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Synchronous Communication And Its Effects On The Collaboration Of Professional Workplace Employees Engaged In A Problem Activity

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SYNCHRONOUS COMMUNICATION AND ITS EFFECTS ON THE COLLABORATION OF PROFESSIONAL WORKPLACE EMPLOYEES ENGAGED IN A PROBLEM ACTIVITY

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DEDICATION

To my mother, who always knew I could do this, but did not live long enough for me to show her.

Josephine Barber Johnson

July 30, 1944 – September 13, 2016

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Our God is an amazing God, and He made me tougher than I could ever imagine.

If I had a dollar for every time I did not believe I could do this and someone in my life reassured me that I could, two things would happen. First, I would have at least a million dollars and second, I would gladly share those dollars with those people.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

> We've all seen the images: Happy young employees, working productively in open-air workspaces, easily collaborating with co-workers and outside colleagues all over the world, utilizing persistent chat tools like Slack to keep on top of all their latest projects and other efforts. It sounds great, and in a few places in Silicon Valley, things do work that way—at least in theory. (O'Donnell, 2017, para. 1)

Millennials are now the largest generation in America and are working their way to becoming the largest generation in the workforce as boomers are retiring out (O'Donnell, 2017). CEO and founder of APPrise Mobile Jeff Corbin stated that "the importance of communicating and engaging with employees has never been more important. There is definitely a shift taking place from 'old school' and legacy communications solutions like email and corporate intranets to newer, more mobile friendly tools" (as quoted in White, 2016, para. 2). Given the widespread adoption of and growing dependence upon these new tools, Millennial workforce expert Lindsey Pollak explained that guidance is often still necessary to identify when "it's appropriate to send a text versus when a phone call or in-person meeting is needed" (as quoted in White, 2016, para. 12). Despite this need for additional guidance, many businesses still claim that the utilization of such asynchronous communication tools (as opposed to synchronous tools) has the potential to save significant amounts of both time and money; however, in some cases, the reality is quite different.

O'Donnell (2017) explained that even though companies are beginning to use more modern communication tools like Slack and Jabber, deployment levels for these technologies remains relatively low—less than 30% in a survey of 1001 U.S. employees. O'Donnell maintained that despite rapid advancements in communication technology, "employee habits haven't really changed" (para. 2). Survey results found that 75% of employees reported that they still primarily used what O'Donnell described as the "old school" methods of phone calls and emails (para. 5).

These 21st century modern communications and collaboration tools notwithstanding, many businesses seem content to continue using tools from the 20th century. Still, proponents argue that:

> Advances in information and communications technology have enabled teams to work together in a virtual environment on tasks that at one time were assumed to require face-to-face meetings. Organizations increasingly view virtual teams as a means to increase their flexibility and responsiveness while reducing costs. (Corbitt, Gardiner, & Wright, 2004, p. 1)

Assertions such as these praise asynchronous communication for its ability to allow people to interact despite the obstacles of time and space. While synchronous communication—which refers to same-time interactions—most commonly involve face-to-face interaction, asynchronous communication includes computer-supported collaboration methods such as email, electronic bulletin boards, chat, and mobile messaging.

In terms of the speed at which teams using asynchronous communication can complete their tasks and the ability to defy the communication barriers of time and space, asynchronous communication can be highly effective. In a comparative study involving eighteen different experiments on collaborative effects, Hatem, Kwan, and Miles (2012) found that groups using asynchronous communication achieved their solution faster than groups using a synchronous method. Additional benefits of asynchronous communication noted in this study included that its use improved the degree of controlling the cost of the project, increased employee productivity, and reduced the amount of time wasted (Hatem, Kwan, & Miles, 2012).

Unfortunately, the types of cost-saving measures that are associated with asynchronous communication do not always result in the desired outcomes when the need for collaboration and social interaction are taken into account. In some cases, these measures may actually reduce collaboration and social interaction (Warkentin, Sayeed & Hightower, 1997). While increasing the speed of productivity, the features of asynchronous communication attempt to foster interaction,

inclusion, and participation—which are all related to the feeling of being there or having a social presence (Warkentin et al., 1997). This is a direct result of asynchronous communication often lacking the *media richness* of synchronous communication. According to Cameron and Webster (2005), rich media involves tools and methods that

> Provide instant feedback, allow verbal and non-verbal cues, uses natural language, and conveys emotion. Rich media are thought to be best when communicating ambiguous ideas or concepts. Face-to-face communication would rate high in richness and email-based communication would be considered lower in richness. (p. 91)

In many human interactions a significant factor in the effectiveness of communication involves non-verbal messages (body language, facial expressions, tone, infliction, etc.)—which are immediate in synchronous communication as opposed to asynchronous communication where such interaction is often solely limited to verbal messages.

Cameron and Webster (2004) explained that organizations may face unforeseen challenges as a result of adopting emerging technologies as a cost-saving measure: "The impact and implications of these technologies for managers and employees often go far beyond the original intent of the technology designers" (p. 85). The authors went on to state that this was due to the lack of richness in asynchronous communication that is frequently found in synchronous communication and which generally allows people to interact at the same time and in the same space. These synchronous methods of communication typically include face-to-face meetings, phone calls, desktop conferencing, and web-based instant messaging programs such as Jabber and Slack. This media richness is critical to the social learning and development that can occur through appropriate collaborative efforts (Ellis, 2001; Krejins et al., 2002, 2003; Nardi & Whittaker, 2002).

Warkentin et al. (1997) explained that teams using synchronous communication develop social links that can produce significant results for an organization: "Development of relational links is important because researchers have associated strong relational links with many positive

outcomes including enhanced creativity and motivation, increased morale, better decisions, and fewer process losses" (p. 979). The importance of collaboration and social interaction found in synchronous communication is broadly supported in the literature (Cameron & Webster, 2005; Kreijns, Kirschner, & Jochems, 2003; Warkentin et al., 1997). Warkentin et al. (1997) concluded that "because [computer-mediated communications systems] reduce the amount and richness of the information that can be exchanged, it is more difficult for virtual teams to complete relationship-developing activities as compared to face-to-face teams" (p. 979). This may be due in part to the relationship between synchronous communication and collaborative learning. Kreijns et al. (2003) stated, "Collaborative learning leads to deeper level learning, critical thinking, shared understanding and long term retention of the learned material" (p. 337). In addition, Warkentin et al. (1997) explained that when face-to-face interaction is not possible, other avenues for building strong relationships are advised to ensure the cohesiveness and effectiveness of the team's interaction.

Statement of the Problem

Asynchronous communication may have a profound impact on employee collaboration and productivity in the workplace due to the loss of face-to-face interaction and the relationships these opportunities may foster. Conversely synchronous communication, as broadly defined within the literature, is a rich media that supports this type of collaboration and social interaction. Synchronous communication methods that encourage collaboration lead to deeper level learning, critical thinking, shared understanding, and long-term retention of the learned material (Kreijns et al., 2003). Schroder et al. (2011) described the benefits of collaboration to professional organizations as they relate to the interprofessional collaborative practice on healthcare. The authors described collaboration as a key factor in better patient and provider outcomes: "This

approach to healthcare has been found to reduce errors, improve quality of care and patient outcomes, reduce healthcare workloads and cost, and increase job satisfaction and retention" (Schroder et al., 2011, p. 189).

Krejins et al. (2003) explained that collaboration also provides opportunities for developing social and communication skills, developing positive attitudes towards co-members and learning material, and building group cohesion. Collaboration is vital to fostering interaction, inclusion, and participation—all of which are related to the feeling of being there or social presence (Warkentin et al., 1997). The need for effective collaboration is common in the business world as organizations seek to provide participants with opportunities to engage in problem solving. In education, collaboration encourages interactions among students that make positive contributions to students' learning (Curtis and Lawson, 1999).

Purpose of the Study

The purpose of this dissertation research was to examine the ways in which the utilization of synchronous communication can support collaboration. The research also sought to identify how synchronous communication methods—most specifically those that include rich media such as face-to-face collaboration—can encourage and support social interactions. Both collaboration and social interaction have been shown to provide a variety of benefits which include deeper-level learning, long-term retention of learned material, positive attitudes, group cohesion, interaction and inclusion, engagement, and learning that is actively constructed by the learners (Rovai, 2002, 2007; Walther, 1996). By observing groups of professional workplace participants engaged in a problem activity, this mixed-methods multiple-case research study aimed to validate broader research on the ways in which synchronous communication encourages collaboration and identify how this research can inform practices to benefit both the worker and the workplace.

Through an examination of a broad spectrum of key measurements and indicators identified in the literature that define and support collaboration, this study presents the observations of a series of professional workplace groups engaged in a problem activity in an effort to validate a custom observation tool. The literature that informed this dissertation research identifies and describes these key measurements that support collaboration using the synchronous communication tool of face-to-face interaction. The observations used in this study include a learning community, both verbal and non-verbal communication, various instances of student (employee) interaction, social presence and a constructivist learning environment; all of which the literature identifies as measurable factors of collaboration.

The research questions that informed this study are as follows:

1. Are social interaction and social presence indicators of collaboration among professional workplace participants engaged in a problem activity using synchronous communication?
2. In what ways, and how often, do groups apply the identified themes of collaboration when participating in a problem activity?
3. What factors contribute to the variations of identified themes of collaboration among groups participating in a problem activity?

Epistemology

Richey, Klein, and Tracey (2011) described the two most common ways in which constructivist theory is interpreted. The first way involved "individual constructivism (also known as cognitive constructivism) which emphasizes individual meaning-making" (p. 129). The second way, most relevant for this study, involved "social constructivism, which highlights the role of social interactions in knowledge development" (p. 129). Constructivists, as explained by Smith

and Ragan (2005), believe that knowledge is built from experience and that learning is both a result of personal interpretation and an active process to develop meaning based on experience. Constructivist theory applications in this study involve active learning through a carefully-constructed, authentic, and contextualized problem activity.

Definition of Terms

The terms and definitions listed here provide an understanding of their context and relevance to this study. As many of these terms and concepts are commonplace, it is important to provide this context to describe how these terms and concepts were operationalized for the purposes of this study, as opposed to how they have been used in other studies.

Active learning with authentic and contextualized learning activities. Authentic learning activities are explained by Richey, Klein, and Tracey (2011) who describe the multiple roles of both participants and instructors. First, learners actively participate in the task at hand. This approach represents a form of experiential learning involving hands-on practical application resulting in skill development as explained by Schank, Berman, and Macpherson (1999). Second, this constructivist approach involves instructor-determined content where the learner must discover answers that the instructor already knows (Duffy & Cunningham, 1996). Discovering these answers through predetermined learning activities requires that participants to interact with information through the lens of their own knowledge and experience (Perkins, 1992). Highlighting the need for learning to be embedded in the local context, Richey, Klein, and Tracey (2011) stated that authentic learning activities "are built using everyday language, everyday problems, and everyday situations" (p. 133). The authors also described the ways in which integrating both active learning and authentic learning activities into instruction "not only makes the instruction more interesting and motivating, but also more likely to be transferred or applied in other settings" (p.

132). This concept of active learning with authentic and contextualized learning activities is significant for the purposes of this study as it quite accurately describes the nature of the activity involved in this study.

Asynchronous communication tools and methods. Asynchronous communication tools and methods generally include computer-supported collaboration methods such as email, electronic bulletin boards, instant/text messaging, etc. Asynchronous communication is often referred to in comparative research studies that measure levels of collaboration and social interaction against synchronous communication tools and methods. As described by Warkentin et al. (1997), these types of tools may be more common in the business world than their synchronous counterparts. However, what is significant about asynchronous communication tools and methods is that they may present "certain advantages for groups exchanging information and may allow group members to concentrate on message content. For example, individuals can take time to reflect on the message they receive and to carefully consider their responses" (Warkentin et al., 1997).

Collaboration. Collaboration was defined by Thomson, Perry, and Miller (2007) as "a process in which autonomous or semi-autonomous actors interact through formal and informal negotiation, jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together (p. 3)." The authors continued, "It is a process involving shared norms and mutually beneficial interactions" (p. 3). Collaboration was also described by Gibson-Langford and Laycock (2007) as "a powerful force—a promising mode—for human engagement" (p. 23). Schrage (1990) described collaboration as "an act of shared creation and/or shared discovery involving significant cognitive involvement including the acceptance of others in contributing toward the creation of shared understanding" (p. 6). Hatem, Kwan, and Miles

(2011) supported Gibson-Langford and Laycock's notion of collaboration as involving the "generation and sharing of information, events and actions" (p. 384).

The literature also refers to the term collaborative learning, which is used to describe the process of learning through various forms of collaboration. Kreijns et al. (2002) described collaborative learning as dependent upon the social interactions of learners and noted that "the psycho-social processes underlying collaborative interactions could be an important factor that impacts learning" (p. 337). For the purposes of this study, both terms will be used in accordance with established definitions and as related to the specific context.

Environment. For the purposes of this particular study environment does not only refer to the physical circumstances or design of the setting, but also the constructivist learning setting, or environment, which has been shown to have certain effects on collaboration. As the constructivist learning setting relates to the physical environment, Martin (2004) described it as a "series of relationships between things, things and people, and people and people" (p. 77). Martin continued to explain that these "relationships are orderly, that is, they have a pattern and a structure—the environment is not a random assemblage of things and people any more than culture is a random assemblage of behaviors and beliefs" (p. 77). With regards to the constructivist learning environment, Rovai (2007) described how this setting has the potential to support the collaborative experience of learners by enabling a sense of community, social presence, and student-to-student interaction.

Rich media. Rich media are essential components to synchronous communication as they provide and support the basic elements of social interaction that are necessary in face-to-face communication. As explained by Cameron and Webster (2005), these basic elements include communication tools that provide instant feedback, allow verbal and non-verbal cues, use natural

language, and convey emotion. Rich media are thought to be most effective when communicating ambiguous ideas or concepts. Perhaps most relevant to this study, the research also indicates that rich media supports collaboration and problem solving through the use of synchronous communication. As an example, face-to-face communication would rate highest in terms of richness while asynchronous communications tools such email would be considered lowest in richness (Cameron and Webster, 2005). This is particularly true as it relates to the research informing this study which supports the necessity of rich media through synchronous communication for the purposes of collaboration.

Social interaction. As defined by Keller, Laurie, Mcleod, and Ridgeway (2012), social interaction is the "communication and responsiveness between two or more individuals, including verbal and nonverbal communication, which affects behavior and thinking" (p. 689). Kreijns et al. (2003) explained that social interaction involves the social process of developing shared understanding through interaction. The authors asserted that social interaction is the natural way for people to learn and appears to be the key to collaboration: "If there is collaboration, then social interaction can be found in it, and vice versa, if there is no social interaction then there is also no real collaboration" (Kreijns et al., 2003, p. 338).

In describing the benefits of the relationship between collaboration and social interaction in the learning environment, Ocker and Yaverbaum (1999) explained:

> Empirical findings indicate that asynchronous collaboration is as effective as face-to-face collaboration in terms on learning, quality of solution, solution content and satisfaction with the solution quality. However, students were significantly less satisfied with the asynchronous learning experience, both in terms of the group interaction process and the quality of group discussion. (p. 427)

Synchronous (same-time) communication tools. Synchronous communication tools involve same-time interaction. These types of tools include "face-to-face meetings, phone calls,

desktop conferencing, web-based ‘chat rooms’ and Internet Relay Chat (IRC)” (Warkentin et al., 1997, p. 978). Warkentin et al.’s (1997) research suggested that:

> People rely on multiple modes of communication in face-to-face conversation, such as paraverbal (tone of voice, inflection, voice volume) and nonverbal (eye movement, facial expression, hand gestures, and other body language) cues. These cues help regulate the flow of conversation, facilitate turn taking, provide feedback, and convey subtle meanings. As a result, face-to-face conversation is a remarkably orderly process. (p. 978)

Assumptions of the Study

There were two assumptions made in this study. The first was the assumption that participant groups would be equally willing to learn and be actively engaged while easily establishing rapport and socially interact with one another to complete the activity without feeling as if they were being forced to do so. The second assumption was that methods of comparable studies that have been conducted in classroom learning environments would yield results similar to this study, which was conducted in a professional workplace environment. It is important to note that few such studies specifically examine synchronous communication and how it effects collaboration. The majority of research found in the literature examines the impact of asynchronous communication and its effects on collaboration.

