20	-4	-1	0	2
21	Working with team members face to face is time consuming	21	0	2	-1	-3
22	I avoid social interactions while on the CLE online enviro	22	-3	-1	0	-3
23	I share my knowledge and expertise in face to face meeting	23	4	4	3	3
24	I do not benefit from online interactions on the CLE online	24	-3	-2	2	-4
25	The CLE online environment (Websitete) promotes a sense of	25	-2	2	-2	-1
26	The CLE online environment provides me an opportunity to e	26	3	1	1	1
27	The CLE online environment (Websitete) provides me an opport	27	2	1	-1	1
28	Online communication can help support the work of communit	28	4	3	4	3
29	The CLE online environment (Websitete) allows for intergener	29	0	1	1	4
30	My interactions in the CLE online environment (Websitete) ha	30	-2	-2	-4	-1
31	The CLE online environment (Websitete) has surfaced similar	31	-1	0	1	0
32	The CLE online environment (Websitete) provides me with a na	32	1	4	3	3
33	I use the CLE online environment (Websitete) to post stories	33	3	-4	-4	-2
34	The CLE online environment (Websitete) responds to the diver	34	-1	-4	0	-1
35	The CLE online environment (Websitete) is equally suitable a	35	-4	-3	-2	-3
36	I require specialized training to better utilize the CLE o	36	-3	0	2	-5

Factor Q-Sort Values for Statements sorted by Consensus vs. Disagreement (Variance across Factor Z-Scores)

No.	Statement	Factor Arrays				
		No.	1	2	3	4
18	The CLE online environment (website) is knowledge-centered	18	0	0	0	0
11	The CLE online environment (website) gives me the opportunity	11	1	0	1	1
9	The CLE online environment (website) provides information	9	2	2	2	2
2	Online communication can help support the work of the CLE	2	3	3	4	2
34	The CLE online environment (website) responds to the diver	34	-1	-1	0	-1
28	Online communication can help support the work of communit	28	4	3	4	3
15	I seek out the knowledge and expertise of other members in	15	0	-2	-2	-2
23	I share my knowledge and expertise in face to face meeting	23	4	4	3	3
26	The CLE online environment provides me an opportunity to e	26	3	1	1	1
16	The CLE online environment (website) is a relevant space t	16	-1	0	-1	0
17	The CLE online environment (website) is learner-centered (	17	-2	-1	1	-1
12	I can use the online CLE environment (website) to help sol	12	-1	1	-1	1
1	The CLE online environment (website) facilitates collaborat	1	0	1	-1	0
31	The CLE online environment (website) has surfaced similar	31	-1	0	1	0
10	I seek out social interactions on the CLE online environme	10	-2	-4	-3	-2
27	The CLE online environment (website) provides me an opport	27	2	1	-1	1
32	The CLE online environment (website) provides me with a na	32	1	4	3	3
8	I prefer online communication over face-to-face meetings	8	-5	-3	-3	-2
30	My interactions in the CLE online environment (website) ha	30	-2	-2	-4	-1
35	The CLE online environment (website) is equally suitable a	35	-4	-3	-2	-3
29	The CLE online environment (website) allows for intergener	29	0	1	1	4
6	I benefit from the my interaction with others during online	6	2	-1	2	1
22	I avoid social interactions while on the CLE online enviro	22	-3	-1	0	-3
25	The CLE online environment (website) promotes a sense of ,	25	-2	2	-2	-1
5	The CLE online environment (website) is easy to use	5	1	0	-3	0
13	I contribute to online environments (websites)	13	1	-3	0	0
20	The CLE online environment (websites) engages its members i	20	-4	-1	0	2
19	The CLE online environment (website) is community-centered	19	-1	2	3	5
21	Working with team members face to face is time consuming	21	0	2	-1	-3
14	I share my knowledge and expertise on the CLE online enviro	14	0	-2	-5	-1
7	I prefer face-to-face meetings over online communication	7	5	5	0	2
3	Working with team members online is time consuming	3	1	3	-2	-4
24	I do not benefit from online interactions on the CLE online	24	-3	-2	2	-4
36	I require specialized training to better utilize the CLE o	36	-3	0	2	-5
33	I use the CLE online environment (website) to post stories	33	3	-4	-4	-2
4	I am an active user of social media (Facebook, Twitter, etc	4	2	-5	5	4

APPENDIX E: Rank Statement Totals within Each Factor

Exact Factor Scores (.1a SPSS) in Z-Score and T-Score units		Factors								
No.	Statement	No.	1	2	3	4				
1	The CLE online environment (Websitete) facilitates colla	1	-0.11	49	0.50	55	-1.02	40	0.60	56
2	Online communication can help support the work of the	2	0.91	59	0.79	58	1.03	60	0.44	54
3	Working with team members online is time consuming	3	0.77	58	1.26	63	-0.66	43	-2.33	27
4	I am an active user of social media (Facebook, Twitter	4	0.93	59	-3.26	17	2.49	75	1.36	64
5	The CLE online environment (Websitete) is easy to use	5	0.13	51	-0.06	49	-1.26	37	0.93	59
6	I benefit from the my interaction with others during o	6	0.83	58	-0.33	47	0.09	51	0.34	53
7	I prefer face-to-face meetings over online communicati	7	2.37	74	1.92	69	-0.14	49	-0.55	44
8	I prefer online communication over face-to-face meetin	8	-1.70	33	-1.16	38	-0.02	50	-1.03	40
9	The CLE online environment (Websitete) provides informat	9	0.30	53	0.75	57	0.77	58	0.50	55
10	I seek out social interactions on the CLE online enviro	10	-0.12	49	-1.47	35	-0.80	42	-0.45	46
11	The CLE online environment (Websitete) gives me the oppo	11	0.27	53	0.40	54	0.42	54	0.49	55
12	I can use the online CLE environment (Websitete) to help	12	-0.77	42	0.50	55	-0.83	42	0.56	56
13	I contribute to online environments (Websitete)	13	1.27	63	-1.73	33	0.60	56	-0.33	47
14	I share my knowledge and expertise on the CLE online e	14	0.42	54	-1.07	39	-1.82	32	0.18	52
15	I seek out the knowledge and expertise of other member	15	0.12	51	-0.61	44	-0.92	41	-0.46	45
16	The CLE online environment (Websitete) is a relevant spa	16	-0.41	46	0.07	51	-0.81	42	0.46	55
17	The CLE online environment (Websitete) is learner-cente	17	-0.83	42	-0.18	48	0.17	52	0.39	54
18	The CLE online environment (Websitete) is knowledge-cent	18	-0.81	42	-0.07	49	0.21	52	0.61	56
19	The CLE online environment (Websitete) is community-cent	19	-0.87	41	0.98	60	0.46	55	1.92	69
20	The CLE online environment (Websitete) engages its membe	20	-1.32	37	0.02	50	0.09	51	0.84	58
21	Working with team members face to face is time consumi	21	0.33	53	0.48	50	0.00	50	-1.85	31
22	I avoid social interactions while on the CLE online en	22	-0.83	42	0.13	51	0.45	54	-1.88	31
23	I share my knowledge and expertise in face to face mee	23	1.17	62	1.19	62	0.80	58	0.46	55
24	I do not benefit from online interactions on the CLE o	24	-0.90	41	-0.35	46	1.88	69	-1.79	32
25	The CLE online environment (Websitete) promotes a sense	25	-1.13	39	0.73	57	-1.24	38	0.55	56
26	The CLE online environment (Websitete) provides an oppo	26	1.01	60	-0.05	50	0.32	53	0.16	52
27	The CLE online environment (Websitete) provides me an op	27	0.43	54	0.60	56	-0.32	47	0.30	53
28	Online communication can help support the work of comm	28	1.02	60	0.54	55	1.42	64	0.32	53
29	The CLE online environment (Websitete) allows for interg	29	-0.43	46	0.22	52	0.26	53	1.28	63
30	My interactions in the CLE online environment (Website	30	-0.16	48	-0.66	43	-1.85	31	0.26	53
31	The CLE online environment (Websitete) has surfaced simi	31	-0.56	44	0.25	52	0.40	54	0.33	53
32	The CLE online environment (Websitete) provides me with	32	-0.07	49	1.35	63	0.71	57	0.70	57
33	I use the CLE online environment (Websitete) to post sto	33	2.29	73	-1.55	34	-1.74	33	-0.73	43
34	The CLE online environment (Websitete) responds to the d	34	-0.78	42	0.14	45	-0.14	47	0.05	51
35	The CLE online environment (Websitete) is equally suitab	35	-1.75	32	-0.53	41	-0.26	49	-0.58	44
36	I require specialized training to better utilize the C	36	-1.00	40	0.29	53	1.29	63	-2.06	29