Significance and Contributions of this Research

By observing professional workplace employees synchronously engaged in a problem activity, this research study sought to provide insight into the value of collaboration and social interaction. This insight may help to highlight the ways in which synchronous communication fosters learning and application within problem situations, despite the prevailing belief that time and money are wasted by using synchronous communication tools over asynchronous tools. As discovered in the research, quite the opposite may be true—as what may be perceived as savings of time and money may actually turn out to be long-term losses related to the benefits of

professional learning and development. These benefits can include deeper-level learning, long-term retention of learned material, positive attitudes, group cohesion, interaction and inclusion, engagement, and learning that is actively constructed by the learners.

Summary

The research for this study described the importance of collaboration and social interaction and the various benefits they provide—such as deeper-level learning, long-term retention of learned material, positive attitudes, group cohesion, interaction and inclusion, engagement, and learning that is actively created by the learners. In the business world, the need for effective collaboration exists as organizations seek to provide professionals with opportunities to engage in the practice of problem activities in an effort to improve efficiency and productivity in the workplace. The current research shows that collaboration encourages interactions that make positive contributions to learning (Curtis & Lawson, 1999).

CHAPTER 2: REVIEW OF LITERATURE

The literature for this study supports the practical and scholarly applications of synchronous communication and collaboration, and describes the effects of synchronous communication on the collaboration of workplace employees engaged in problem solving. Through an examination of a variety of research studies, the literature describes how to identify and measure collaboration along six themes (see Table 1). These themes are (a) verbal communication; (b) non-verbal communication; (c) sense of community; (d) planning; (e) contributing; and finally, (f) participant perspective—which the literature describes as an outcome that occurs in conditions that contain the first five themes. While providing the context for how the literature describes the identification and measurement of collaboration, the literature review illustrates how synchronous communication affects collaboration by focusing on the specific measurable items that exist within each theme.

There are two important factors to note in this literature review. The first is that key research in the literature exists in the form of comparative studies that examine how collaboration is supported by both asynchronous and synchronous communication methods. While these particular studies primarily examine the effects of asynchronous communication, they provide valuable insights for both methods. These types of studies may also provide the groundwork for future studies that conversely focus on the effects of synchronous communication—particularly on the collaborative efforts of professional workplace employees engaged in problem solving.

Secondly, it is also important to recognize that the majority of the literature that exists for this study represents a period of time in the late-to-early 21st century when asynchronous communication was quickly becoming the communication method of choice for many businesses and organizations. With the rise of technological advances that supported asynchronous

communication, this method was seen as more progressive while synchronous methods were seen as archaic. However, between the turn of the century and the middle of the first decade, support for asynchronous communication within this body of research seemed to have waned as the majority of studies began to show not only higher levels of effectiveness using synchronous communication, but also more long-term positive effects. As a result of this shift in the research, the studies that emerged during this recent period began to focus more on design methodology and how to incorporate more features of synchronous communication into environments that contained more asynchronous methods.

As described in the literature, each of the themes outlined in Table 1 include specific measurements and indicators. These measurements and indicators provide clarification and support for how to identify each theme that defines collaboration. According to Hatem et al. (2012) and Warkentin et al. (1997), *verbal communication* is measured by word count—meaning the quantity of words—and the effect of words on team dynamics—meaning the quality of the words. Within this body of research, Hatem et al. (2012), Warkentin et al. (1997), and Ellis (2001) described the *non-verbal communication* theme of collaboration as measured by body language, facial expressions, eye contact, and gestures. *Sense of community* supports collaboration as explained by Ellis (2001), Dawson (2006), Krejins et al. (2003), and Rovai (2007) and is measured through the creation of learning and social communities, social interactions, social presence, and creation of the constructivist learning environment. The next theme, *planning*, is measured in the immersive experiences of learners and in the design of the physical environment. Supporting research includes studies by Kapp and O'Driscoll (2010), Martin (2004), and Roberston and Huang (2005). The theme of *contributing* involves the research of Curtis and Lawson (2001), Gibson-Langford and Laycock (2007), Johnson and Johnson (1996), and Tutty and Klein (2008). The

measurements and indicators of the theme of contributing include participant actions of giving help, responding to inquiries and questions, generating ideas, exchanging resources, sharing knowledge, challenging others, explaining perspectives, and elaborating. Lastly, *participant perspective* is the theme that the literature describes as the outcome in situations where the measurements and indicators of the first five themes are present. This theme includes levels of participant perceptions of the overall learning experience, participant levels of satisfaction with the process of group interaction, quality of discussions, course structure, group outcomes and decisions process. Significant research studies for this theme include Guiller (2008), Ocker and Yaverbaum (1999), Stein and Wanstreet (2003), and Warkentin et al. (1997).

These themes identified in the literature, and the measurements and indicators for each theme are outlined in Table 1. This table also includes key research studies that support each theme. These themes, measurements, and indicators, along with supporting research studies are described in more detail in this literature review.

Verbal Communication

In comparing the effectiveness of face-to-face and computer-mediated collaboration, the research studies of Hatem et al. (2012) and Warkentin et al. (1997) illustrated how the use of words in verbal communication is used to measure collaboration. In their studies, these authors described how both verbal communication (words and their quality) and paraverbal communication (tone of voice, inflection, voice volume) can affect the collaboration and social interaction of professionals engaged in problem-solving.

While the communication methods discussed in these studies are primarily asynchronous, the research they provide is valuable as they attempt to improve the quality and effectiveness of

Table 1

Defining themes of collaboration, measurements and indicators and research

Theme	**Measurements & Indicators**	**Research**
Verbal communication	1. Effect of words on team dynamics (quality)	Hatem et al., 2012 Warkentin et al., 1997
Non-verbal communication	1. Body language 2. Facial expressions 3. Eye contact 4. Gestures	Ellis, 2001 Hatem et al., 2012 Warkentin et al., 1997
Sense of community	1. Learning community 2. Social interaction 3. Social presence 4. Constructivist learning environment	Ellis, 2001 Dawson, 2006 Kapp and O'Driscoll, 2010 Krejins et al., 2003 Nardi and Whittaker, 2002 Rovai, 2007
Planning	1. Immersive experiences 2. Design of physical environment	Kapp and O'Driscoll, 2010 Martin, 2004 Robertson and Huang, 2006
Contributing	1. Giving help 2. Asking and answering questions 3. Generating ideas 4. Exchanging resources 5. Challenging others 6. Elaborating	Curtis and Lawson, 2001 Gibson-Langford et al., 2007 Johnson and Johnson, 1996 Tutty and Klein, 2008
Participant perspective	1. Participant perceptions of overall learning experience 2. Participant levels of satisfaction a. Participant satisfaction with the process of group interaction b. Participant perceptions of the quality of discussions c. Participant satisfaction with the course structure d. Participant satisfaction with group outcomes e. Participants satisfaction with the decisions process	Guiller, 2008 Ocker and Yaverbaum, 1999 Stein and Wanstreet, 2003 Warkentin et al., 1997

communication methods. Warkentin et al. (1997) described the attempts of one such comparative study and the alternate methods that it employed in an effort to improve the asynchronous communication methods to achieve similar levels of communication that are found using synchronous communication methods. While discussed more in the theme of *Non-verbal communication*, Warkentin et al. (1997) also contributed to the discussion of rich media and how its effective use with communication contributes to collaboration. In a similar study, Hatem et al. (2012) suggested that spoken words (verbal communication) may provide some representation of social interaction; a critical factor and key component in identifying and measuring collaboration. This notion of social interaction is also addressed in the theme, *sense of community.*

Warkentin et al. (1997) also explained how it is not only the spoken words (verbal communication) that contribute to the effectiveness of face-to-face communication, but also unspoken words and expressions (non-verbal communication): "People rely on multiple modes of communication in face-to-face conversation, such as paraverbal (tone of voice, inflection, and volume) and non-verbal (eye movement, facial expression, hand gestures, and other body language) cues" (p. 978). This type of communication is important as "these cues help regulate the flow of conversation, facilitate turn taking, provide feedback, and convey subtle meanings. As a result, face-to-face conversation is a remarkably orderly process" (Warkentin et al., 1997, p. 978).

Non-Verbal Communication

Non-verbal communication represents the theme that emphasizes the importance of unspoken words and expressions as it relates to collaboration. This theme appropriately follows the discussion of the previous theme, *verbal communication*. A significant concept discussed in this theme is rich media. Research studies supporting this theme include Ellis (2001), Hatem et al. (2012), Warkentin et al. (1997), and Nardi and Whittaker (2002).

Non-verbal communication, or the unspoken word, is identified in the literature as instances of body language and facial expressions, eye contact, posture, and hand gestures. In terms of supporting collaboration, non-verbal communication cannot stand alone; however, when paired with verbal communication and in the correct context, together they are significant in determining the richness of media. The studies of Cameron and Webster (2004), Ellis (2001), Warkentin et al. (1997), and Daft and Lengel (1986) all highlighted the significance of media richness in communication and its effects on collaboration. Daft and Lengel (1986) defined media richness as the "ability of information to change understanding within a time interval," and explained that face-to-face communication provided the highest levels of media richness (p. 560). Warkentin et al. (1997) concluded that "rich media allow multiple information cues (the words spoken, tone of voice, body language, etc.) and feedback" (p. 978).

In their discussions on how teams using computer-mediated communication were unable to collaborate as effectively as teams using face-to-face communication, both Ellis (2001) and Warkentin et al. (1997) elaborated on the role of media richness. In a study distinguishing collaboration using the synchronous form of face-to-face communication from collaboration using the asynchronous form of online communication, Ellis (2001) explained the value of verbal communication that is exchanged in face-to-face dialogues. Among the students in the study, half of them considered the "lack of both body language and the ability to accurately assess emotion a disadvantage" (Ellis, 2001, p. 173). Ellis stated that ten respondents felt they were missing the ability to "read face-to-face nuances such as body language when engaged in the online forum" (p. 173). The author highlighted the response of one participant who stated, "It can be difficult to assume the manner or tone of the conversation from one member to another; to assume sarcasm in the like, without any face-to-face contact" (Ellis, 2001, p. 173). Another respondent explained

that the "lack of facial and body expressions can contribute to limiting the effectiveness of the communication that is taking place" (p. 173).

Nardi and Whittaker (2002) explained the importance of both face-to-face contact and eye contact. Participants in their study described the significance of eye contact in face-to-face communication by calling it "crucial" in making connections with others. The authors explained, "Eye contact sometimes had to do with social bonding, with making a primitive (mammalian?) connection to others by 'looking people in the eye,' a phrase many used" (p. 19). Participants also explained how eye contact can command attention and even persuade someone:

> When you're in a conference room and you're at a conference table and all these conversations are going on and people are going back and forth and they look at each other, and they look at the other people in the room, and they're trying to convey a point or trying to persuade someone, uhm, eye contact and body language mean a lot. If your eyes are on a computer, you may as well not even be there. You may as well be a secretary taking notes. (Nardi and Whittaker, 2002, p. 20)

Nardi and Whittaker (2002) concluded, "Face-to-face communication signaled the highest level of commitment to others through the presentation of the body. It also afforded the best opportunities for vital informal conversation" (p. 18).

Sense of Community

The research in the two previous themes illustrates how rich media that engages both verbal and non-verbal communication can contribute to participants' ability to develop a sense of community. This in turn supports collaboration and transitions to the theme *sense of community.* The literature supporting this theme explains the necessity of a sense of community among participants and how it is essential to collaboration. Key concepts in this theme are learning community, social interaction (including student-to-student and peer-to-peer interaction), learning environment, and constructivist learning environment. Key research discussed in this theme

includes studies from Curtis and Lawson (2001), Dawson (2006), Ellis (2001), Kapp and O'Driscoll (2010), Krejins et al. (2003) and Rovai (2007).

The literature for this study involves both comparative and design-based research studies that examined both synchronous and asynchronous communication and how they affect collaboration. A common point of agreement among the research in this particular theme is that a sense of community is essential to collaboration and for collaborative learning. From the demonstrated success of the sense of community that exists in synchronous environments, the researchers asserted that it is necessary to integrate components that support a sense of community into asynchronous environments:

> In order for collaborative learning to take place successfully, it is crucial that the learner feels part of a learning community where his/her contributions add to a common knowledge pool and where a community spirit is fostered through social interactions. (Bernard, Rojo de Rubalcava, & St-Pierre, 2000, p. 262)

Consistent with the literature presented in the earlier themes, these comparative studies are essential resources as they described methods and techniques shown to support collaboration in the synchronous environments—with the hopes that the asynchronous environments can employ similar methods and receive similar results. Gunawardena, Lowe, and Anderson (1997) analyzed the content of an online debate in order to identify certain elements of knowledge construction among participants. By doing this, the authors also collected evidence of collaboration among participants as a component of the knowledge construction process. In addition, Hiltz (1998) demonstrated that collaborative learning can lead to learning outcomes that are comparable with those achieved in face-to-face classes.

Both Dawson (2006) and Rovai (2007) described the communities that arise out of increased verbal and non-verbal communication. In a practical study involving workplace employees, Dawson (2006) described the impact of communication on participants' sense of

community. He asserted that when there is increased communication among participants, there is also a sense of community that develops among participants. Dawson concluded by encouraging "education managers and practitioners… to monitor and alter the learning and teaching practices designed and implemented to promote community among the student cohort in a just-in-time environment" (p. 153).

Similar to Dawson's recommendations for practitioners, Rovai (2007) encouraged instructors to "provide discussion forums from socio-economic discussions that have the goal of nurturing a strong sense of community with the courses as well as group discussion forums for content-and task-oriented discussions that center on authentic topics" (pp. 80-81). Rovai also explained how this sense of community is fostered by social interactions which, under the right circumstances, can improve the overall learning experience, yield positive outcomes on student achievement, and even contribute to student satisfaction. The author stated, "The strength of classroom community and the value of personal relationship are directly related to the frequency and quality of social interactions among community members" (Rovai, 2007, p. 81). The research of both Garrison and Anderson (2003) and Gunawardena and Zittle (1997), suggested that social presence among members of a learning community increases interaction, facilitates critical thinking, strengthens a sense of community, promotes learner satisfaction and collaborative learning, and contributes directly to the success of the learning experience.

The literature for this third theme also emphasized the importance of both community and social interaction in a constructivist environment. In its explanation of constructivist learning, the literature frequently referred to *social interaction* and *social presence* as both are critical to establishing and measuring a constructivist learning, particularly as it relates to this study. Ellis (2001), Kapp and O'Driscoll (2010), and Rovai (2007) explained this notion of student interaction

and how it thrives within constructivist learning environments in their comparative and design-based research studies. Kapp and O'Driscoll (2010) encouraged designers to create environments that "direct learners to that 'aha!' learning moment" (p. 31). The authors continued, "The designer must enable a context that naturally encourages peer-to-peer interaction and collaboration that will help the learners achieve specific learning goals" (p. 31).

Rovai (2007) described how this constructivist learning environment supports the social experience of learners through social presence and student-to-student interaction. Citing Vygotsky (2006), Rovai explained that students do not "learn in isolation, and that cognitive psychology maintains that people naturally learn and work collaboratively" (p. 78). This is why the role of the instructor must be more than that of a lecturer. He wrote that "The goal is to create a learning environment that motivates students to engage in positive social interaction and active engagement in learning" (p. 79). He further noted that within this context the facilitator must play an active role in the design and facilitation of learning by developing social presence in the classroom: "Creating a safe learning environment where all members of the learning community feel valued is the foundation for equitable and effective discourse. The emphasis is on student-to-student interactions and the development of social presence" (p. 79).