APPENDIX F: Descending Array of Differences Between Factors

Descending Array of Differences Between Factors		1	and	2
No.	Statement	Type 1	Type 2	Difference
4	I am an active user of social media (Facebook, Twitter, etc	0.842	-2.287	3.130
33	I use the CLE online environment (Website) to post stories	1.426	-1.632	3.058
13	I contribute to online environments (Websites)	0.607	-1.260	1.867
6	I benefit from the my interaction with others during online	0.874	-0.411	1.285
14	I share my knowledge and expertise on the CLE online enviro	0.053	-1.180	1.233
26	The CLE online environment provides me an opportunity to e	1.067	0.325	0.742
10	I seek out social interactions on the CLE online environme	-1.004	-1.513	0.509
15	I seek out the knowledge and expertise of other members in	-0.111	-0.598	0.487
5	The CLE online environment (Website) is easy to use	0.349	0.058	0.291
28	Online communication can help support the work of communit	1.539	1.256	0.284
27	The CLE online environment (Website) provides me an opport	0.648	0.371	0.276
30	My interactions in the CLE online environment (Website) ha	-0.595	-0.811	0.216
2	Online communication can help support the work of the CLE	1.108	0.982	0.126
11	The CLE online environment (Website) gives me the opportun	0.337	0.230	0.107
7	I prefer face-to-face meetings over online communication	2.208	2.135	0.073
23	I share my knowledge and expertise in face to face meeting	1.652	1.748	-0.097
18	The CLE online environment (Website) is knowledge-centered	-0.105	-0.003	-0.102
9	The CLE online environment (Website) provides information I	0.722	0.884	-0.162
16	The CLE online environment (Website) is a relevant space t	-0.267	0.000	-0.267
29	The CLE online environment (Website) allows for intergener	-0.007	0.276	-0.283
21	Working with team members face to face is time consuming	0.218	0.573	-0.356
34	The CLE online environment (Website) responds to the diver	-0.461	-0.051	-0.410
24	I do not benefit from online interactions on the CLE onlin	-1.184	-0.687	-0.497
1	The CLE online environment (Website) facilitates collaborat	-0.015	0.511	-0.526
17	The CLE online environment (Website) is learner-centered (	-0.653	-0.119	-0.534
31	The CLE online environment (Website) has surfaced similari	-0.484	0.090	-0.574
8	I prefer online communication over face-to-face meetings	-2.038	-1.454	-0.584
12	I can use the online CLE environment (Website) to help sol	-0.327	0.302	-0.629
35	The CLE online environment (Website) is equally suitable a	-1.996	-1.351	-0.645
3	Working with team members online is time consuming	0.310	1.049	-0.739
22	I avoid social interactions while on the CLE online enviro	-1.159	-0.258	-0.901
32	The CLE online environment (Website) provides me with a na	0.276	1.311	-1.035
20	The CLE online environment (Website) engages its members i	-1.240	-0.070	-1.170
36	I require specialized training to better utilize the CLE o	-1.230	-0.019	-1.211
19	The CLE online environment (Website) is community-centered	-0.463	0.952	-1.415
25	The CLE online environment (Website) promotes a sense of ,	-0.896	0.650	-1.547

Descending Array of Differences Between Factors 1 and 3

No.	Statement	No.	Type 1	Type 3	Difference
33	I use the CLE online environment (website) to post stories	33	1.426	-1.634	3.059
7	I prefer face-to-face meetings over online communication	7	2.208	-0.191	2.398
14	I share my knowledge and expertise on the CLE online enviro	14	0.053	-2.263	2.316
5	The CLE online environment (website) is easy to use	5	0.349	-1.233	1.582
3	Working with team members online is time consuming	3	0.310	-0.725	1.035
27	The CLE online environment (website) provides me an opport	27	0.648	-0.310	0.958
30	My interactions in the CLE online environment (website) ha	30	-0.595	-1.449	0.854
21	Working with team members face to face is time consuming	21	0.218	-0.572	0.790
13	I contribute to online environments (websites)	13	0.607	-0.097	0.703
15	I seek out the knowledge and expertise of other members in	15	-0.111	-0.716	0.605
26	The CLE online environment provides me an opportunity to e	26	1.067	0.480	0.588
1	The CLE online environment (website) facilitates collaborat	1	-0.015	-0.480	0.465
23	I share my knowledge and expertise in face to face meeting	23	1.652	1.222	0.430
10	I seek out social interactions on the CLE online environme	10	-1.004	-1.352	0.348
16	The CLE online environment (website) is a relevant space t	16	-0.267	-0.549	0.281
28	Online communication can help support the work of communit	28	1.539	1.291	0.248
6	I benefit from the my interaction with others during online	6	0.874	0.688	0.187
12	I can use the online CLE environment (website) to help sol	12	-0.327	-0.386	0.059
18	The CLE online environment (website) is knowledge-centered	18	-0.105	0.052	-0.156
2	Online communication can help support the work of the CLE	2	1.108	1.352	-0.244
25	The CLE online environment (website) promotes a sense of ,	25	-0.896	-0.609	-0.287
11	The CLE online environment (website) gives me the opportun	11	0.337	0.644	-0.307
29	The CLE online environment (website) allows for intergener	29	-0.007	0.334	-0.342
9	The CLE online environment (website) provides information I	9	0.722	1.124	-0.402
34	The CLE online environment (website) responds to the diver	34	-0.461	0.052	-0.513
17	The CLE online environment (website) is learner-centered C	17	-0.653	0.181	-0.834
22	I avoid social interactions while on the CLE online enviro	22	-1.159	-0.306	-0.853
32	The CLE online environment (website) provides me with a na	32	0.276	1.156	-0.879
31	The CLE online environment (website) has surfaced similari	31	-0.484	0.553	-1.036
8	I prefer online communication over face-to-face meetings	8	-2.038	-0.883	-1.155
35	The CLE online environment (website) is equally suitable a	35	-1.996	-0.767	-1.229
20	The CLE online environment (website) engages its members i	20	-1.240	-0.003	-1.237
4	I am an active user of social media (Facebook, Twitter, etc	4	0.842	2.321	-1.478
19	The CLE online environment (website) is community-centered	19	-0.463	1.196	-1.659
24	I do not benefit from online interactions on the CLE onlin	24	-1.184	0.940	-2.124
36	I require specialized training to better utilize the CLE o	36	-1.230	0.939	-2.169