Encouraging social interactions through the creation of constructivist learning environments is relevant to this particular study as Rovai (2007) asserted that the "strength of classroom community and the value of personal relationships are directly related to the frequency and quality of social interactions among community members" (p. 81). In an effort to translate these principles to the experiences of professional workplace employees engaged in problem solving, Rovai—drawing from the research of Lebow (1993)—suggested a number of components that every constructivist learning environment should include. Among these components is the

requirement that the learning be embedded in social experience and be designed from a constructivist perspective. Warkentin et al. (1997) asserted that face-to-face groups will have stronger relational links than asynchronous groups: "With a relational variable of 'satisfaction with group outcomes,' their definition was 'related to positive attitudes of group members towards one another'" (p. 980). Rovai's *Conceptual model for facilitating online discussions effectively* (see Figure 1) represents these necessary components based on social learning theory and the need to create a social context that involves personal experiences, observations, and interactions with other individuals. In this conceptual model, Rovai (2007) presented two main components: (a) the design of the course which serves the purpose of clarifying the instructor's expectations for student dialogue, defining quality student interactions, and generating student motivation—for the ultimate aim of constructing new knowledge; and (b) the facilitation of the course which provides direction for how the instructor could use the course design to effectively moderate and facilitate online discussions and how to identify and cope with interpersonal communication issues, which if unattended, could become barriers to learning (pp. 85-86). Altogether, Rovai (2007) explained that the emphasis ought to be on student-to-student interactions and on the development of social presence.

Similar to the efforts of Rovai, Ocker and Yaverbaum (1999) discussed the concept of a constructivist learning environment and how to transfer this concept from the educational setting to the professional workplace setting. In their comparative study of the effectiveness of collaboration between asynchronous and synchronous communication, the authors' research examined various levels of student learning, quality, and satisfaction among 43 graduate students.

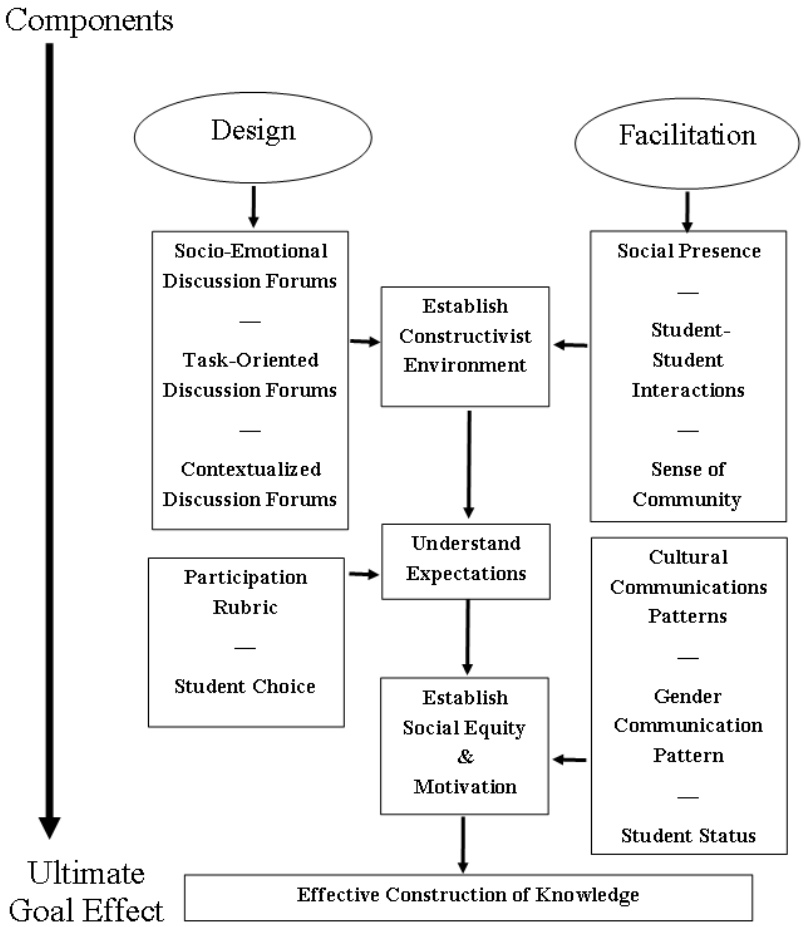


Figure 1. Rovai's (2007) conceptual model for facilitating online discussions effectively

Their findings suggested that the learner "participates in the construction of knowledge by formulating ideas into words; and these ideas are built upon through the reactions and responses of others" (Ocker and Yaverbaum, 1999, p. 428). Ocker and Yaverbaum (1999) concluded that "knowledge is not merely transferred from expert to learner, but is actively created in the learning community; thus, interaction among students is an important principle of the collaborative approach to learning" (p. 428). Ellis (2001) also supported this notion of making learning an active process by building a collaborative learning environment where students acquire information on their own, and evaluate, analyze, and discuss it with each other. These types of discussions and interactions allow students to build structured arguments and draw conclusions. With a skilled

facilitator, not just a lecturer, this process can result in knowledge being transmitted back-and-forth amongst the students (Ellis, 2001).

In their examination of sociability in computer-supported collaborative learning environments, Kreijns et al. (2002, 2003) discussed both the role and the outcomes of social interaction, and how such collaborative interactions can positively impact both learning performance and learner satisfaction. Albeit, the environments discussed in their study employed asynchronous communication methods, the research provided is valuable as it described the various effects and outcomes of social interaction and collaboration, as compared to environments employing more synchronous communication methods. Emphasizing the significance of social interaction Kreijns et al. (2002) stated, "Social interaction is important for establishing a social space in which a structure can be found that encompasses social relationships, group cohesion, trust and belonging, all of which contribute to open communication, critical thinking, supportive interaction, and social negotiation" (p. 5). While this notion of learner satisfaction is discussed in the later theme, *participant perspective*, Kreijns et al. (2002, 2003) also described how social interaction can affect both learning and learner satisfaction. Drawing from the research of Walther (1996), Gunawardena (1995), and Gunawardena and Zittle (1997), the authors described the relationship between social interaction and learning performance in terms of the benefits gained in both learning outcomes and learner satisfaction.

The model of education and the social (psychological) dimension of social interaction (see Figure 2) represents both learning and social performance where the outcomes and factors are represented by boxes, and the processes are represented by circles (Kreijns et al., 2003). This model supports the notion that aside from processes that are directly related to the task, the socio-emotional processes are also critical to the social interaction in collaborative learning (Kreijns et

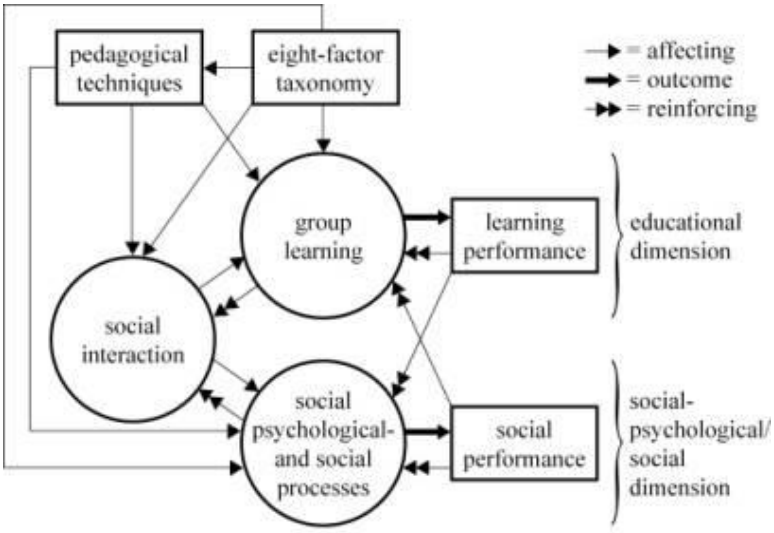


Figure 2. Kreijns et al.'s (2003) two functions of social interaction.

al., 2003). As stated by Kreijns et al. (2003), "In other words, it relates to processes that have to do with getting to know each other, committing to social relationships, developing trust and belonging, and building a sense of on-line community" (p. 342). While typical in synchronous environments, these processes have to be actively created in asynchronous environments. Kreijns et al. (2003) explained, "Contemporary [computer-supported collaborative environments] may not provide adequate opportunities for social interaction, the development of friendships and camaraderie" (p. 342). Emphasizing the importance of relational bonds, the authors wrote:

> If group members are initially not acquainted with each other and the group has zero-history (which is often the case in distance education institutions), group forming, developing a group structure, and group dynamics are essential to developing a learning community. (Kreijns et al., 2003, p. 342)

As this social (psychological) dimension of social interaction demonstrates its value to the overall learning experience, the authors concluded that three variables must exist simultaneously: "functional pedagogy for instruction, relevant content to be learned and a working community of learning… If any one of the three variables approaches zero, the function also approaches zero" (Kreijns et al., 2003, p. 342). In assisting online designers with creating a learning environment

that motivates learners to engage in positive social interaction and active learning, Rovai (2007) explained the importance of social interaction where participants have opportunities to build relationships with, seek help from, and learn from other participants. He wrote that the "strength of classroom community and the value of personal relationships are directly related to the frequency and quality of social interactions among community members" (p. 81). Rovai (2007) also shared that, "Each student helps others learn as well as getting help from other students so that all members of the learning community are actively involved in the teaching-learning process (p. 83).

Planning

This fourth theme utilizes *planning* to measure collaboration and includes the immersive experiences and the design of the physical environment as indicators. Literature relevant to this theme includes the research of Kapp and O'Driscoll (2010), Martin (2004), Robertson and Huang (2006), and Nardi and Whittaker (2002). Similar to the studies that described the role of the constructivist learning environment in supporting collaboration (as explained in the previous theme of *sense of community*), each of these studies focused on the responsibility of designers and facilitators in creating immersive experiences for learners within a physical environment that supports collaboration through synchronous communication (most specifically through face-to-face interaction) while allowing participants some level of control over that physical environment.

In their comparative study on the effectiveness of collaboration between asynchronous and synchronous environments, Kapp and O'Driscoll (2010) explained how "collaboration is necessary and required for success, such as working on a team exercise to solve a puzzle" (p. 32). They described how a "designer must establish a context that encourages collaboration, helps learners achieve specific learning goals, fosters peer-to-peer interactions and provides the right

context for the instruction to occur" (p. 31). In revisiting their "aha moment," the authors discouraged the use of "didactic step-by-step instructions" while encouraging

> Minimal guidelines that will direct learners toward the 'aha' learning moment. If the right context and guidelines are provided, employees will learn from each other, from the environment, and from the immersive experience. They will learn in a manner that increases retention and recall of information. (p. 31)

As it relates to the design of the physical environment, both Martin (2004) and Robertson and Huang (2006) suggested key elements of this physical environment that encourage collaboration through synchronous communication. By comparing the effectiveness of collaboration in asynchronous and synchronous environments, the elements noted by Martin (2004) and Robertson and Huang (2006) include ergonomic details such as the arrangements of space and objects in the classroom. Martin (2004) stated,

> The physical environment is concerned with what we can actually see and almost touch (almost because elements like noise and heat are part of the physical environment but can not be touched, but rather felt or heard). The built environment affects people directly or indirectly. (p. 78)

Robertson and Huang (2006) examined the "effects of a workplace design and training intervention and the relationships between perceived satisfaction of office workplace design factors and work performance measures" (p. 3). In terms of office workplace design factors, the authors referred to items such as layout and storage, and in terms of work performance measures, they included items such as individual performance, group collaboration, and effectiveness. The results of their study suggested "that when an office work environment is ergonomically designed and coupled with training, it provides employees with a high degree of environmental control and knowledge, which may positively influence individual performance, group collaboration and effectiveness" (Robertson and Huang, 2006, p. 11). Robertson and Huang (2006) also emphasized how important it is for participants to have some level of control over their learning environment:

> Results showed a significant positive impact of the intervention on environmental satisfaction for workstation layout. Satisfaction with workstation layout had a significant relationship with individual performance, group collaboration and effectiveness; and satisfaction with workstation storage had a significant relationship with individual performance and group collaboration. (p. 3)

Similarly, in describing the relationship between environment (social, physical and cultural) and behavior in the classroom, both Nardi and Whittaker (2002) and Martin (2004) suggested that specific arrangements in the physical properties or environment of the classroom can either hinder or promote the collaboration and social interaction among participants. Nardi and Whittaker (2002) stated, "Another means of social bonding enabled in face-to-face communication is sharing mutually meaningful experience in a common physical space" (p. 11). As Martin (2004) explained, "These groups [social, physical, cultural] are clearly linked as the physical environment affects the social interactions and the cultural environment affects the physical environment and its social components" (p. 77). Figure 3 illustrates this relationship.

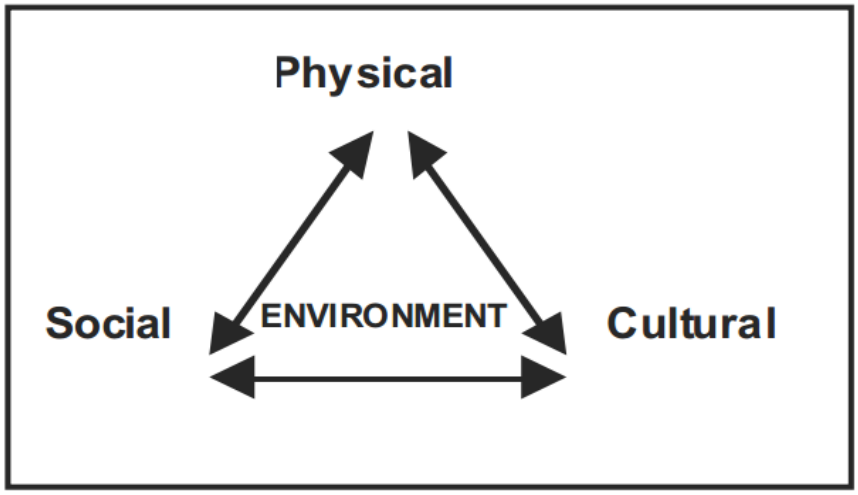


Figure 3. Martin's (2004) Environmental Triangle

Citing David (1975), Martin (2004) added that the "arrangements of space and objects influence interaction in setting such as hospitals, libraries and classrooms" (p. 79). As described

by Martin, the specific design of the learning environment can communicate to participants that discussion and interaction are involved:

> Physical and spatial aspects of a learning environment communicate a symbolic message of what is expected to happen in a particular place. The atmosphere of a classroom is readily apparent when one enters it and is reflected by subtle cues in the physical arrangement as well as by the style of teaching. (p. 79)

An example of this is when an instructor purposely arranges the chairs in a classroom in the form of a circle rather than in rows and columns; this type of environmental design forces participants to face each other and communicates to them that interaction is involved. As Martin (2004) stated,

> The effective arrangement and management of space can facilitate the learning process, while the unplanned ineffective use of space can result in unforeseen and unexpected interference, and may even serve to instigate conflicts. The teacher sometimes does not realise that certain behaviors occur in the classroom as a result of how the room has been arranged. (p. 80)

Contributing

The literature in the theme of contributing describes the actionable behaviors of participants that demonstrate collaboration. In this sense, these participants are *contributing* to the collaborative efforts of the group by exhibiting these certain behaviors. Among these efforts, the literature identifies the following eight items as specific units of measurements of collaboration: (a) giving help; (b) asking and answering questions; (c) generating ideas; (d) exchanging resources; (e) sharing knowledge; (f) challenging others; (g) explaining perspectives; and (h) elaborating. Supporting research for this theme includes the studies of Curtis and Lawson (2001), Gibson-Langford and Laycock (2007), Johnson and Johnson (1996), and Tutty and Klein (2008).