Descending Array of Differences Between Factors 1 and 4

No.	Statement	No.	Type 1	Type 4	Difference
3	Working with team members online is time consuming	3	0.310	-1.643	1.953
33	I use the CLE online environment (Website) to post stories	33	1.426	-0.484	1.910
21	Working with team members face to face is time consuming	21	0.218	-1.566	1.784
7	I prefer face-to-face meetings over online communication	7	2.208	0.851	1.357
36	I require specialized training to better utilize the CLE o	36	-1.230	-2.068	0.838
24	I do not benefit from online interactions on the CLE onlin	24	-1.184	-1.872	0.688
28	Online communication can help support the work of communit	28	1.539	0.928	0.611
26	The CLE online environment provides me an opportunity to e	26	1.067	0.558	0.509
22	I avoid social interactions while on the CLE online enviro	22	-1.159	-1.591	0.433
13	I contribute to online environments (Websites)	13	0.607	0.178	0.428
23	I share my knowledge and expertise in face to face meeting	23	1.652	1.233	0.419
15	I seek out the knowledge and expertise of other members in	15	-0.111	-0.430	0.319
5	The CLE online environment (Website) is easy to use	5	0.349	0.040	0.308
2	Online communication can help support the work of the CLE	2	1.108	0.853	0.255
6	I benefit from the my interaction with others during online	6	0.874	0.680	0.194
14	I share my knowledge and expertise on the CLE online enviro	14	0.053	-0.044	0.097
9	The CLE online environment (Website) provides information I	9	0.722	0.734	0.012
27	The CLE online environment (Website) facilitates collaborat	27	0.648	0.665	-0.018
1	The CLE online environment (Website) gives me the opportun	1	-0.015	0.023	-0.038
11	The CLE online environment (Website) provides me an opport	11	0.337	0.467	-0.130
34	The CLE online environment (Website) responds to the diver	34	-0.461	-0.309	-0.152
30	My interactions in the CLE online environment (Website) ha	30	-0.595	-0.270	-0.325
18	The CLE online environment (Website) is knowledge-centered	18	-0.105	0.259	-0.364
17	The CLE online environment (Website) is learner-centered	17	-0.653	-0.217	-0.436
10	I seek out social interactions on the CLE online environme	10	-1.004	-0.547	-0.457
35	The CLE online environment (Website) is equally suitable a	35	-1.996	-1.525	-0.471
16	The CLE online environment (Website) is a relevant space t	16	-0.267	0.211	-0.478
8	I prefer online communication over face-to-face meetings	8	-2.038	-1.472	-0.567
4	I am an active user of social media (Facebook, Twitter, etc	4	0.842	1.416	-0.573
32	The CLE online environment (Website) provides me with a na	32	0.276	0.855	-0.579
12	I can use the online CLE environment (Website) to help sol	12	-0.327	0.297	-0.624
31	The CLE online environment (Website) has surfaced similari	31	-0.484	0.147	-0.631
25	The CLE online environment (Website) promotes a sense of ,	25	-0.896	-0.153	-0.744
29	The CLE online environment (Website) allows for intergener	29	-0.007	1.235	-1.242
20	The CLE online environment (Website) engages its members i	20	-1.240	0.790	-2.031
19	The CLE online environment (Website) is community-centered	19	-0.463	1.771	-2.235

Descending Array of Differences Between Factors 2 and 3

No.	Statement	No.	Type 2	Type 3	Difference
7	I prefer face-to-face meetings over online communication	7	2.135	-0.191	2.325
3	Working with team members online is time consuming	3	1.049	-0.725	1.774
5	The CLE online environment (Website) is easy to use	5	0.058	-1.233	1.291
25	The CLE online environment (Website) promotes a sense of ,	25	0.650	-0.609	1.260
21	Working with team members face to face is time consuming ,	21	0.573	-0.572	1.146
14	I share my knowledge and expertise on the CLE online enviro	14	-1.180	-2.263	1.083
1	The CLE online environment (Website) facilitates collaborat	1	0.511	-0.480	0.991
12	I can use the online CLE environment (Website) to help sol	12	0.302	-0.386	0.688
27	The CLE online environment (Website) provides me an opport	27	0.371	-0.310	0.682
30	My interactions in the CLE online environment (Website) ha	30	-0.811	-1.449	0.638
16	The CLE online environment (Website) is a relevant space t	16	0.000	-0.549	0.549
23	I share my knowledge and expertise in face to face meeting	23	1.748	1.222	0.526
32	The CLE online environment (Website) provides me with a na	32	1.311	1.156	0.155
15	I seek out the knowledge and expertise of other members in	15	-0.598	-0.716	0.118
22	I avoid social interactions while on the CLE online enviro	22	-0.258	-0.306	0.048
33	I use the CLE online environment (Website) to post stories	33	-1.632	-1.634	0.001
28	Online communication can help support the work of communit	28	1.256	1.291	-0.036
18	The CLE online environment (Website) is knowledge-centered	18	-0.003	0.052	-0.055
29	The CLE online environment (Website) allows for intergener	29	0.276	0.334	-0.058
20	The CLE online environment (Website) engages its members i	20	-0.070	-0.003	-0.067
34	The CLE online environment (Website) responds to the diver	34	-0.051	0.052	-0.103
26	The CLE online environment provides me an opportunity to e	26	0.325	0.480	-0.154
10	I seek out social interactions on the CLE online environme	10	-1.513	-1.352	-0.161
9	The CLE online environment (Website) provides information I	9	0.884	1.124	-0.240
19	The CLE online environment (Website) is community-centered	19	0.952	1.196	-0.244
17	The CLE online environment (Website) is learner-centered (	17	-0.119	0.181	-0.300
2	Online communication can help support the work of the CLE	2	0.982	1.352	-0.370
11	The CLE online environment (Website) gives me the opportun	11	0.230	0.644	-0.414
31	The CLE online environment (Website) has surfaced similari	31	0.090	0.553	-0.462
8	I prefer online communication over face-to-face meetings	8	-1.454	-0.883	-0.571
35	The CLE online environment (Website) is equally suitable a	35	-1.351	-0.767	-0.584
36	I require specialized training to better utilize the CLE o	36	-0.019	0.939	-0.958
6	I benefit from the my interaction with others during online	6	-0.411	0.688	-1.098
13	I contribute to online environments (Websites)	13	-1.260	-0.097	-1.164
24	I do not benefit from online interactions on the CLE onlin	24	-0.687	0.940	-1.627
4	I am an active user of social media (Facebook, Twitter, etc	4	-2.287	2.321	-4.608