Combined, the research studies of Curtis and Lawson (2001), Johnson and Johnson (1996) and Tutty and Klein (2008) identified the following actions and behaviors—described by Curtis and Lawson (2001) as “major types of behaviors in collaborative learning situations” (p. 26):

- Giving and receiving help and assistance;
- Exchanging resources and information;
- Explaining elaborating information;
- Sharing existing knowledge with others;
- Giving and receiving feedback;
- Challenging others' contributions (cognitive conflict and controversy leading to negotiation and resolution);
- Advocating increased effort and perseverance among peers;
- Engaging in small group skills;
- Monitoring each other's efforts and contributions. (Curtis & Lawson, 2001, p. 26)

In their comparative study on the effectiveness of collaboration between online and face-to-face instruction, Tutty and Klein (2008) explained that, "researchers have found that student interactions influence learning and performance in collaborative settings" (p. 119). As it relates to the activities of asking and answering questions, Hooper and Hannafin (1991), King (1989), and Sherman and Klein (1995) also described how questioning contributes to learning in collaborative groups and how small groups that asked task-related questions were more successful at problem solving than groups that did not exhibit such interaction behaviors. In a comparison of computer-mediated groups, Sherman and Klein (1995) reported that participants exhibiting more helping behaviors such as asking and answering questions performed better than participants exhibiting significantly fewer helping behaviors.

In describing these contributing behaviors, this research also explained the concept of "positive social interdependence" and the benefits it provides to learners (Curtis & Lawson, 2001, p. 22). The authors explained, "The behaviors that characterize positive social interdependence include giving and receiving help, exchanging resources and information, giving and receiving feedback, challenging and encouraging each other, and jointly reflecting on progress and process" (Curtis & Lawson, 2001, p. 22). This concept of positive social interdependence is significant for this particular study as it encourages a collaborative environment where participants work together

rather than in isolation. As described by Curtis and Lawson (2001), "Positive social interdependence is contrasted with individualistic and competitive work environments" (p. 22).

In terms of how this concept of positive social interdependence can benefit the participants, the literature in this theme suggests increased success and improved performance among collaborative groups as opposed to more independent groups. Johnson and Johnson (1996) explained how this concept of dependency can create social support, which can lead to increased self-esteem, which can in turn positively impact performance more so than in an individual setting. Kreijns et al. (2003) also wrote that in terms of "positive interdependence, team members are linked to each other in such a way that each team member cannot succeed unless the others succeed and/or that each member's work benefits the others (and vice versa)" (p. 339).

These authors also explained the differences in learning strategies between collaborative (loosely-structured) and cooperative (highly-structured). Common in the literature informing this dissertation study, the authors chose to use the term collaboration, as opposed to cooperation—for its smaller group approaches as explained by Smith and McGregor (1992) and for its reflective nature of the literature which is more commonly associated with virtual learning environments as explained by Tutty and Klein (2008). Similar to both Curtis and Lawson (2001) and Johnson and Johnson (1996), Tutty and Klein (2008) supported the theme of contributing by asserting that "collaborative learning refers to a variety of education approaches that encourage students to work together, including: cooperative learning; problem-based instruction; guided design; writing groups; peer teaching; workshops, discussion groups; and learning communities" (p. 102). Measurable indicators included what the authors referred to as *interaction behaviors*, such as "questioning, answering, encouraging, discussing, and off-task" (Tutty and Klein, 2008, p. 118).

In explaining the title of their research study, "So They Can Fly… Building a Community of Inquirers," Gibson-Langford and Laycock (2007) informed their readers that not everything happens according to plan, and that "through serious consideration of the infrastructure for shared creativity, and through applying guiding principles in developing collaboration, our community began to fly" (p. 32). This concept is relevant to this theme of contributing for two reasons: first, it emphasizes how important the process of transforming tacit knowledge to explicit knowledge is to collaboration; and secondly, it illustrates the potential for limitless levels of collaboration. Through the creation of a group wiki powered by the active contributions of participants, the authors described the contributing actions and behaviors of participants that include encouraged interactions, discussions, and social networking that encourage collaboration (Gibson-Langford & Laycock, 2007). In what the authors referred to as a "non-threatening" learning environment, participants demonstrated contributory actions and behaviors that included "viewing others' work in progress, making critical comment, adding value through helping each other problem-solve, whilst at the same time taking advantage of the open pathways for critical dialogue, reflection, praise and a bit of chit-chat" (Gibson-Langford and Laycock, 2007, p. 33).

Participant Perspective

This sixth theme, participant perspective, is the most essential theme to this particular study as it encompasses the outcomes of the five earlier theme and how when combined, all six themes illustrate the effects of synchronous communication on the collaboration of professional workplace employees engaged in problem solving. The literature in this theme revisits key concepts from the earlier themes (particularly, sense of community) and integrates their effects with participant levels of satisfaction and achievement as well as participant perceptions of the overall learning experience. This body of literature is led primarily by the research of Ocker and Yaverbaum

(1999), but also includes supporting research studies from Guiller (2008), Stein and Wanstreet (2003), and Warkentin et al. (1997). Terms to clarify in this theme include *participant, student,* and *learner*, which are used synonymously.

In describing the effects of synchronous communication on the collaboration of professional workplace employees engaged in problem solving, the research in this body of literature elaborates on the theme of sense of community by illustrating how factors such as social interaction can affect student levels of satisfaction with the learning experience as well as their overall perceptions of the learning experience. According to Stein and Wanstreet (2003) and Rovai (2007), varying degrees of collaboration, social interaction, and social presence can affect participant satisfaction with the learning experience. Dawson (2006) and Rovai (2007) introduced the concept of learner-to-learner interaction—as opposed to learner-to-instructor interaction—and how it affects learner satisfaction with the learning experience, while Ocker and Yaverbaum (1999) explained how collaboration, social interaction, and the construction of knowledge contribute to participant satisfaction with the learning experience. Lastly, Tutty and Klein (2008) described how both social interaction and collaboration contribute to student satisfaction with the learning experience, while Guiller (2008) and Francescato et al. (2006) presented studies on how group interaction and quality of discussion affect satisfaction with the learning experience.

At the forefront of this theme's literature is Ocker and Yaverbaum's (1999) comparative study that focused on the role of peer relationships as a key component of educational success. Citing various research studies that include Whipple (1987), Alavi (1994), Bouton and Garth (1983), and Benbunan-Fich (1997), the authors described the importance of the constructivist learning environment as it relates to collaboration. Advancing from the traditional method of learning where knowledge is transferred from the instructor to the student, Ocker and Yaverbaum

(1999) maintained that there are more benefits in terms of learning when the knowledge is actively created in the learning environment by the students and is transferred from student-to-student. This type of interaction supports the collaborative approach to learning and is also an essential component in the overall levels of student satisfaction; both with the course and with the overall learning experience (Ocker and Yaverbaum, 1999).

Warkentin et al. (1997) explained that face-to-face groups were significantly more satisfied with the group interaction process and the quality of the discussion than those working with an asynchronous (computer-supported) method: "Face-to-face groups reported a higher degree of cohesion, were more satisfied with the decisions process followed by the groups, and were more satisfied with the team's outcome" (p. 985). Their study also noted two important findings. The first was that the advantages of collaboration technologies may not always outweigh their disadvantages. The second finding was that "while collaboration technologies have the capability of creating a communication environment for virtual partners who are separated by time and/or space, they may hinder the development of a strong sense of cohesion and satisfaction with the group's interaction process" (Warkentin et al., 1997, p. 986).

Conversely, in their comparative mixed-methods study on the role of social presence in distance learning environments, the findings of Stein and Wanstreet (2002) disputed the need for social presence as it relates to users actively choosing an asynchronous or synchronous communication method. This study "examined factors that contributed to satisfaction with perceived knowledge gained in a distance learning environment where collaboration represents a major portion of the course structure" (Stein & Wanstreet, 2003, p. 193). The authors attempted to discover whether giving participants "authority over the physical learning environment and offering different formats for collaboration, either online or in person, contributed to the learners'

overall satisfaction with the course" (p. 193). Stein and Wanstreet (2003) concluded, "Results indicate that social presence may not have played a role in choice of distance learning format" (p. 193). It is noteworthy that while Stein and Wanstreet (2003) conducted their study using a course designed with a constructivist approach which purposely encouraged collaboration, their study specifically examined the distance learning environment, which is different from the environment that this dissertation research study sought to examine. The authors stated that "the course uses a constructivist approach in which learners make meaning by formulating ideas and refining them through the responses of others. Therefore, collaborative work is central to the completion of the academic tasks" (Stein and Wanstreet, 2003, pp. 193-194). Their focus on the asynchronous delivery method of distance learning environment—as opposed to a synchronous method—provided context for their results. While Stein and Wanstreet (2003) found no statistical difference in satisfaction with the overall course structure between online and face-to-face learners, Ocker and Yaverbaum (1999) found that the level of participant satisfaction with the collaborative learning experience was superior over the asynchronous experience. According to Ocker and Yaverbaum (1999), "Students in the FtF [face-to-face] treatment reported enjoying interacting with the group members more than the asynchronous groups and also thought that their FtF discussions were of higher quality to the asynchronous ones" (p. 436). This was the case even though the asynchronous groups reported being just as satisfied with the end product as the synchronous groups. Ocker and Yaverbaum's (1999) findings indicated that a "technology-supported collaborative environment is an effective means of learning and conducting complex group work. However, it also shows that people prefer to interact in an FtF manner" (p. 438). Lastly, Guiller's (2008) findings also supported collaboration using synchronous communication when he wrote that "collaborating in the online condition was just as successful as in the face-to-

face condition in terms of learning, quality of solution, solution content, and satisfaction with the solution; unfortunately, these findings also determined that in terms of student satisfaction with the overall group interaction and quality of discussion, students were significantly less satisfied with the asynchronous learning experience than the face-to-face experience" (p. 188).

Summary

The literature for this study identifies a number of methods to measure collaboration. Specifically, this literature presents six themes, five of which provide measurable indicators of collaboration, with the sixth describing the overall outcomes when indicators from all themes are present. Much of the literature included comparative studies of collaboration between asynchronous and synchronous communication methods such as online, computer-supported, computer-mediated, and face-to-face. These studies provide critical insight as they attempt to hold asynchronous methods to the same standards as synchronous methods. These standards examined the overall efficiency of collaboration between the methods, while other studies examined participant satisfaction between the methods. Together, this body of literature provides a comprehensive view of how collaboration and social interaction are identified using synchronous and asynchronous communication methods. This creates the context on how this study will illustrate the effects of synchronous communication on the collaboration and social interaction of professional workplace employees engaged in a problem activity.

CHAPTER 3: METHODOLOGY

Introduction

By examining key measurements and indicators of collaboration as described in the literature, this mixed-methods, multi-group research study utilizing a constructivist approach examined how synchronous communication affects the collaboration of professional workplace participants engaged in a problem activity. The problem activity was based on David J. Smith's, *If the World Were a Village* (2002) wherein participants completed the activity while being observed for instances in which they demonstrated key measurements and indicators of collaboration as described in the literature. Qualitative research methods included the use of a researcher's journal, the administration of a questionnaire, post-activity interview, and a custom-created observation tool to identify and record specific actions and behaviors that support collaboration and social interaction as described in the literature. Analysis of this data involved descriptive and inferential statistics and a narrative discussion. Together, these research methods were guided by the following research questions:

1. Are social interaction, social presence and collaboration present among professional workplace participants engaged in a problem activity using synchronous communication?
2. In what ways, and how often, do groups apply the identified themes of collaboration when participating in a problem activity?
3. What factors contribute to the variations of identified themes of collaboration among groups participating in a problem activity?

The methodology employed in this dissertation research is outlined in Table 2 and is described in detail in the following sections: research design; setting, participants, data collection

Table 2

Methodology Data Sources and Data Collection Methods

Research Question	Data Collection Methods	Data Collection Timelines	Analysis Method
1. Are social interaction, social presence and collaboration present among professional workplace participants engaged in a problem activity using synchronous communication?	• **Observation** of groups during study activity • **Researcher's journal** with constant reflection and feedback	• Ten one-hour sessions were conducted between 1/27/2017 and 2/10/2017 • Each session had three-to-five participants	• Descriptive Statistics • Inferential Statistics • Narrative Analysis
2. In what ways, and how often, do groups apply the identified themes of collaboration when participating in a problem activity?	• A post-activity **questionnaire** was completed by each participant immediately following their activity	• Data for the post-activity questionnaires was collected between 1/27/2017 and 2/10/2017	• Descriptive Statistics • Inferential Statistics
3. What factors contribute to the variations of identified themes of collaboration among groups participating in a problem activity?	• A post-activity **interview** was conducted with each individual group member • **Researcher's journal** kept with constant reflection and feedback	• Post-activity interviews were conducted with thirty-five participants over the course of two days on 2/9/2017 and 2/10/2017	• Descriptive Statistics • Narrative Analysis

methods and procedures, data collection tools; quantitative and qualitative data analysis; trustworthiness; data collection timeline; and summary.

Research Design

This was a mixed-methods, multi-group research study that involved the observation of ten participant groups made up of 46 total participants, and the collection of both qualitative and quantitative data.

Rationale for research design. By observing ten participant groups, totaling 46 participants of professional workplace employees, engaged in a problem activity, this study examined and analyzed collaboration and social interaction using synchronous communication. As previously noted, the literature supports the design of problem-activity based learning experiences in a collaborative setting. As maintained by Rovai (2007):

> The final element of the design strategy is to provide discussion forums for content-and task-oriented authentic discussions that support collaborative group activities and the construction of content knowledge. Authentic topics address "real-life" challenges that adults can relate to and that provide a recognizable context for learning. (p. 81)

Rovai (2007) continued to explain that

> Authentic topics involve settings and applications that would normally involve knowledge to enable students to better construct meaning in practical ways so that knowledge can be applied outside of the school environment. Learners, therefore, engage directly in discussions that reflect events in their lives and that they can integrate with their own past experiences. (p. 81)

Spector (2015) also supports this notion of educational practicality in the thirteenth chapter of his book which addressed educational technologies in the workplace when he wrote that "highly valued is the ability to reason critically and think clearly with regard to complex problem-solving situations" (p. 133).

Rovai's (2007) research not only supported the efforts of this particular study, but also the earlier notion of collaboration defined by both Gibson-Langford and Laycock (2007) and Hatem

et al. (2011). Gibson-Langford and Laycock (2007) described this as "an act of shared creation and/or shared discovery involving significant cognitive involvement including the acceptance of others in contributing toward the creation of shared understanding" (p. 24). As described by Ellis (2001), this type of collaboration, with a constructivist approach, produces emotional connections and a sense of community:

> The philosophy behind the subject was that of building a collaborative learning environment with the students finding information themselves, evaluating and critically analyzing the information, discussing it with one another, building structured arguments and drawing conclusions about the various topics under discussion. It used a constructivist approach, one of "learning as an active process rather than a transmission of knowledge from program to student." (pp. 169-170)

This constructivist approach is supported by a similar study by Ocker and Yaverbaum (1999) in which collaborative groups that using both synchronous and asynchronous communication asserted that social interaction is "an important principle of the collaborative approach to learning" (p. 428). Describing their collaborative model, they remind us that knowledge is not merely transferred from expert to learner, but that it is "actively created in the learning community, thus the interaction among students is an important principle," as the learner "participates in the construction of knowledge by formulating ideas into words, and these ideas are built upon through reactions and responses of others" (Ocker and Yaverbaum, 1999, p. 428).

Setting

The Kaufman Financial Group, leader in the high-risk specialty insurance industry, hosted this study at their training facility, the Kaufman Institute Learning Center. This center is located at the Kaufman Financial Group's headquarters in Farmington Hills, Michigan which houses close to 200 of the company's nearly 1,800 agents and specialists in North America and the United Kingdom. The Kaufman Financial Group provides services that include specialty insurance products, underwriting, premium financing, claims management, loss control, and audits. Founded

in 1969 by the late Herbert W. Kaufman, the Kaufman Financial Group started as a holding company serving general agents and brokers of specialty insurance products and services. Since then, the company has evolved in profitability, leadership, and ownership. With an annual premium of two billion dollars, the company has yet to have an unprofitable quarter in its more than forty years of existence.

The Kaufman tradition of excellence continues under the current leadership of CEO, Chairman and President, Alan J. Kaufman, son of Herbert W. Kaufman. Under Alan Kaufman's leadership, the company was returned to private ownership in 1996 and no longer reports to any financial oversight committee. Kaufman explained his dedication to training during my initial interview with him when he mentioned that during the country's economic recession, instead of reducing or eliminating training—which was common among other organizations—the Kaufman Financial Group actually increased the amount of training for its employees. This lead to the creation of the Kaufman Institute in 2008, and its newly-built physical location, the Kaufman Learning Center which was completed in 2015. The Kaufman Institute seeks to be the premier learning hub for specialty wholesale insurance.

Participants

A total of 46 participants volunteered for one of 10 sessions. The majority of participants were employees of the Kaufman Financial Group and represented various Kaufman Financial Group companies—all of which are located in Farmington Hills, Michigan. These companies included Kaufman Financial Group (headquarters), Burns & Wilcox, Atain Insurance Group, and Royal Premium Financing. These employees represented various levels of management (including company executives, vice presidents, and directors); specialized roles (including attorneys and accountants); non-supervisory insurance roles (including underwriters, claims adjustors, and

inspectors); and professional roles (including human resources and information technology employees). The remaining participant represented other employees, though all professional in nature (two teachers, three nurses, and one programmer).

After contacting and receiving approval for the study from the Senior Corporate Vice President of Human Resources for Kaufman (see Appendix A), the participants were selected from a pool of volunteers that responded to an initial email message from the Senior Corporate Vice President of Human Resources and a subsequent message from the primary investigator to additional volunteers. Selection criteria was based on participant's professional employee status and their ability to attend their scheduled 60-minute session in its entirety. Participants were asked to not answer phone calls, respond to emails or text messages, or leave during the study for any reason—other than an emergency or that they were no longer interested in participating in the study. All participants received and completed written consent and study overview forms to provide them information about the nature of the study and their rights as participants of the study (see Appendix B).

Data Collection Methods and Procedure

Data collection methods. This study utilized the following data collection methods: (a) observation; (b) questionnaire; (c) interview; and (d) researcher's journal. Each of these methods is described in detail in the section outlining Data Collection Tools. The data gathered by these methods were analyzed using both qualitative and quantitative methods. These methods of analysis are described in the section, Data Analysis.

Data collection procedures. This study observed 10 groups of three-to-five participants per group, using the synchronous communication method of face-to-face as they worked collaboratively to complete a problem activity entitled, "Village of 100." This activity was based

on David J. Smith's (2002) *If the World Were a Village*. The activity involved a total of nine questions that were strategically selected to force participants to confront their own assumptions about the world and rely solely upon the combined knowledge of their group. As described by Rovai (2007) and Spector (2015), the real-world thinking and problem activity aspect of this activity created plentiful opportunities for collaboration and social interaction amongst the participants. The design of this activity also provided participants with opportunities to acquire the metacognitive tools to construct knowledge and engage in critical analysis of their own thinking, actions and experiences long after they leave the learning environment (Ada, 2010; Blaschke & Brindley, 2011; Bourner, 2003; Lin, Hmelo, Kinzer & Secules, 1999). Lastly, the scoring of participant groups' answers to the questions in the activity was not included as a measurement of collaboration or social interaction, but the process by which they came to their answers was.

The activity. Commonly used in diversity awareness and team-building training classes, the Village of 100 activity asked participants to describe the various socio-economic situations of an imaginary village that contained exactly 100 villagers. The situations in this village represented the world's current conditions with all existing ratios remaining exactly the same; with the exception of the population which was set to one hundred. Situations—reflected as questions in the activity—included the native lands of the villagers, languages spoken by the villagers, religions of the villagers, literacy rates and college degrees earned by the villagers, gender, skin color, and age of the villagers, and wealth among the villagers. The nine final questions selected for the Village of 100 problem activity are listed here with summaries of the available answers from which participant groups would choose in Appendix C. With the exception of the sixth question, all totals needed to equal exactly one hundred, representing the total number of villagers.

The first question asked the groups "How many people in our 'Village of 100,' come from the following continents?" From the listing of continents below, groups had to estimate the appropriate numbers: Asia, Africa, Europe, South America, Central America (including Mexico), and the Caribbean, Canada and the United States. The second question asked how many people in the village would be either men or women. The third question asked groups to determine the ages of the villagers from a selection of three choices: 0–14 years; 15 years– 64 years; and 65 years and older. The fourth question asked groups to share their thoughts on the skin color of the villagers between white and non-white. The fifth question asked groups to determine how many villagers could read and write (how many were literate) and how many were unable to read and write (illiterate). The sixth question asked groups to determine the primary languages spoken by 38 of the villagers. In this instance, the totals did not equal one hundred as only 38 languages were listed and did not include languages that were believed to be the native languages for the remaining 62 villagers. From a listing of the following languages, groups needed to ensure their numbers totaled 38: English, Spanish, Hindi, Arabic, Bengali, a Chinese dialect, Portuguese, Russian, and Japanese. The seventh question asked groups to determine the religions of the villagers from the lineup of Muslims, Christians, Hindu, Buddhists, other global religions, such as Baha'i faith, Confucianism, Shintoism, Sikhism or Jainism; and those who were non-religious. The eighth question asked groups to determine how many villagers had a college degree and how many did not. The ninth and final question asked groups to determine who would control the wealth in the village. This question presented groups with three choices to which they needed to assign percentages that totaled 100. The choices were listed as follows:

_____Would control 59% of the village's wealth (all are citizens of the United States)
_____Would control a 2% percentage of the village's wealth
_____Would control 39% of the village's wealth
_____ = 100

What differentiated this problem activity from other ways of conducting it was the requirement for participants to complete the activity as a group, rather than individually. Once given the instructions and rules for completing the activity, groups were given 60 minutes to answer all nine questions using only their own assumptions and current knowledge. Participants were not allowed to use any outside resources, including cell phones, tablets, laptops, the web, Siri, Google, etc. While working to correctly answer all of the questions, each group was also faced with the challenge of collaboratively coming to a consensus on one answer for question as all group participants had to unanimously agree on each answer. This forced participants to construct convincing arguments as to why the answer that they supported was the answer that should be selected by the entire group. To accomplish this, group members collaborated and interacted using actions and behaviors as described in the literature. The instructions given to each participant group are listed below. The primary investigator read them to the entire group first, and then presented each participant with a hard copy:

> If we could shrink the Earth's population to a village of precisely 100 people, with all existing ratios remaining the same, what would this village look like?
>
> Work together to answer each question. Your team will have one opportunity to have your answers confirmed for accuracy. You may use this opportunity at any time while you are completing the activity.
>
> At the end of this exercise, your team will submit one document that contains the answers your group has chosen. In other words, this is not an individual activity that will result in multiple answers to each question, but rather a group activity where your group will submit the answers that you have chosen together.
>
> Your expertise will come only from the combined knowledge of your team and nowhere else. No cell phones, tablets, computers or any other electronic devices are allowed. You have 60 minutes to answer all questions but are not penalized for completing the activity earlier. Are there any questions? Good luck!

At the end of each activity, the primary investigator shared the correct answers to the questions with the groups—though the accuracy of the groups' responses was not recorded as data for this study. That situation notwithstanding, the primary investigator gave each group a "lifeline" halfway through their activity where their findings were validated. This lifeline gave participants either a "yes" or a "no" answer as to if their chosen responses were correct, and in some instances, included feedback in the form of "very close" and "not close at all." After the lifeline, groups had the remaining time left in their session to continue working on their final responses. At the end of the session, groups shared their final responses and were given all of the correct answers.

While each group worked to complete the problem activity, between three and five volunteer raters observed specific actions and behaviors that the groups exhibited, and documented their findings. These actions and behaviors were identified in the literature and included in the custom observation tool (see Appendix D). Altogether, thirteen raters assisted with making these observations. Nine raters (69.23%) were current Wayne State University students in either the Psychology or Instructional Technology departments and four raters (30.77%) worked in adult learning (one industrial organizational psychologist, two teachers, and one instructional designer).

Wayne State University Students were notified of this research opportunity through group emails that were sent to both departments asking for volunteers. The primary investigator contacted all students who expressed interest in becoming a rater and reviewed the study with them, along with rater responsibilities and session days and times. Those selected were scheduled for sessions based on their availability. The primary investigator trained each rater for one hour prior to the start time of the session for which they were observing. During these training sessions, the primary investigator reviewed the behavioral indicators that corresponded with the literature theme for which the rater that was responsible and provided specific examples. Raters were given

a five-dollar Starbucks gift card for each session that they rated. All data gathered by the raters were treated as confidential, had all identifying information removed, and was securely stored in the Google drive of the primary investigator.

Data collection tools. Data collection tools included a custom observation tool, questionnaire, interview, and researcher's journal; all of which collected data that were specific to each of the six literature themes outlined in Table 1 (see Chapter 2): (a) verbal communication; (b) non-verbal communication; (c) sense of community; (d) planning; (e) contributing; and (f) participant perspective—which the literature describes as a product, or outcome, of the first five themes. The data collection tools used in this study measured the actions and behaviors that are described in the literature as characteristic of collaboration and social interaction. The custom observation tool examined verbal communication, non-verbal communication, sense of community, and contributing. The researcher's journal examined the themes of planning and participant perspective. Rovai's Classroom Community Scale (CCS; 2002) was used as the questionnaire (see Appendix E) which—along with the participant interviews—was used to examine sense of community, contributing, and participant perspective. These measurements are explained below and the process is described in greater detail in the Data Analysis section.

As described in the literature review, verbal communication was measured by the meaning and effect of words on team dynamics. Non-verbal communication was measured by body language, facial expressions, eye contact, and gestures. Sense of community was measured through the creation of the learning and social communities, social interactions, social presence, and a constructivist learning environment. Planning was measured in the immersive experiences of learners and in the design of the physical environment. Contributing involved participant actions of giving help, responding to inquiries and questions, generating ideas, exchanging resources,

sharing knowledge, challenging others, explaining perspectives, and elaborating. The theme that the literature describes as the situation, or outcome in the presence of the first five themes was participant perspectives. This theme included levels of student perceptions of the overall learning experience, and student levels of satisfaction with the process of group interaction, quality of discussions, course structure, group outcomes and decisions process.

Observation. Frey, Lohmeier, Lee, and Tollefson (2006) wrote, "Collaboration can be reported as the mean level of perceived collaboration across all respondents for all partners, summarized in other meaningful ways, or provided as raw data in a table" (p. 388). To record the participant observations during the problem activity described in the Data Collection Procedures section, each rater was given a section to complete on the custom observation tool that listed criteria to identify collaboration and social interaction as described in the literature.

As Thomsen (2007) wrote, "Few instruments to measure collaboration exist and those that do are difficult to adapt outside the immediate context of a particular study" (p. 7). The custom observation tool created for this study is unique in that while other measurement tools for collaboration solely rely upon the perceptions of participants, this custom observation tool measures both collaboration and social interaction by also including specific actions and behaviors of participant groups as described in five of the six literature themes. These themes are (a) verbal communication, (b) non-verbal communication, (c) sense of community, (d) contributing, and (e) planning.

To identify collaboration, the custom observation tool included actions, behaviors, and efforts of participants that were specific to each of the literature themes. Raters were asked to document each time they observed an instance of these actions and behaviors. Each of these themes included between five and six sub-categories of data points that further supported each theme.

These specific data points are represented in Tables 4, 5, 6 and 7, and are organized by literature theme. Each theme is represented by category and sub-category, and was specifically designed to measure and identify collaboration and social interaction as described by the literature.

In essence, the categories defined in the custom observation tool seek to identify the actions, behaviors, and efforts as participants that convey feelings of being there and of developing stronger relational links; similar to those situations defined by the literature as having media richness. As recalled in the definition provided by Daft and Lengel (1986), rich media is the "ability of information to change understanding within a time interval" (p. 560). As stated by Warkentin et al. (1997),

> Rich media allow multiple information cues (the words spoken, tone of voice, body language, etc.) and feedback. It takes more time and effort by group members to achieve the same level of mutual understanding in a lean medium, such as CMCS [computer-mediated communication systems], than in a rich one, such as face-to-face communication. (p. 978)

It appears that while completing a problem activity, rich media are essential in creating feelings of being there and of developing stronger relational links. Warkentin et al. (1997) stated, "Development of relational links is important because researchers have associated strong relational links with many positive outcomes including enhanced creativity and motivation, increased morale, better decisions, and fewer process losses" (p. 978).

Early proponents of social presence theory contend that the social context cues present in face-to-face communication, but absent in computer-mediated communication (CMC), cause "messages to be more impersonal" and the communication to be generally "unemotional or undersocial" (Walther, 1992, p. 53). Walther (1992) explained how these social context cues are conveyed even within the physical environment, including in the physical aspects of other "actors" or participants. Unique to the face-to-face setting, these cues can include physical adornments,

personal appearance, and nonverbal behaviors. Walther described how the absence of these social context cues, as in CMC, can lead to uninhibited communication and the insults, swearing, hostile and intense language, and self-absorption that can accompany it. Walther concluded, "The lack of social context cues is also conducive to equalized participants. When these cues are absent, actors who would otherwise defer speaking turns to higher-status participants become disinhibited" (p. 53). Short (1976) also emphasizing the importance of a face-to-face environment, reminded us that in the verbal cues present in this form of communication assists in building and maintaining interactions between participants. He wrote that without the visual channel,

> possibilities for expression of socio-emotional material decreases the information available about the other's self-image, attitudes, moods, and reactions. So, regarding the medium as an information transmission system, the removal of the visual challenge is likely to produce a serious disturbance of the affective interaction. (pp. 59–60)

Walther (1993) also found that the transmission of socio-emotional cues and other patterns of communication occur at a significantly lower rate in CMC than they do in face-to-face communication.

It is also important to examine the dynamics of the relationship between social interaction and synchronous communication, particularly as it relates to group problem solving. Krejins et al. (2003) examined these dynamics and the inherent difficulties present in the use of CMC tools. The authors contended that the likelihood of social relationships being developed is diminished in CMC and without the ability of participants to make those necessary face-to-face impressions, CMC can be seen as "impersonal, unfriendly and task-oriented" (Krejins et al., 2003, p. 345). As a result, "communication behavior may negatively influence activities" and this may render CMC as "unsuitable for certain communication activities" and may even affect its effectiveness with group problem solving (Krejins et al., 2003, p. 345).

Verbal communication. The first category of the custom observation tool was verbal communication. As supported by the literature, this category contained five sub-categories: (a) calm/relaxed; (b) excited/enthused; (c) focused/determined; (d) loud/impatient; and (e) bored/unenthused. Each of these sub-categories was described along with supporting research from the literature.

Examples of calm/relaxed behaviors were noted in the efforts of participants to make introductions to one another, engage in small talk, and make non-task related inquires or comments. As Hatem et al. (2012) explained, "Prior knowledge of other participants helps to build strong trust" (p. 385). Examples of the sub-category of focused/determined were noted each time a participant would ask questions, solicit the feedback and suggestions of all group members, and/or share his or her own thoughts and suggestions towards completing the activity. Rovai (2007) explained that "collaborative learning is evidenced by comments directed primarily student-to-student rather than student-to-instructor. Evidence of support and encouragement is exchanged between students, as well as willingness to critically evaluate the work of others with constructive comments" (p. 80).