Descending Array of Differences Between Factors 2 and 4

No.	Statement	No.	Type 2	Type 4	Difference
3	Working with team members online is time consuming	3	1.049	-1.643	2.692
21	Working with team members face to face is time consuming	21	0.573	-1.566	2.140
36	I require specialized training to better utilize the CLE o	36	-0.019	-2.068	2.050
22	I avoid social interactions while on the CLE online enviro	22	-0.258	-1.591	1.334
7	I prefer face-to-face meetings over online communication	7	2.135	0.851	1.284
24	I do not benefit from online interactions on the CLE onlin	24	-0.687	-1.872	1.185
25	The CLE online environment (Website) promotes a sense of ,	25	0.650	-0.153	0.803
23	I share my knowledge and expertise in face to face meeting	23	1.748	1.233	0.516
1	The CLE online environment (Website) facilitates collaborat	1	0.511	0.023	0.488
32	The CLE online environment (Website) provides me with a na	32	1.311	0.855	0.456
28	Online communication can help support the work of communit	28	1.256	0.928	0.328
34	The CLE online environment (Website) responds to the diver	34	-0.051	-0.309	0.258
35	The CLE online environment (Website) is equally suitable a	35	-1.351	-1.525	0.174
9	The CLE online environment (Website) provides information I	9	0.884	0.734	0.150
2	Online communication can help support the work of the CLE	2	0.982	0.853	0.129
17	The CLE online environment (Website) is learner-centered (	17	-0.119	-0.217	0.099
5	The CLE online environment (Website) is easy to use	5	0.058	0.040	0.017
8	I prefer online communication over face-to-face meetings	8	-1.454	-1.472	0.017
12	I can use the online CLE environment (Website) to help sol	12	0.302	0.297	0.005
31	The CLE online environment (Website) has surfaced similar i	31	0.090	0.147	-0.057
15	I seek out the knowledge and expertise of other members in	15	-0.598	-0.430	-0.168
16	The CLE online environment (Website) is a relevant space t	16	0.000	0.211	-0.211
26	The CLE online environment provides me an opportunity to e	26	0.325	0.558	-0.233
11	The CLE online environment (Website) gives me the opportun	11	0.230	0.467	-0.237
18	The CLE online environment (Website) is knowledge-centered	18	-0.003	0.259	-0.262
27	The CLE online environment (Website) provides me an opport	27	0.371	0.665	-0.294
30	My interactions in the CLE online environment (Website) ha	30	-0.811	-0.270	-0.541
19	The CLE online environment (Website) is community-centered	19	0.952	1.771	-0.819
20	The CLE online environment (Website) engages its members i	20	-0.070	0.790	-0.860
29	The CLE online environment (Website) allows for intergener	29	0.276	1.235	-0.959
10	I seek out social interactions on the CLE online enviro	10	-1.513	-0.547	-0.966
6	I benefit from the my interaction with others during online	6	-0.411	0.680	-1.091
14	I share my knowledge and expertise on the CLE online enviro	14	-1.180	-0.044	-1.137
33	I use the CLE online environment (Website) to post stories	33	-1.632	-0.484	-1.148
13	I contribute to online environments (Websites)	13	-1.260	0.178	-1.439
4	I am an active user of social media (Facebook, Twitter, etc	4	-2.287	1.416	-3.703

Descending Array of Differences Between Factors 3 and 4

No.	Statement	No.	Type 3	Type 4	Difference
36	I require specialized training to better utilize the CLE o	36	0.939	-2.068	3.008
24	I do not benefit from online interactions on the CLE onlin	24	0.940	-1.872	2.812
22	I avoid social interactions while on the CLE online enviro	22	-0.306	-1.591	1.286
21	Working with team members face to face is time consuming	21	-0.572	-1.566	0.994
3	Working with team members online is time consuming	3	-0.725	-1.643	0.918
4	I am an active user of social media (Facebook, Twitter, etc	4	2.321	1.416	0.905
35	The CLE online environment (website) is equally suitable a	35	-0.767	-1.525	0.758
8	I prefer online communication over face-to-face meetings	8	-0.883	-1.472	0.588
2	Online communication can help support the work of the CLE	2	1.352	0.853	0.499
31	The CLE online environment (website) has surfaced similar	31	0.553	0.147	0.405
17	The CLE online environment (website) is learner-centered (	17	0.181	-0.217	0.398
9	The CLE online environment (website) provides information I	9	1.124	0.734	0.390
28	Online communication can help support the work of communit	28	1.291	0.928	0.363
34	The CLE online environment (website) responds to the diver	34	0.052	-0.309	0.361
32	The CLE online environment (website) provides me with a na	32	1.156	0.855	0.301
11	The CLE online environment (website) gives me the opportun	11	0.644	0.467	0.177
6	I benefit from the my interaction with others during online	6	0.688	0.680	0.008
23	I share my knowledge and expertise in face to face meeting	23	1.222	1.233	-0.011
26	The CLE online environment provides me an opportunity to e	26	0.480	0.558	-0.078
18	The CLE online environment (website) is knowledge-centered	18	0.052	0.259	-0.208
13	I contribute to online environments (websites)	13	-0.097	0.178	-0.275
15	I seek out the knowledge and expertise of other members in	15	-0.716	-0.430	-0.286
25	The CLE online environment (website) promotes a sense of ,	25	-0.609	-0.153	-0.457
1	The CLE online environment (website) facilitates collaborat	1	-0.480	0.023	-0.503
19	The CLE online environment (website) is community-centered	19	1.196	1.771	-0.575
12	I can use the online CLE environment (website) to help sol	12	-0.386	0.297	-0.683
16	The CLE online environment (website) is a relevant space t	16	-0.549	0.211	-0.759
20	The CLE online environment (website) engages its members i	20	-0.003	0.790	-0.793
10	I seek out social interactions on the CLE online environme	10	-1.352	-0.547	-0.805
29	The CLE online environment (website) allows for intergener	29	0.334	1.235	-0.900
27	The CLE online environment (website) provides me an opport	27	-0.310	0.665	-0.976
7	I prefer face-to-face meetings over online communication	7	-0.191	0.851	-1.041
33	I use the CLE online environment (website) to post stories	33	-1.634	-0.484	-1.149
30	My interactions in the CLE online environment (website) ha	30	-1.449	-0.270	-1.179
5	The CLE online environment (website) is easy to use	5	-1.233	0.040	-1.273
14	I share my knowledge and expertise on the CLE online enviro	14	-2.263	-0.044	-2.219

APPENDIX G: Factor Q-sort Values for Each Statement

Factor Scores -- For Factor 1

No.	Statement	No.	Z-SCORES
7	I prefer face-to-face meetings over online communication	7	2.208
23	I share my knowledge and expertise in face to face meeting	23	1.652
28	Online communication can help support the work of communit	28	1.539
33	I use the CLE online environment (website) to post stories	33	1.426
2	Online communication can help support the work of the CLE	2	1.108
26	The CLE online environment provides me an opportunity to e	26	1.067
6	I benefit from the my interaction with others during online	6	0.874
4	I am an active user of social media (Facebook, Twitter, etc	4	0.842
9	The CLE online environment (website) provides information I	9	0.722
27	The CLE online environment (website) provides me an opport	27	0.648
13	I contribute to online environments (websites)	13	0.607
5	The CLE online environment (website) is easy to use	5	0.349
11	The CLE online environment (website) gives me the opportun	11	0.337
3	Working with team members online is time consuming	3	0.310
32	The CLE online environment (website) provides me with a na	32	0.276
21	Working with team members face to face is time consuming	21	0.218
14	I share my knowledge and expertise on the CLE online envir	14	0.053
29	The CLE online environment (website) allows for intergener	29	-0.007
1	The CLE online environment (website) facilitates collaborat	1	-0.015
18	The CLE online environment (website) is knowledge-centered	18	-0.105
15	I seek out the knowledge and expertise of other members in	15	-0.111
16	The CLE online environment (website) is a relevant space t	16	-0.267
12	I can use the online CLE environment (website) to help sol	12	-0.327
34	The CLE online environment (website) responds to the diver	34	-0.461
19	The CLE online environment (website) is community-centered	19	-0.463
31	The CLE online environment (website) has surfaced similari	31	-0.484
30	My interactions in the CLE online environment (website) ha	30	-0.595
17	The CLE online environment (website) is learner-centered (	17	-0.653
25	The CLE online environment (website) promotes a sense of ,	25	-0.896
10	I seek out social interactions on the CLE online environme	10	-1.004
22	I avoid social interactions while on the CLE online enviro	22	-1.159
24	I do not benefit from online interactions on the CLE onlin	24	-1.184
36	I require specialized training to better utilize the CLE o	36	-1.230
20	The CLE online environment (website) engages its members i	20	-1.240
35	The CLE online environment (website) is equally suitable a	35	-1.996
8	I prefer online communication over face-to-face meetings	8	-2.038

Factor Scores -- For Factor 2

No.	Statement	No.	Z-SCORES
7	I prefer face-to-face meetings over online communication	7	2.135
23	I share my knowledge and expertise in face to face meeting	23	1.748
32	The CLE online environment (website) provides me with a na	32	1.311
28	Online communication can help support the work of communit	28	1.256
3	Working with team members online is time consuming	3	1.049
2	Online communication can help support the work of the CLE	2	0.982
19	The CLE online environment (website) is community-centered	19	0.952
9	The CLE online environment (website) provides information I	9	0.884
25	The CLE online environment (website) promotes a sense of ,	25	0.650
21	Working with team members face to face is time consuming	21	0.573
1	The CLE online environment (website) facilitates collaborat	1	0.511
27	The CLE online environment (website) provides me an opport	27	0.371
26	The CLE online environment provides me an opportunity to e	26	0.325
12	I can use the online CLE environment (website) to help sol	12	0.302
29	The CLE online environment (website) allows for intergener	29	0.276
11	The CLE online environment (website) gives me the opportun	11	0.230
31	The CLE online environment (website) has surfaced similari	31	0.090
5	The CLE online environment (website) is easy to use	5	0.058
16	The CLE online environment (website) is a relevant space t	16	0.000
18	The CLE online environment (website) is knowledge-centered	18	-0.003
36	I require specialized training to better utilize the CLE o	36	-0.019
34	The CLE online environment (website) responds to the diver	34	-0.051
20	The CLE online environment (website) engages its members i	20	-0.070
17	The CLE online environment (website) is learner-centered (	17	-0.119
22	I avoid social interactions while on the CLE online enviro	22	-0.258
6	I benefit from the my interaction with others during online	6	-0.411
15	I seek out the knowledge and expertise of other members in	15	-0.598
24	I do not benefit from online interactions on the CLE onlin	24	-0.687
30	My interactions in the CLE online environment (website) ha	30	-0.811
14	I share my knowledge and expertise on the CLE online enviro	14	-1.180
13	I contribute to online environments (websites)	13	-1.260
35	The CLE online environment (website) is equally suitable a	35	-1.351
8	I prefer online communication over face-to-face meetings	8	-1.454
10	I seek out social interactions on the CLE online environme	10	-1.513
33	I use the CLE online environment (website) to post stories	33	-1.632
4	I am an active user of social media (Facebook, Twitter, etc	4	-2.287

Factor Scores -- For Factor 3

No.	Statement	No.	Z-SCORES
4	I am an active user of social media (Facebook, Twitter, etc	4	2.321
2	Online communication can help support the work of the CLE	2	1.352
28	Online communication can help support the work of communit	28	1.291
23	I share my knowledge and expertise in face to face meeting	23	1.222
19	The CLE online environment (website) is community-centered	19	1.196
32	The CLE online environment (website) provides me with a na	32	1.156
9	The CLE online environment (website) provides information I	9	1.124
24	I do not benefit from online interactions on the CLE onlin	24	0.940
36	I require specialized training to better utilize the CLE o	36	0.939
6	I benefit from the my interaction with others during online	6	0.688
11	The CLE online environment (website) gives me the opportun	11	0.644
31	The CLE online environment (website) has surfaced similari	31	0.553
26	The CLE online environment provides me an opportunity to e	26	0.480
29	The CLE online environment (website) allows for intergener	29	0.334
17	The CLE online environment (website) is learner-centered (	17	0.181
18	The CLE online environment (website) is knowledge-centered	18	0.052
34	The CLE online environment (website) responds to the diver	34	0.052
20	The CLE online environment (website) engages its members i	20	-0.003
13	I contribute to online environments (websites)	13	-0.097
7	I prefer face-to-face meetings over online communication	7	-0.191
22	I avoid social interactions while on the CLE online enviro	22	-0.306
27	The CLE online environment (website) provides me an opport	27	-0.310
12	I can use the online CLE environment (website) to help sol	12	-0.386
1	The CLE online environment (website) facilitates collaborat	1	-0.480
16	The CLE online environment (website) is a relevant space t	16	-0.549
21	Working with team members face to face is time consuming	21	-0.572
25	The CLE online environment (website) promotes a sense of ,	25	-0.609
15	I seek out the knowledge and expertise of other members in	15	-0.716
3	Working with team members online is time consuming	3	-0.725
35	The CLE online environment (website) is equally suitable a	35	-0.767
8	I prefer online communication over face-to-face meetings	8	-0.883
5	The CLE online environment (website) is easy to use	5	-1.233
10	I seek out social interactions on the CLE online environme	10	-1.352
30	My interactions in the CLE online environment (website) ha	30	-1.449
33	I use the CLE online environment (website) to post stories	33	-1.634
14	I share my knowledge and expertise on the CLE online envir	14	-2.263