Rovai's (2007) assertions also described the next sub-category, excited/enthused, which included positive affirmations, words of encouragement, and instances when the tone and infliction of participants became louder, faster, and/or higher. Rovai added that members are ideally empathic rather than aggressive and that their comments show qualities such as sociability, sensitivity, discernment, concern, kindness and gentleness. Further, self-control is demonstrated in qualities that include respectfulness, flexibility, temperateness, discreteness, humbleness, forgiveness, and confidence (Rovai, 2007). In a comparative study between online and face-to-face learning, Ellis (2001) described how online participants experienced difficulty gaining

agreement without face-to-face contact. He wrote: "In face-to-face discussions, agreement is gained from the group by such things as nodding one's head and murmurs of agreement" (p. 176). This deficiency could negatively impact the collaboration and interaction of the group. Ellis (2001) continued:

> In the online forum, as people tend not to post to voice agreement with a comment, it is almost impossible to gauge whether others are silent because of agreement or because of a lack of willingness to post. Hence the discussion sometimes became forced. (p. 176)

The sub-categories of bored/unenthused and loud/impatient were included as controls to provide for the more positive sub-categories. They are described here, and their frequencies are discussed in Chapter 4. Bored/unenthused incidents included when participants demonstrated behaviors such as frequently looking at the time, not wanting to participate, being withdrawn and/or overly sarcastic, or intentionally withholding their own thoughts and opinions, and deferring to other group members. Loud/impatient behaviors were noticed when participants would express frustration with disagreements, be passive aggressive, or express a desire to hurry through the exercise (not to thoroughly complete the activity, but rather to leave in a hurried fashion). As illustrated in Table 3, the rater was directed to *listen* for specific words and phrases used by participants to identify and measure verbal communication.

Table 3

Specific data points on the custom observation tool that support literature theme, Verbal Communication

Behavior	**Examples**
Calm/relaxed	Making introductions and/or small talk and non-task related comments and/or inquiries
Loud/impatient	Expressing frustration with disagreements, using passive aggressive language, rushing others
Focused/determined	Expressing own feedback and thoughts, engaging the entire group
Excited/enthused	Speaking louder, faster, in a higher tone
Bored/unenthused	Asking about the time and rushing to leave, deferring to the group without providing any feedback, sarcasm

Non-verbal communication. Contrary to the last measurement point where the rater was directed to *listen* for certain words and phrases, in order to measure non-verbal communication, the rater was directed to *look* at the specific actions, behaviors, and body language of participants, as described in the literature. As Warkentin, Kwan, and Miles (1997) reminded us, our non-verbal communication is part of what makes face-to-face conversation such a "remarkably orderly process" (p. 978). The actions and behaviors below in Table 4 represent the data points on the custom observation tool used to measure non-verbal communication.

Table 4

Specific data points on the custom observation tool that support literature theme, Non-verbal Communication

Behavior	**Examples**
Calm/relaxed	Comfortable posture, pleasant and/or satisfied facial expression
Loud/impatient	Stern facial expression, tapping of hands, feet, fingers
Focused/determined	Look of concentration, eye contact, upright and engaged posture
Excited/enthused	Smiling, leaning in, nodding, laughing
Bored/unenthused	Disengaged posture, negative eye contact, pained facial expressions

Sense of community. To measure sense of community, the rater needed to document instances of communal actions, behaviors, and efforts of participants as described in the literature that support social presence and social interaction. This section revisits the research of Rovai (2007) who asserted that, "students do not learn in isolation and cognitive psychology means that people naturally learn and work collaboratively" and that "learning is embedded in social experience (p. 78). Data points included on the custom observation tool that illustrate these points are represented below in Table 5.

Table 5

Specific data points on the custom observation tool that support literature theme, Sense of Community

Behavior	**Examples**
Sense of inclusion and belonging	Making attempts to get all group members involved
Bonding behavior	Desire to complete all answers correctly, competitive desires
Encouraging and supportive behavior	Laughing, high-fiving
Positive feedback	Affirmations such as "Yes," "Great idea," "Great job"
Efforts to know more about other group members	Any form of introductions, asking for names/professions

Contributing. To measure *contributing*, the rater was directed to document instances where participants actively engaged with and made efforts to assist their group as described in the literature. To determine these specific efforts, it is necessary to revisit the "exploratory" study of Curtis and Lawson (2001) that focused on the "major types of behaviors in collaborative learning situations" (p. 26). These behaviors and efforts, translated into words, created the measurements of verbal communication during the observations. They were:

> Giving and receiving help and assistance; exchanging resources and information; explaining and elaborating information; sharing existing knowledge with others; giving and receiving feedback; challenging others' contributions; advocating increased effort and perseverance among peers; engaging in small group skills; and monitoring each others' efforts and contributions. (Curtis and Lawson, 2001, p. 26)

These behaviors and efforts are listed below in Table 6.

Curtis and Lawson (2001) provided relevance to this discussion with their research on "positive social interdependence" and its benefits to learners (p. 22). They stated, "The behaviors that characterize positive social interdependence include giving and receiving help, exchanging resources and information, giving and receiving feedback, challenging and encouraging each other, and jointly reflecting on progress and process" (p. 22). This concept of positive social interdependence is significant for this particular study as it encourages a collaborative environment where participants work together rather than in isolation: "Positive social interdependence is contrasted with individualistic and competitive work environments" (p. 22).

Table 6

Specific data points on the custom observation tool that support literature theme, Contributing

Behavior	**Examples**
Asking questions for understanding	Asking questions for understanding
Generating ideas	What if, what about, how about, imagine if we…
Challenging others	Requesting evidence to support a response
Exchanging resources	Sharing ideas and post knowledge/experience
Elaborating and answering questions	Providing examples for clarity and answers for understanding
Agreeing and supporting others	Making supportive statements such as "Certainly," "Absolutely," and exhibiting supportive body language such as high-fiving

Planning. Data collected during the observations using the researcher's journal were used to measure planning. These data looked specifically at how participants rearranged their learning

environment to meet the needs of their participant group. As Martin (2003), Nardi and Whittaker (2002), and Robertson and Huang (2006) reminded us, the learning environment can have a significant impact on the learning, collaboration, interaction and even the overall levels of the satisfaction of participants with the learning experience. As Martin (2003) stated,

> The physical and spatial aspects of a learning environment communicate a symbolic message of what is expected to happen in a particular place. The atmosphere of a classroom is clear when one enters it and is reflected by subtle cues in the physical arrangement as well as by the style of teaching. The arrangement of classroom space can communicate expectations for behavior that are reinforced by institutional policies. (p. 79)

The observation tool in Qualtrics. To electronically input data into the observation tool, the primary investigator designed a Qualtrics that contained all of the questions with areas for the raters to enter their observations. This allowed for a simple data entry process and an organized collection of the data for analysis. To ensure accuracy, raters entered their responses onto paper forms that were created by the primary investigator prior to entering them into Qualtrics. After each session, raters accessed the observation tool from their smart phone, table, laptop, or the PC provided by the primary investigator, by clicking on the website or by scanning the QR code. This QR code sent all data directly into Qualtrics where they were stored securely on the primary investigator's Google drive.

Questionnaire. Rovai's CCS (2002) served as the questionnaire for this study and was given to each participant immediately upon completion of their group's problem activity. Described by Dawson (2006) as a "valid and reliable measure of classroom community" that provides "interpretable factors: connectedness and learning" (p. 155), Rovai's CCS (2002) examined sense of community among students enrolled in 28 different university courses.

Troubled by higher dropout rates among distance learners, Kerka (1996), Besser and Donahue (1996), and Twigg (1997) all suspected that the physical separation of students reduced

their sense of community and contributed to feelings of disconnectness, isolation, distraction, and lack of personal attention. The authors suggested that this could affect the interaction and overall satisfaction with the learning experience of students in distance education courses or programs. Tinto (1993) emphasized the importance of community in reducing dropouts when he postulated that the levels of student satisfaction with the learning community and the student's pursuit of a college education increased when the students felt involved with the learning community and developed relationships with other members. To increase this sense of community, McAdam (1982) suggested that members not only engage in interpersonal interaction with other members of the community, but that they also develop a sense of belonging and actively participate in the community.

The CCS was specifically designed to measure connectedness and learning that included "feelings of connectedness, cohesion, spirit, trust, and interdependence among members" (Rovai, 2002, p. 201). The CCS also supports three of the literature themes identified in this study: (a) sense of community; (b) contributing; and (c) participant perspective. The items on the CCS that support the first literature theme, *sense of community,* described how participants viewed the levels of communal interactions during their activity. These items include participants' views on being trusted by other members, trusting other members, and connecting to other members. The items on the CCS that support the second literature theme, *contributing*, described the level to which participants felt comfortable contributing to the success of their group's activity by asking questions, exposing vulnerability, and speaking openly. Items on the CCS that supported the third literature theme, *participant perspective,* assessed overall levels of participant satisfaction with their learning experience. Rovai (2002) wrote that

> additional items addressed community issues pertaining to feelings regarding interaction among community members as they pursue the construction of understanding and the

> degree to which members share values and beliefs among each other regarding the extent to which their educational goals and expectations are being satisfied. (p. 202)

The questionnaire was placed into Qualtrics and participants completed it immediately after their group activity. Using a QR code provided by the primary investigator, participants accessed the CCS using either their smart phone, or on the smart phone or tablet of the one of the raters. Explaining the design for the wording and scoring of the scale, Rovai (2002) stated:

> Half of the items were negatively worded and all items followed a five-point Likert-type scale to include responses such as *agree, strongly agree, neutral, disagree* and *strongly disagree.* The scores are computed by adding points that are assigned to each item. Items are reversed-scored where appropriate to ensure that the most favorable choice is assigned a value of four and the least favorable choice is assigned a value a zero. Consequently, higher scores reflect stronger sense of community. (p. 201)

The analysis of the data collected in this process are described in more detail in the section, Data analysis.

Pre-activity participant demographics. Basic demographic information was collected from all participant prior to the start of their activity. The primary investigator created a demographic questionnaire in Qualtrics and as participants arrived they were asked to complete it using their smart phone or tablet. In the few instances where a participant did not have a smart phone or tablet, he or she completed this questionnaire using the smart phone or tablet of one of the raters. As all data were coded as anonymous in Qualtrics, no responses were stored on any device, or were able to be viewed or tracked outside of Qualtrics.

Interview. Each study participant was given an opportunity to share their perspectives on their group's interactions by giving a post-activity interview with the primary investigator. A total of 33 post-activity interviews were conducted with group participants within 21 days of their activity. This represents 73.33% of the total of group participants. The interview consisted of 11 reflective questions based on indicators identified in the literature, as well as observations from

the participant groups, as noted in the researcher's journal. While all 11 interview questions were asked of participants at each interview, the questions represented in the following tables include those questions that most closely related to the applicable literature themes, and provided the most relevant data.

As it relates to a *sense of community*, the interview questions represented below in Table 7 had two objectives: (a) to discover practical connections to participants' professional lives with real-world applicability; and (b) assess how participants' viewed the levels of interaction and sense of community of others.

Table 7

Post-activity interview questions that support literature theme, Sense of Community

Interview Question Number	**Interview Question**	**Objective**
IQ_2	Did this activity mimic any collaborative instances in your professional life, i.e. work?	Looking for practical connections and real-world applicability
IQ_3	Did you feel fully engaged in this activity?	Looking to assess self-perceptions of interaction
IQ_6	Do you feel that everyone in your group fully participated? Please explain.	Looking to assess perception of others' levels of interaction and sense of community

As it relates to levels of *contributing*, the interview questions represented in Table 8 sought to determine participants' self-perceptions of their levels of interaction and contributions, along with their any relevant cognitive application through their prior knowledge and experience.

Table 8

Post-activity interview questions that support literature theme, Contributing

Interview Question Number	**Interview Question**	**Objective**
IQ_4	Did you actively make contributions to your group's efforts? Please explain.	Looking to assess comfort with, and levels of, self-perceptions of interaction
IQ_5	Did you feel comfortable making contributions to your group's efforts? Please explain.	Looking to assess comfort with, and levels of, self-perceptions of interaction
IQ_7	Did you have any previous insight or knowledge that helped your group with their Reponses? Please explain.	Looking to assess cognitive application

Lastly, for participant perspective, the interview questions represented in Table 9 had four objectives seeking to determine the overall value and satisfaction of the learning experience as described by the participants. The first objective sought to establish value for a professional workplace employee. The second objective looked for construction or acquisition of new knowledge. The third objective sought to assess levels of confidence during and perceived value of a synchronous problem activity. The fourth objective sought to assess levels of self and group learning. The analysis of the data collected from the interviews is described in more detail in the section, *Data Analysis.*

Researcher's (reflective) journal. Mruck and Breuer (2008) described the use of a researcher's, or reflective journal, as a practice designed to "make visible to the reader the constructed nature of research outcomes; a construction that originates in the various choices and decisions researchers undertake during the process of researching" (Mruck & Breuer, 2008, p. 3).

Table 9

Post-activity interview questions that support literature theme, Participant Perspective

Interview Question Number	**Interview Question**	**Objective**
IQ_1	Did you find value in this activity? If so, please briefly describe that value.	Looking to establish value for a professional workplace employee
IQ_8	Did you learn anything new during the activity? Please explain.	Looking for construction or acquisition of new knowledge
IQ_9	How confident did you feel with your group's final responses?	Looking to assess levels of confidence during a synchronous problem activity
IQ_10	How successful do you think your group would have been had you used an asynchronous communication method, i.e. if you had worked together virtually rather than face-to-face?	Looking to assess perceived value of synchronous communication methods for a problem activity
IQ_11	Did you experience an "aha moment" where you were shocked or surprised at what you learned?	Looking to assess levels of self and group learning

Ortlipp (2008) explained that these journals can provide transparency to readers on the research progress, and inspire a researcher to alter their approach during the research process:

> In some instances critical self-reflection prompted me to change my approach during the research process, to use methods that I had not initially planned to use, and to discard pre-planned ways of going about the research that I had included in my research proposal. (p. 695)

For this particular study, a researcher's journal was used during the data collection and analysis processes to track progress, monitor critical self-reflections, and suggest alternate methods for future implications.

Data Analysis

Data gathered for this multi-case, mixed-methods research study were analyzed using both qualitative and quantitative research methods as described in Table 2. The analysis is presented

with the corresponding research questions identified as research question one (RQ1), research question two (RQ2), and research question three (RQ3). Together, all of the research questions address each of the literature themes.

Research question one: *Are social interaction, social presence and collaboration present among professional workplace participants engaged in a problem activity using synchronous communication?* This research question address five of the literature themes: (a) verbal communication; (b) non-verbal communication; (c) sense of community; (d) contributing; and (e) planning. Qualitative research methods included narrative analysis using empirical data collected from the observation tool and entered into the researcher's journal, while quantitative research methods included both descriptive and inferential statistics using data collected from the observation tool. The quantitative data analysis progressed through three phases. The first phase involved data preparation and coding. The second phase involved descriptive statistics of the sample demographics and item distribution details. The third phase involved inferential statistics that illustrated frequencies and identified correlations that existed between several of the data points. All statistic measurements and calculations, including frequencies, means, standard deviations and Pearson's Product-Moment Correlation coefficients for the quantitative data analysis were processed using Qualtrics and Microsoft Excel.

Research question two: *In what ways, and how often, do groups apply the identified themes of collaboration when participating in a problem activity?* This research question addresses three literature themes: (a) sense of community; (b) contributing; and (c) participant perspective. Employing all quantitative data analysis, the data collected from this process generated descriptive statistics and also involved a narrative analysis. The data collected included both group and individual responses to Rovai's Classroom Community Scale (CCS; 2002). These responses were

analyzed using Rovai's scoring systems, which were similar to a Likert scale, i.e. "4 for agree, 5 for strongly agree" and a reserve-scored scale for negative items. The scores were entered into Microsoft Excel to illustrate frequencies and display correlations.

Research question three: *What factors contribute to the variations of identified themes of collaboration among groups participating in a problem activity?* This research question addressed three literature themes: (a) sense of community; (b) contributing; and (c) participant perspective. Similar to RQ1, the analysis process for this research question involved both descriptive statistics and narrative analysis. Data collected included individual interviews conducted by the primary investigator with each participant after their activity, along with data from the researcher's journal. Microsoft Excel was used to illustrate frequencies.

Trustworthiness

Based on Shenton's (2004) recommended strategies for ensuring trustworthiness in qualitative research projects, this study employed the following criteria: (a) credibility, (b) transferability, (c) dependability, and (d) confirmability. Methods on demonstrating trustworthiness using these criteria are explained here with more specific information included in the Chapter 5: Discussion.

Credibility. Activities in this study that increased the probability of high credibility included (a) triangulation, (b) peer debriefing, or scrutiny of the research project, (c) negative case analysis, and (d) member checks as described by Shenton (2004).

Triangulation. Triangulation involved the "use of different sources, especially observation, focus groups and individual interviews, which form the major data collection strategies for much qualitative research" (Shenton, 2004, p. 65). This study included each of these data collection methods.

Negative case analysis. Recommended by both Lincoln and Guba (1985) and Miles and Huberman (1994), this process involved revisiting data which could include contradictory information. As described by Shenton (2004):

> If the study includes the production of typologies, on completing the initial categories the investigator may revisit the data in order to confirm that these constructs do indeed account for all instances of the phenomenon involved, even if some of the types embrace only one instance. (p. 67)

Negative case analysis incorporated into this study included the comparative studies that examine various aspects of collaboration using primarily asynchronous communication methods with limited references to synchronous communication methods.

Peer debriefing, or scrutiny of the research project. As Shenton explained, investigators should welcome feedback from "colleagues, peers and academics" as they can offer a "fresh perspective that such individuals may be able to bring [which] may allow them to challenge assumptions made by the investigator, whose closeness to the project frequently inhibits his or her ability to view it with real detachment" (Shenton, 2004, p. 67). By engaging the professional expertise of those in education from the Kaufman Financial Group, along with those from the Wayne State University community, the primary investigator employed peer debriefing, or scrutiny of the research project.

Member checks. Guba and Lincoln (1985) considered this to be the "single most important provision that can be made to bolster a study's credibility" (as cited in Shenton, 2004, p. 68). As Shenton (2004) described, once the investigator has engaged the informant in reading the transcripts, "the emphasis should be on whether the informants consider that their words match what they actually intended since, if a tape recorder has been used, the articulations themselves should at least have been accurately captured" (p. 68). Methods employed during the study to support member checks included audio recording and verbal feedback during the interview.

Transferability. Merriam (1998) discussed the importance of findings from one study being able to apply to other situations. Bassey (1981) explained how this applicability can increase the likelihood that other practitioners can relate these findings to their own positions. Both Lincoln and Guba (1985) and Firestone (1993) were among those who presented a similar argument which suggested that the investigator take responsibility to ensure that sufficient contextual information is provided to enable this transfer. In addition, Shenton (2004) emphasized the "great value" in effective transferability that exists when "findings may be true of people in other settings, similar projects employing the same methods but conducted in different environments" (Shenton, 2004, p. 70). With the broad applicability of this study spanning across different settings and environments (education, workforce, office professional, etc.), transferability is clear.

Dependability. The investigator exhibited dependability by providing an in-depth methodological description enabling this work to be repeated in the same context, with the same methods, and with the same participants, obtaining similar results (Shenton, 2004).

Confirmability. Confirmability refers to the "investigator's comparable concern to objectivity. That the findings of this study are the result of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher" (Shenton, 2004, p. 72). According to Shenton (2004), "The role of triangulation in promoting such confirmability must again be emphasized, in this context to reduce the effect of investigator bias" (Shenton, 2004, p. 72).

Data Collection Timeline

Data collection occurred over the course of 10 one-hour sessions conducted on the dates and times as listed below in Table 10. All sessions took place at the Kaufman Institute Learning Center in Farmington Hills, Michigan.

Table 10
Data Collection Timeline

#	Data Collected	Dates	Times
1	Observation and Questionnaire	January 20, 2017	12-1 PM
2	Observation and Questionnaire	January 27, 2017	12-1 PM
3	Observation and Questionnaire	January 30, 2017	1-2 PM
4	Observation and Questionnaire	February 1, 2017	12-1 PM
5	Observation and Questionnaire	February 2, 2017	12-1 PM
6	Observation and Questionnaire	February 3, 2017	1-2 PM
7	Observation and Questionnaire	February 6, 2017	12-1 PM
8	Observation and Questionnaire	February 7, 2017	12-1 PM
9	Observation and Questionnaire	February 9, 2017	12-1 PM
10	Observation and Questionnaire	February 10, 2017	12-1 PM
11	Interviews	February 9, 2017	8 AM – 11 AM 2 PM – 5 PM
12	Interviews	February 10, 2017	8 AM – 11 AM 2 PM – 5 PM

Summary

This mixed-methods, multiple-case study with a constructivist approach aspired to examine the effects of synchronous communication on the collaboration of ten professional workplace groups. The three research questions collectively address each of the themes identified in the literature by utilizing both quantitative and qualitative research and analysis methods. Data collection methods for this study included observation, questionnaire, interview, and the use of a researcher's journal. Both the custom observation tool used during the activity, and the CCS questionnaire (Rovai's, 2002) included specific measurements and indicators of collaboration and social interaction as noted in the literature. The post-activity interviews, with questions also based on themes identified in the literature, provided reflective opportunities for participants to discuss

their experiences, and how they viewed the social interaction and collaboration of their group during the activity. Methods employed to establish trustworthiness included credibility, transferability, dependability and conformability. Quantitative data analysis involved both descriptive and inferential statistics to identify frequencies and correlations, while qualitative data analysis also involved descriptive statistics, and narrative analysis. Statistical software tools for these analyses included Qualtrics and Microsoft Excel.

CHAPTER 4: RESULTS

Introduction

The results chapter begins with a description of the participant population and then illustrates how the collected data were organized. As this mixed-methods research study included both quantitative and qualitative data, the data are presented as it relates to each of the research questions and literature themes. The presentation of the results is followed by a discussion on significant findings, limitations, implications, and recommendations for future research in Chapter 5.

Participant Population

While the ideal sample size included a participant population of 50, and a total of 10 participant groups, the actual sample had a participant population of 46 and a total of 10 participant groups. Upon receiving approval from the Wayne State University Institutional Review Board (see Appendix F), both the Kaufman Human Resources Vice President and primary investigator sent emails to eighty randomly selected Kaufman employees. This email contained a link with which employees who were interested in volunteering could choose the day and time of their activity. Initially, volunteers could choose their session from a variety of days and times that included up to three sessions per day. These original sessions were scheduled within a two-week period and offered sessions from 9:00 a.m.–10:00 a.m., 11:00 a.m.–12:00 p.m., and 3:00 p.m.–4:00 p.m. However, the Kaufman CEO requested that employees not be away from work outside of the provided lunch hour so the primary investigator adjusted the schedule of sessions to only include one session per day from either 12:00 p.m.–1:00 p.m. or 1:00 p.m.–2:00 p.m. This significantly reduced the number of sessions that could be conducted in a single day from two to three down to

one since the sessions could not be conducted back-to-back as each session was preceded by rater training. All ten sessions took place over the course of 22 days.

To obtain the ideal number of participants for the study—in addition to those who volunteered from Kaufman—the primary investigator reached out to several professional contacts and asked for volunteers. The majority of participants (93.43%) were employees of the Kaufman Financial Group and represented various Kaufman Financial Group companies. The remaining participants (6.57%) represented non-Kaufman employees; all professional in nature (two teachers, three nurses, one writer, and one programmer). Table 11 presents the described the length of service of Kaufman employees who volunteered to participate.

Table 11

Participant Demographics: How long have you worked for Kaufman?

#	**Answer**	**%**	**Count**
1	Less than 6 months	13.04%	6
2	6 months–1 year	2.17%	1
3	1–2 years	6.52%	3
4	2–5 years	34.78%	16
5	5 years or more	28.26%	13
6	Other	15.22%	7
	Total	100%	46

As illustrated in Table 12, the demographics of participants included a majority of White/Caucasians (n = 86.61%), followed by Black/African-American (n = 10.87%), Arab/Middle Eastern (n = 2.17%), Asian/Pacific Islander (n = 2.17%), and Hispanic (n = 2.17%).

Table 12

Participant Demographic: Please choose the one race/ethnicity that best describes you.

#	Answer	%	Count
1	American Indian or Alaskan Native	0.00%	0
2	Arab / Middle Eastern	2.17%	1
3	Asian / Pacific Islander	2.17%	1
4	Black / African American	10.87%	5
5	Hispanic	2.17%	1
6	White / Caucasian	82.61%	38
	Total	100%	46

Table 13 illustrates the gender of participants who were 43.48% male and 56.52% female.

Table 13

Participant Demographic: What is your gender?

#	Answer	%	Count
1	Male	43.48%	20
2	Female	56.52%	26
	Total	100%	46

Table 14 illustrates the age ranges of participants and shows that the majority fell into the 25 to 34 year-old range, with the next majority falling into the 45 to 54 year-old range.

Table 14

Participant Demographic: What is your age?

#	Answer	%	Count
1	18–24	10.87%	5
2	25–34	41.30%	19
3	35–44	6.52%	3
4	45–54	19.57%	9
5	55–64	13.04%	6
6	65–74	6.52%	3
7	75 or older	2.17%	1
	Total	100%	46

The highest levels of education are represented in Table 15 with 67.39% of participants having earned a university degree, 23.91% having earned an advanced degree, 4.35% having a post-secondary/vocational education, and 4.35% with a high school diploma.

Table 15

Participant Demographic: What is the highest level of education you have completed?

#	Answer	%	Count
1	High School Diploma	4.35%	2
2	Post-Secondary/Vocational	4.35%	2
3	University Degree	67.39%	31
4	Advanced Degree	23.91%	11
	Total	100%	46

Organization and Presentation of Data

Data for this study were organized by literature theme and then by collection method. Each section of data from the literature themes are followed by a description of how the data address each of the research questions with a thorough explanation in the final chapter. The literature theme of verbal communication examined how spoken word affected the collaboration and social interaction of the groups, and employed the custom observation tool. The literature theme of non-verbal communication examined body language and also employed the observation tool. The literature themes of sense of community and contributing looked at actions and behaviors that demonstrated both the desire to create a community amongst group members and the desire to be a contributing part of that community. These literature themes employed the observation tool, questionnaire, and participant interviews. The literature theme of planning uncovered how participants exert control over the design of their learning environment. This literature theme employed the observation tool. Lastly, the literature theme of participant perspective examined levels of satisfaction with the learning amongst participants. This literature theme employed both the questionnaire and participant interviews. Organized in this manner, the data contributed to organized discussions that address each of the research questions.

Research Findings

The data collected from the observation tool are presented in Table 16 and organized to include frequencies of the specific observational data points that coincide with the five literature themes. Also included in the presented data are both the average number of observed frequencies and the standard deviation. These data are incorporated into each of these sections along with relevant information collected in the researcher's journal on observations from the group activities.

In some instances, information from the observations includes noteworthy circumstances and situations that supports what the literature identified as collaboration and social interaction.

Table 16

Total frequencies for all categories identified on the custom observation tool

Session/Group	Q1_Verbal	Q2-3_NonVerbal	Q4_Sense_Comm	Q5_Contributing
Group A	116	12	139	106
Group B	341	46	31	202
Group C	638	117	111	66
Group D	137	67	68	65
Group E	505	48	50	180
Group F	569	65	76	217
Group G	302	18	69	101
Group H	623	147	105	105
Group I	572	72	120	179
Group J	628	300	125	252

Verbal communication: Observation d**ata**. Supportive of RQ1, *Are social interaction, social presence and collaboration present among professional workplace employees engaged in a problem activity using synchronous communication,* the first item on the observational tool (question 1) asked raters to indicate the total number of identified instances of the verbal communication of participants that coincided with the following five categories of the language described as supportive of collaboration and social interaction: (a) calm/relaxed, (b) loud/impatient, (c) focused/determined, (d) excited/enthused, and (e) bored/unenthused. Table 17 illustrates the total frequencies, averages, and standard deviations of each sub-category of verbal communication for each session. Frequencies of loud/impatient and bored/unenthused verbal communication were included as controls to provide balance and accountability to the other

positive instances. These frequencies were deducted from the total numbers of verbal communication frequencies.

Table 17

Frequencies of observed instances of collaborative verbal communication from the custom observation tool

Session Group	Q1_Calm	Q1_Loud	Q1_Focused	Q1_Excited	Q1_Bored	Totals
Group A	31	20	64	43	2	116
Group B	6	1	321	15	0	341
Group C	24	0	445	170	1	638
Group D	0	0	132	6	1	137
Group E	6	1	383	117	0	505
Group F	5	0	462	102	0	569
Group G	2	5	298	8	1	302
Group H	6	0	530	87	0	623
Group I	8	0	476	92	4	572
Group J	6	0	530	92	0	628
Totals	94	27	3641	732	9	4431
Mean	9.40	2.70	364.10	73.20	0.90	
Standard Deviation	9.95	6.27	161.32	53.83	1.29	

Calm/relaxed. Instances where participants made introductions to get to know the other participants, made small talk, or non-task related inquiries demonstrated verbal communication noted as calm/relaxed (Hatem et al., 2012). As illustrated in Table 17, the session where participants exhibited the highest instances of these behaviors was Group A with 31 observed frequencies. This group had both one very soft-spoken group member in it who came across as very calm, and a very out-spoken group member who wanted to debate many of the group's

responses. This made the dynamics of this group interesting despite being the smallest group in the sample. Conversely, the session where participants exhibited the lowest instances of these behaviors was Group D with zero observed frequencies. Unbeknownst to the primary investigator, this entire group all worked in the same department. This association may have contributed to this group not exhibiting any of the actions indicative of calm and relaxed behavior since they were already acquainted. Group I exhibited frequencies closest to the average number of frequencies (9.4) with eight observed instances.

Loud/impatient. As described by Hatem et al. (2012), instances where group members expressed frustration with disagreements, used passive aggressive language, or rushed others to give their thoughts were observed as incidents of loud/impatient verbal communication. Describing the actions and behaviors as "negative," Hatem et al. (2012) list them as including behaviors such as "domineering, aggressive, avoidance, deceptive and mocking" (p. 391). Raters noted that two groups exhibited the highest observed frequencies of loud/impatience verbal communication; Group A with 20 recorded frequencies, and Group G with five recorded frequencies. Two other groups exhibited one instance while the remaining six groups had no instances.

Group A (which also had the highest instances of calm/relaxed behaviors) exhibited the highest instances of loud/impatient verbal communication. Raters for this session noted disagreements between two specific group members; one who was very soft-spoken and the other one who was very out-spoken. This was an interesting and unplanned occurrence that resulted in the third member of this group acting as a mediator. This group member mentioned this unofficial role during his interview with the primary investigator which is discussed in the literature theme, participant perspective.

Group G had the next highest frequencies as the rater noted instances of impatience from one particular group member who was identified as a member of the executive group. It was also noteworthy, as described in the researcher's journal, that this same participant group consisted of all males and was devoid of social pleasantries—such as those observed in Session E, one of the all-female groups. Even though this group was respectful and not overtly rude, there were no introductions made and no efforts to exude politeness or manners. This group did exhibit frequent incidents of sarcasm and impatience. This group was also aggressive in sharing of existing knowledge with the group which supports the literature themes, *sense of community* and *contributing*; what the research describes as necessary components of collaboration and social interaction. Lastly, this group also exhibited their competitive nature as they expressed concern about not finishing in time with such comments as: "We are running out of time;" "We have to get through more questions;" and "Let's just put that [answer] so that we can move on."