Factor Scores -- For Factor 4

No.	Statement	No.	Z-SCORES
19	The CLE online environment (website) is community-centered	19	1.771
4	I am an active user of social media (Facebook, Twitter, etc	4	1.416
29	The CLE online environment (website) allows for intergener	29	1.235
23	I share my knowledge and expertise in face to face meeting	23	1.233
28	Online communication can help support the work of communit	28	0.928
32	The CLE online environment (website) provides me with a na	32	0.855
2	Online communication can help support the work of the CLE	2	0.853
7	I prefer face-to-face meetings over online communication	7	0.851
20	The CLE online environment (website) engages its members i	20	0.790
9	The CLE online environment (website) provides information I	9	0.734
6	I benefit from the my interaction with others during online	6	0.680
27	The CLE online environment (website) provides me an opport	27	0.665
26	The CLE online environment provides me an opportunity to e	26	0.558
11	The CLE online environment (website) gives me the opportun	11	0.467
12	I can use the online CLE environment (website) to help sol	12	0.297
18	The CLE online environment (website) is knowledge-centered	18	0.259
16	The CLE online environment (website) is a relevant space t	16	0.211
13	I contribute to online environments (websites)	13	0.178
31	The CLE online environment (website) has surfaced similari	31	0.147
5	The CLE online environment (website) is easy to use	5	0.040
1	The CLE online environment (website) facilitates collaborat	1	0.023
14	I share my knowledge and expertise on the CLE online enviro	14	-0.044
25	The CLE online environment (website) promotes a sense of ,	25	-0.153
17	The CLE online environment (website) is learner-centered (	17	-0.217
30	My interactions in the CLE online environment (website) ha	30	-0.270
34	The CLE online environment (website) responds to the diver	34	-0.309
15	I seek out the knowledge and expertise of other members in	15	-0.430
33	I use the CLE online environment (website) to post stories	33	-0.484
10	I seek out social interactions on the CLE online environme	10	-0.547
8	I prefer online communication over face-to-face meetings	8	-1.472
35	The CLE online environment (website) is equally suitable a	35	-1.525
21	Working with team members face to face is time consuming	21	-1.566
22	I avoid social interactions while on the CLE online enviro	22	-1.591
3	Working with team members online is time consuming	3	-1.643
24	I do not benefit from online interactions on the CLE onlin	24	-1.872
36	I require specialized training to better utilize the CLE o	36	-2.068

APPENDIX E: Institutional Review Board Exemption

Exemption Request EXP2011F2052 - Approval

<https://bobcatmail.txstate.edu/owa/?ae=Item&t=IPM.Note&id...>

Exemption Request EXP2011F2052 - Approval

AVPR IRB [ospirb@txstate.edu]

Sent: Tuesday, January 24, 2012 3:59 PM

To: Rodríguez, Gregory

DO NOT REPLY TO THIS MESSAGE. This email message is generated by the IRB online application program.

Based on the information in IRB Exemption Request EXP2011F2052 which you submitted on 11/23/11 14:04:44, your project is exempt from full or expedited review by the Texas State Institutional Review Board.

If you have questions, please submit an IRB Inquiry form:

http://www.txstate.edu/research/irb/irb_inquiry.html

Comments:

No comments.

=====

Institutional Review Board

Office of Research Compliance

Texas State University-San Marcos

(ph) 512/245-2314 / (fax) 512/245-3847 / ospirb@txstate.edu / JCK 489

601 University Drive, San Marcos, TX 78666

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REFERENCES

- Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*(2), 117–148.
- Barbosa, J., Willoughby, P., Rosenberg, C., & Mrtek, R. (1998). Statistical methodology: VII. Q-methodology, a structured analytical approach to medical subjectivity. *Academic Emergency Medicine, 5*, 1032–1040.
- Billet, S. (2006). Work, subjectivity and learning. In S. Billet, T. Fenwick, & M. Somerville (Eds.). *Work, subjectivity, and learning. Understanding learning through working life*. (pp. 1-20). Dordrecht, The Netherlands: Springer.
- Boyd, D., & Ellison, N. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication, 13*, 210–230.
- Brook, C., & Oliver, R. (2003). Online learning communities: Investigating a design framework. *Australasian Journal of Educational Technology, 19*(2), 139-160.
- Brown, J., Broderick, A. J., Lee, N. (2007). Word of mouth communication within online communities: Conceptualizing the online social network. *Journal of Interactive Marketing, 21*(3), 2-20.
- Brown, S. (1980). *Political subjectivity: Applications of q methodology in political science*. New Haven, CT: Yale University Press.
- Brown, S. (1993). A primer on Q methodology. *Operant subjectivity, 16* (3), 91-138.

- Brown, S., Durning, D. W., & Selden, S. (1999). Q methodology. In G. J. Miller, & M. L. Whicker (Eds.), *Handbook of research methods in public administration* (pp. 599–637). New York: Marcel Dekker.
- Brown, S. R., & Unga, T. (1970). Representativeness and the study of political behavior: an application of Q technique to reactions to the Kent State incident. *Social Science Quarterly*, 51(3), 514–526.
- Caspi, A., & Blau, I. (2008). Social presence in online discussion groups: Testing three conceptions and their relations to perceived learning. *Social Psychological Education*. 11, no. 3: 323–46.
- Chang, C. (2003). Towards a distributed web-based learning community. *Innovations in Education and Teaching International*, 40(1), 27–42.
- Collins, M., & Murphy, K. (1997). Development of communications conventions in instructional electronic chats. *Journal of Distance Education* 12, no. 1/2: 177–200.
- Community Learning Exchange (CLE). (2011)., Center for Ethical Leadership. (n.d.). Retrieved from <http://www.communitylearningexchange.org>
- Cunningham, S., Tapsall, S., Ryan, Y., Stedman, L., Bagdon, K., & Flew, T. (1997). *New media and borderless education: A review of the convergence between global media networks and higher education provision*. Canberra: Department of Employment, Education, Training and Youth Affairs.
- Daft, R.L., & R.H. Lengel. 1986. A proposed integration among organisational information requirements, media richness and structural design. *Management Science*, 32: 554–71.

- della Porta, D. (1988). Recruitment processes in clandestine political organizations: Italian left-wing terrorism. *Structure to Action*: 155- 172. Greenwich, CT: JAI Press.
- DuFour, R. (2004). What is a "Professional Learning Community"? *Educational Leadership*, 61(8), 6-11. Retrieved from EBSCOhost.
- Facebook. Statistics (2010). Retrieved from <http://www.facebook.com/press/info.php?statistics>.
- Gammelgaard, J. (2010). Knowledge retrieval through virtual communities of practice. *Behaviour & Information Technology*, 29(4), 349–362.
doi:10.1080/01449290903548406.
- Garrison, D. R. 2007. Online community of inquiry review: Social, cognitive and teaching presence issues. *Journal of Asynchronous Learning Networks*. 11, no. 1: 61–72.
- Giddens, A. (1991). *The consequences of modernity*. Stanford University Press.
- Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology*, 78 (6), 1360–80.
- Hampton, K. N., Sessions, L. F., Her, E. J. & Rainie, L. (2009). How the internet and mobile phones impact Americans' social networks. Pew Internet & American Life Project. Retrieved from http://www.pewinternet.org/~media/Files/Reports/2009/PIP_Tech_and_Social_Isolation.pdf.
- Hiltz, S., & Turoff, M. (1993). *Network nation: Human communication via computer*. (Revised ed.). Cambridge, MA: MIT Press.

- Hlapanis, G. & Dimitracopoulou, A. (2007) The school-teacher's learning community: matters of communication analysis. *Technology Pedagogy and Education* 16 (2) 133-152.
- Hord, S. M. (1997). *Professional learning communities: Communities of continuous inquiry and improvement*. Austin, TX: Southwest Educational Development Laboratory.
- Hsu, M. H., Ju, T. L., Yen, C., & Chang, C. (2007). Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations. *International Journal of Human-Computer Studies*, 65, 153.
doi:10.1016/j.ijhcs.2006.09.003
- Janssen, M., & Mendys-Kamphorst, E. (2007). Evolution of market shares with repeated purchases and heterogeneous network externalities. *Journal of Evolutionary Economics*, 17(5), 551–577.
- Kang, M., Kim, B., Gloor, P. & Bock, G.-W. (2011), Understanding the effect of social networks on user behaviors in community-driven knowledge services. *Journal of the American Society for Information Science and Technology*, 62: 1066–1074.
doi: 10.1002/asi.21533
- Kiesler, S., & Sproull, L. (1992). Group decision making and communication technology. *Organizational Behavior & Human Decision Processes*, 52, 96-123.
- Kraut, R., Rice, R., Cool, C., & Fish, R. (1998). Varieties of social influence. The role of utility and norms in the success of a new communication medium. *Organization Science*, 9(4), 437–453.

- Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
- Lee, B., & Anderson, J. (2001). An analysis of Internet adopters. *Operant Subjectivity*, 25(1), 11–36.
- Lee, B., & Synn, W. (2001). Investor response to online stock trading: a study using Q methodology. *Operant Subjectivity*, 24(3), 109–131.
- Lee, S., Vogel, D., & Limayem, M. (2002). Virtual community informatics: what we know and what we need to know? In R. H. Sprague (Ed.), *Proceedings of the 35th Hawaii international conference on system sciences* (pp. 2863-2872). Los Alamitos, CA: IEEE Computer Society Press.
- Leithwood, K., & Louis, K.S. (Eds.). (1998). *Organizational learning in schools*. Lisse, The Netherlands: Swetz & Zeitlinger.
- Lewis, L. A., Koston, Z., Quartley, M., & Adsit, J. (2010). Virtual Communities of Practice: Bridging Research and Practice Using Web 2.0. *Journal of Educational Technology Systems*, 39(2), 155–161. doi:10.2190/ET.39.2.e
- Liddicoat, A. J. (2006). Developing professional standards for accomplished language teachers. *Babel*, 40(3), 4-6 and 38.
- Little, J. (2005). Professional learning and school-network ties: Prospects for school improvement. *Journal of Educational Change*, 6(3).
- Liu, C. C. (2011). Identifying the value types of virtual communities based on the Q method. *International Journal of Web Based Communities*, 7(1), 52. doi:10.1504/IJWBC.2011.038125.

- Louis, K. S., Marks, H. M., & Kruse, S. (1996). Teachers' professional community in restructuring schools. *American Educational Research Journal*, 33, 757–798.
- Marshall, H. (1991). The social identities of women lawyers. *Operant Subjectivity*, 14(3), 106–121.
- McAdam, D. & Paulsen, R. (1993). Specifying the relationship between social ties and activism. *American Journal of Sociology*. 99:640-667.
- McCombs, B., & Vakili, D. (2005). A learner-centered framework for e-learning. *Teachers College Record*, 107 (8), 1582-600.
- McLeod, P. L., R.S. Baron, & M. W. Marti. 1997. The eyes have it: Minority influence in face-to-face and computer-mediated group discussion. *Journal of Applied Psychology*. 82, no. 5: 706–18.
- McKeown, B., & Thomas, D. (1988). Q methodology. London: Sage Publications.
- McLaughlin, M.W., & Talbert, J.E. (2001). *Professional communities and the work of high school teaching*. Chicago, IL: The University of Chicago Press.
- Meiers, M., & Ingvarson, L. (2005). Investigating the links between teacher professional development and student learning outcomes. Report to the Commonwealth Department of Education Australian Council for Educational Research. Retrieved November 20, 2009 from <http://www.acer.edu.au/tll/PDforteachers.html>
- Militello, M., & Janson, C. (2007). Socially-focused, situationally-driven practice: a study of distributed leadership practices among school principals and counselors. *Journal of School Leadership*, 17(4), 409–441.
- Moore, B. (2008). Using technology to promote communities of practice in social work education. *Social Work Education*, 27(6), 592-600.

- Murray, K. E., & Waller, R. (2007). Social networking goes abroad. *International Educator*, 16(3), 56–59
- Newman, M. E. J. (2003). The structure and function of complex networks. *SIAM Review*, 45(2), 167-256. Retrieved from <http://www.jstor.org/stable/25054401>
- Nickols, F. (2003). *Communities of practice: An overview*.
- O'Reilly, T. (2005). *What is web 2.0 patterns and business models for the next generation of software*. Retrieved March 9, 2011, from <http://www.oreilly.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web20.html>.
- Palloff, R., & Pratt, K. (1999). Building learning communities in cyberspace: effective strategies for the online classroom. San Francisco: Jossey-Bass.
- Patton, M. (2002). Qualitative evaluation and research methods. (2nd ed.). Newbury Park, CA: Sage.
- Rhoads, J., & Brown, S. (2002). Sex, lies, and videotape: attitudes toward the Clinton impeachment. *Operant Subjectivity*, 25(2), 99–116.
- Robey, D., Khoo, H.M. & Powers, C. (2000). Situated learning in cross-functional virtual teams. *IEEE transaction on professional communication*, 43 (1), 51-66.
- Rodgers, E. (2003). *Diffusion of Innovations* (5th ed.). New York: The Free Press.
- Rogers, J. (2000) Communities of practice: A framework for fostering coherence in virtual learning communities. *Educational Technology and Society*. 3 (3), 1-12.
- Rourke, L., T. Anderson, D. R. Garrison, and W. Archer. 2001. Assessing social presence in asynchronous text-based computer conferencing. *Journal of Distance Education* 14, no. 2: 50–71.

- Schauer, B. (2005). What put the '2' in web 2.0? Retrieved March 11, 2011 from http://adaptivepath.com/images/publications/essays/What_puts_the_2_in_Web_2_0.pdf
- Schlager, M. S., Farooq, U., Fusco, J., Schank, P., & Dwyer, N. (2009). Analyzing online teacher networks: Cyber networks require cyber research tools. *Journal of Teacher Education*, 60(1), 86-100. Retrieved from EBSCOhost.
- Schmolck, P. (2011). PQ-method, version 2.20 manual. Neibiderg, Germany: University of the Bundeswehr, Munich. Retrieved from <http://www.lrzmuemchen.de/~schmolck/qmethod>
- Schrum, L. (1998). On-line education: A study of emerging pedagogy. In Cahoon, B. (Ed.), *Adult Learning and the Internet*, San Francisco, CA: Jossey-Bass Publishers, 53–61.
- Schwartz, H. L. (2010). FACEBOOK: The new classroom commons?. *Education Digest*, 75(5), 39-42. Retrieved from EBSCOhost.
- Scott, J. (2000). *Social Network Analysis: A Handbook*, 2nd ed., London. Sage.
- Scribner, J. P., Cockrell, K. S., Cockrell, D. H., & Valentine, J. W. (1999). Creating professional communities in schools through organizational learning: an evaluation of a school improvement process. *Educational Administration Quarterly*, 35(1), 130-160.
- Selwyn, N. (2000). Creating a "connected" community? Teachers' use of an electronic discussion group. *Teachers College Record*, 102, 750-778.
- Sergiovanni, T. (1994). *Building community in schools*. San Francisco, CA: Jossey-Bass Inc.

- Shirky, C. (2008). *Here comes everybody: The power of organizing without networks*. New York: The Penguin Press.
- Short, J., E. Williams, & B. Christie. 1976. *The social psychology of communication*. New York: John Wiley & Sons.
- Singer, J. (1999). Pairing Q methodology and case studies to explore journalists' attitudes toward new media forms. *Operant Subjectivity*, 22(1/2), 1–19.
- Song, J., & Walden, E. (2007). How consumer perceptions of network size and social interactions influence the intention to adopt peer-to-peer technologies. *International Journal of E-Business Research*, 3(4), 49–66.
- Squire, K., & Johnson, C. (2000). Supporting distributed communities of practice with interactive television. *Educational Technology Research and Development*, 48(1), 23-43.
- Stacey, E., Smith, P. J. & Barty, K. (2004). Adult learners in the workplace: Online learning and communities of practice, *Distance Education*, 25 (1), 107-124.
- St. Clair, R. (1998). On the commonplace: Reclaiming community in adult education. *Adult Education Quarterly*, 49(1), 5-14.
- Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional learning communities: a review of the literature. *Journal of Educational Change*, 7(4), 221–258. doi:10.1007/s10833-006-0001-8.
- Texas Education Agency. (2012). Project Share reaches, exceeds 1 million users. [Press release]. Retrieved from:
http://www.tea.state.tx.us/news_release.aspx?id=2147508721

- Thomas, D., McBride, A., & Baas, L. (1996). Contrary convictions: race and subjectivity in public opinion on the O.J. Simpson criminal trial. *Operant Subjectivity*, 19(3/4), 58–84.
- The New York Times. (2009). The Texas Education Agency, Epsilen LLC, and The New York Times Company to collaborate on innovative eLearning portal. [Press release]. Retrieved from <http://www.nytc.com>
- Valaitis, R. K., Akhtar-Danesh, N., Brooks, F., Binks, S., & Semogas, D. (2011). Online communities of practice as a communication resource for community health nurses working with homeless persons. *Journal of Advanced Nursing*, 67(6), 1273–1284. doi:10.1111/j.1365-2648.2010.05582.x
- Valenta, A. L., & Wigger, U. (1997). Q-methodology: Definition and application in health care informatics. *Journal of the American Medical Informatics Association*, 4(6), 501-510.
- Van Exel, N. J. A., & De Graf, G. Q methodology: A sneak preview. 2005. Retrieved September 20, 2011 from <http://www.jobvanexel.nl>
- Vescio, V., Ross, D., & Adams, A. (2008). A review of research on the impact of professional learning communities on teaching practice and student learning. *Teaching and Teacher Education*, 24, (1), 80-91.
- Wasko, M. M., & Faraj, S. (2005). Why should i share? examining social capital and knowledge contribution in electronic networks of practice. *MIS Quarterly*, 29(1), 35–57.
- Wasserman, S., & Faust, K. (1994). *Social network analysis*. Cambridge. Cambridge University Press.

- Watts, S., & Stenner, P. (2005). Doing q methodology: Theory, method and interpretation. *Qualitative Research in Psychology*, 2, 67-91.
- Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge: Cambridge University Press.
- Wenger, E., McDermott, R., & Snyder, W. (2002). *Cultivating communities of practice: A guide to managing knowledge*. Boston, MA: Harvard Business Press.
- Wenger, E. C., & Snyder, W. M. (2000, Jan-Feb). Communities of practice: The organizational frontier. *Harvard Business Review*, 139-145.
- Wheatley, M. (2007). *Finding our way: leadership for an uncertain time*. San Francisco: Berrett-Koehler Publishers.
- Wick, C. (2000). Knowledge management and leadership opportunities for technical communicators. *Technical Communication*, 47 (4), 515-529.

VITA

Gregory (Greg) Rodríguez began his career in education working in the Southwest Independent School District at Southwest High School the week immediately following his undergraduate commencement ceremony. Greg taught middle and high school for eight years, including high school Spanish and English and later middle school English and Language Arts, in the Southwest, Del Valle, and Southside school districts.

After receiving his Master of Education in Curriculum and Instruction with a specialization in Instructional Technology, Greg took on a new role as a Campus Instructional Technologist and later a Technology Integration Facilitator for the San Antonio Independent School District. During his time as an educational technologist, Greg had the pleasure of implementing many of the technologies that began a pedagogical shift towards a constructivist paradigm.

In 2009, Greg moved to Austin to work for the Austin Independent School District as an Administrative Supervisor for High School Redesign. He later began working with teacher preparation at Texas State University-San Marcos where he coordinated the Teaching Residency Program for Critical Shortage Areas, a multi-million dollar grant from the US Department of Education.

Since 2011, Greg has served as the Director for Accountability and School Improvement in the San Marcos Consolidated Independent School District. He has co-authored various articles and presented at the local, state, and national level.

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This dissertation was typed by Gregory Rodríguez.