Focused/determined. Observations during the group activities included more instances of focused/determined actions and behaviors, as demonstrated in the language, than any other category as illustrated in Table 17. This sub-category included instances such as when participants asked for the feedback and suggestions of all group members, expressed their own feedback and thoughts, and asked questions. Two sessions exhibited the highest frequencies of instances of being focused/determined: Group F and Group J at 530 frequencies each. During Group F's session, the rater noted that half of the group members (two) admitted that they had very little knowledge on these subjects. This led to the entire group being very supportive in terms of soliciting feedback from all group members, carefully vetting responses to all the questions, and making efforts to ensure that the thoughts and opinions from all group members. The rater for this group also noted that during this session, group members began using the instructions packet of one of the group

member's as their group's tallying packet. This was unique amongst all the other groups as the other groups had multiple packets and ended up combining their answers at the end, as directed in the opening instructions. Also interesting during this session—and reflected in the high instances of focused/determined behaviors—was how one group member, in order to get a better vantage point of the tallying packet, stood up from their seat, sat on the edge of the table, and leaned in towards the group. This group member's effort to gain a front row seat to participate in the group's decision-making process demonstrated a desire to be actively included with the group; therefore resulting in the higher instances of focused/determined behaviors.

Group J exhibited high frequencies of both focused/determined actions and behaviors (530 recorded incidents), and excited/enthused actions and behaviors (92 recorded incidents). This all-female group, included participants from two different age ranges: 25–34 (n = 2) and 5–64 (n = 3). This group exhibited high levels of energy as they worked together on each answer, providing their own individual thoughts, while deferring to the majority for their final answers. Conversely, the session with the lowest observed instances of focused/determined behaviors was Group A with 64 frequencies. This was the same group that exhibited the highest instances of both calm/relaxed and loud/impatient behaviors as it contained the two opposite group members (one out-spoken and one soft-spoken). Lastly, Group E most closely represented the average number of frequencies (364) with 383 observed instances. This group was characterized by its all-female population, high observations of politeness, and accurate answers to the questions posed in the activity.

Excited/enthused. As noted in the literature, specific words and phrases exchanged between participants supported this next sub-category of verbal communication. These words and phrases included positive affirmations and encouragements along with instances of participants speaking louder, faster and higher. The research also discusses the concept of "paraverbal

communication," which, as previously mentioned, includes tone of voice, inflection, and voice volume (Warkentin et al., 1997). In addition, attributes such as "cooperative, confident, emphasizing, committed, optimistic and respectful" are described as positive aspects of human behavior (Hatem et al., 2012, p. 391).

The session with the highest frequencies of excited/enthused verbal communication was Group C with 170 recorded instances. This group was a mix of high-energy, mostly younger participants which resulted in higher instances of the paraverbal language characteristic in this literature of excited/enthused behavior. As noted in the researcher's journal, the most senior group member (age range 55–64) took the lead by suggesting how to approach the activity and who should be responsible for which tasks (i.e. completing the math calculations, tallying votes). As the majority of participants were between 25–34 age range (with one in the 18–24 range), these younger participants had different ideas than that of the senior participant and wanted to work through each question together to provide their own thoughts and feedback on the answers selected by the majority. This situation cultivated healthy discussion that generated the highest instances of words and phrases consistent with cooperation, emphasis, and respect.

Conversely, Group D exhibited the lowest number of frequencies of excited/enthused verbal communication with only six observed instances. As mentioned earlier, this group also had the lowest observed instances of calm-relaxed behaviors as group participants were already acquainted with one another. Unlike other groups, where not all members were already acquainted, this group seemed to approach this activity as an ordinary department project and as a result, may not have been as excited or enthused as other groups. Representing the closest number of instances to the average of 73, was Group H with 87 observed frequencies.

Bored/unenthused. Words and phrases that demonstrated instances of being bored/unenthused included frequently asking about the time, refusing to participate, passing to other group members, rushing to leave, being sarcastic or willfully withdrawn with phrases such as, "Whatever you guys think…" and "It doesn't matter to me." These types of actions are consistent with what Hatem et al. (2012) described as a negative aspect of human behavior which would include attributes such as avoidance, deceptive, clowning, depressive, selfish, disappointing, doubtful, pessimistic, mocking" (p. 391).

Observations from the raters indicated that only five out of the 10 sessions contained instances of bored/unenthused verbal communication. Raters noted only one instance in three of these sessions; two in one session, and four was the highest number of observed frequencies of bored/unenthused instances of verbal communication noted in Group I. This session was unique in that unbeknownst to the primary investigator until the day of the session, there was a direct reporting relationship where a vice president had two employees that worked in his department. While these data alone cannot determine the exact effect this relationship had on the collaboration and interaction of this group, if any, there were observations noted that were more relevant to the literature themes, *sense of community* and *contributing*.

Non-verbal communication: Observation data. In contrast to question 1 on the observation tool where raters *listened* for certain words and phrases, questions 2A and 3A on the observation tool required that raters *look* for identified actions and behaviors used to identify and measure instances of collaboration and social interaction as described in the literature. Data collected for this literature theme was also supportive of RQ1, *Are social interaction, social presence and collaboration present among professional workplace employees engaged in a problem activity using synchronous communication*. This category was separated into two groups:

negative and positive with the same sub-categories as verbal communication. Negative non-verbal communication as described in the literature included the following sub-categories: unfocused/indifferent; loud/impatient; and unfocused/indifferent. Positive non-verbal communication as described in the literature included the following sub-categories: calm/relaxed; focused/determined; and excited/enthused. Similar to question 1, verbal communication, frequencies of negative non-verbal communication were subtracted from the positive frequencies to generate the total frequencies. These total frequencies, along with the average/mean and standard deviation, are presented below in Table 18.

Table 18

Frequencies of observed instances of collaborative non-verbal communication from the custom observation tool

Session/Group	**Q2A_Neg**	**Q3A_Pos**	**Totals**
Group A	10	22	12
Group B	52	98	46
Group C	9	126	117
Group D	31	98	67
Group E	3	51	48
Group F	7	72	65
Group G	36	54	18
Group H	31	178	147
Group I	12	84	72
Group J	0	300	300
Totals	191	1083	892
Mean	19.10	108.30	89.20
Standard Deviation	17.18	80.08	84.67

Negative non-verbal communication. Consistent with the literature, actions and behaviors included on the observation tool indicative of negative non-verbal communication included sluggish or disengaged posture, bored or negative facial expressions, frowning, tapping of feet and/or hands, crossed arms and stern and/or negative eye contact, including rolling the eyes and sighing. The session that reflected the highest instances of negative non-verbal communication as identified on the observation tool was Group B. Noted in this group was that the male participants exhibited more negative non-verbal communication than did the females, and of these males, the top frequencies existed among those between the age ranges of 45–54 and 55–64. While demographic differences were not included as research variables for this study, this observation was noteworthy as it differentiated this group from the others. It may also be significant that the group with the next highest frequency of negative non-verbal communication was Group G, one of the all-male groups.

Conversely, the session with the lowest number of observed instances of negative non-verbal communication was Group J with zero frequencies. This high-energy, all-female group also exhibited some of the highest frequencies of positive non-verbal communication, focused-determined verbal communication, sense of community and contributing. Lastly, the group exhibiting instances closest to the average number of instances (19) was Group I with 12 observed frequencies.

Positive non-verbal communication. As described in the literature, actions and behaviors identified by the observation tool as indicative of positive non-verbal communication included upright attentive and engaged posture, comfortable and/or pleasant facial expressions, a look of focus and concentration perhaps leaning in, and smiling. Group J exhibited the highest frequencies of positive non-verbal communication with 300 instances; nearly 60% more than the session with

the next highest instances. This group consisted of five females; two of whom were between the ages of 25 and 34, and three of whom were between the ages of 55 and 64. All group members appeared to be comfortable sharing their thoughts and suggestions on the questions, as this group exhibited more focused/determined gestures than any group. There was a high frequency of looks of concentration, solid eye contact, and upright and engaged posture from all group participants. The next highest frequencies were in the sub-category of excited/enthused as participants in this group frequently smiled, nodding in agreement, and leaned in.

Conversely, Group A exhibited the lowest number of instances of positive non-verbal communication with 22 observed frequencies. As previously mentioned in the section on verbal communication, this all-male group may have exhibited so few instances as a result of the dynamics of having both a soft-spoken and out-spoken group member working together. Lastly, Group B exhibited observed instances closest to the average (108) with 98 frequencies.

Sense of community: Observation data. Question 4 on the observation tool identified frequencies of when participants supported a sense of community through their actions and behaviors as described in the literature. Data collected as it relates to this literature theme supported all three research questions: RQ1, *Are social interaction, social presence and collaboration present among professional workplace employees engaged in a problem activity using synchronous communication;* RQ2, *In what ways, and how often, do groups apply the identified themes of collaboration when participating in a problem activity*; and RQ3, *What factors contribute to the variations of identified themes of collaboration among groups participating in a problem activity.* As described by Kreijns et al. (2002) and Rovai (2007), these actions and behaviors included those such as getting all group members involved, making efforts to get to know more about other group members, exhibiting a competitive desire to answer all questions

correctly, laughing, high-fiving, and using encouraging words such as “Great idea!” The total number of frequencies, along with the average/mean and standard deviation, are listed below in Table 19.

The group that exhibited the highest frequencies of a sense of community was Group A with 139 observed frequencies. Group A included members who were all male, and represented three different races/ethnicities (Caucasian, African-American, and Asian) along with three different age ranges (25–34, 45–54 and 55–64). While this group did exhibit higher frequencies of both calm/relaxed and loud/impatient verbal communication, this group was also very interactive. Between the out-spoken and assertive group member, and the soft-spoken and reserved group

Table 19

Frequencies of observed instances of a sense of community from the custom observation tool

Session/Group	**Q4_Sense of Community**
Group A	139
Group B	31
Group C	111
Group D	68
Group E	50
Group F	76
Group G	69
Group H	105
Group I	120
Group J	125
Totals	894
Mean	89.4
Standard Deviation	35.58

member, the third group member seemed to assume the role of mediator and made significant efforts to establish a healthy and neutral balance for the entire group. How this group exhibited the highest frequencies of a sense of community was in the number of times they supported each other with positive feedback and encouraging words and positive affirmations such as, “Great idea,” and “Yes, I agree.”

Noted in the observations was that Group B had the lowest observed instances of a sense of community at 31. Also noted during the observations was that among all of the groups, providing positive feedback and affirmations such as “Great idea,” Great job,” “Yes, I agree,” were the most frequently observed actions and behaviors supportive of collaboration and social interaction; specifically as it related to creating a sense of community. The next most frequently observed actions and behaviors were those of bonding and encouraging one another. This was demonstrated in the groups’ desires for their group to be the best, to correctly answer all of the questions, and in the frequent instances of laughing and high-fiving.

Sense of community: Questionnaire data. Items on Rovai’s Classroom Community Scale (CCS; 2007) questionnaire that correspond with the first literature theme, sense of community, reflect the overall sense of how participants created a learning community, allowed for social interaction, and created their own learning as described in the research of Ellis (2001), Dawson (2006), Kapp and Driscoll (2010), Krejins, et al. (2003) and Rovai (2007). As Dawson (2006) wrote:

> The CCS has been validated and incorporated within education studies designed to evaluate the degree of community experienced among various student cohorts from primary to tertiary institutions. Hence, the correlation of the data deriving from the CCS with data concerning various communication behaviors (frequency and mode) operating within the classroom environment may provide additional quantitative lead indicators of the degree of sense of community occurring among the student body. (p. 155)

Table 20 illustrates the eleven items on Rovai's CCS that substantiated how participants exhibited the actions and behaviors consistent with a sense of community during their group's activity.

Table 20

Rovai's CCS items pertaining to sense of community: Sense of Community (11 items)

CCS #	Item	Min	Max	Mean	SD
1	I felt that [participants] in this [activity] cared about each other	2	4	3.43	0.62011
3	I felt connected to others in this [activity]	1	4	3.26	0.68101
5	I did not feel a spirit of community	0	4	3.13	0.93354
7	I felt that this [activity] was like a family	0	4	2.43	1.08837
9	I felt isolated in this [activity]	0	4	3.41	0.80488
11	I trusted others in this [activity]	2	4	3.35	0.70608
13	I felt that I could rely on others in this [activity]	1	4	3.33	0.59831
14	I felt that other [participants] did not help me learn	0	4	3.11	0.84927
15	I felt that [participants] of this [activity] depended on me	0	4	2.39	0.85578
17	I felt uncertain about others in this [activity]	0	4	2.87	0.97999
19	I felt confident that others supported me	1	4	3.11	0.70642

Sense of community: Interview d**ata.** Supported by the literature of Ellis (2001), Rovai (2002) and Warkentin et al., (1997), three post-activity participant interview questions sought to discover practical applicability and assess participants' perceptions of others' levels of interaction. The first interview question sought to discover practical applicability of the collaboration and interaction from the activity, and asked participants, "Did this activity mimic any collaborative instances in your professional life, i.e. work? Please explain." 85% of participants responded positively with "Yes," indicating that overall, this method of communication is common in their

work environment. Only one respondent answered, “No,” and the remaining 12% responded more positively than negatively with comments such as, “Occasionally,” and “Most of the time.” Respondents also shared the circumstances under which this type of interaction mimics their professional life (i.e. work). Circumstances included, “project-based events,” “trouble-shooting projects,” “work-related issues,” “brainstorming sessions,” “[efforts to be] creative,” “[efforts to] gain a consensus,” and “meetings when we’re trying to figure out how to approach things, when we need to do things better.” Only one respondent indicated that the individual’s problem-solving efforts were done “in a one-on-one format.”

The second interview question for this literature theme sought to discover participants’ view of their levels of engagement and asked, “Did you feel fully-engaged in this activity? Please explain.” With minimal follow-up comments, 97% of respondents indicated “Yes,” while 3% (one respondent) commented, “To the extent that I could. There were others who were overtly engaged and I was trying to keep track of the time to get as much completed as possible.” Another respondent shared that she practiced self-restraint during the activity, “Yes, most of the time. I was in a group with older people who thought about things differently and I did not want to be confrontational and was much more passive.” Two respondents shared that the “no cell phone or devices rule” kept them engaged, which may suggest that had the participants not been facing one another, engagement may have been lower.

The third interview question sought to assess participant perceptions of others’ levels of interaction and engagement and asked, “Did you feel that everyone in their group fully participated? Please explain.” Of this group, 90.91% indicated, “Yes” to this question while 9.09% indicated, “No.” Two of these latter responses came from the same group, and one came from a group member who was a manager and had two direct reports in their group; one of these direct

reports shared that they believed the other direct report did not contribute as much as they normally would because their immediate supervisor was also in the group. The comment made by the manager in the group was, “No, there seemed to be one person that was not engaged and participating. I did make several attempts to get them involved and engaged.” The other direct report also noticed this behavior and stated during his interview, “There was one person that did not participate at all. I tried to engage them but didn’t see much effort to participate” while the other direct report responded, “There were a few people that were pretty quiet.”

Contributing: Observation data. Question 5 on the observation tool identified frequencies of participants’ actions and behaviors that contributed to the overall success of the group’s activity, as described by the literature. Data collected as it relates to this literature theme supported all three research questions: RQ1, *Are social interaction, social presence and collaboration present among professional workplace employees engaged in a problem activity using synchronous communication;* RQ2, *In what ways, and how often, do groups apply the identified themes of collaboration when participating in a problem activity*; and RQ3, *What factors contribute to the variations of identified themes of collaboration among groups participating in a problem activity.* Supported by Curtis and Lawson (2001), these actions and behaviors included those such as providing help to other group members by clarifying confusion, asking questions for understanding, generating ideas by asking questions such as, “What about…?” or “What if…?,” politely challenging other group members to clarify their suggestions by providing evidence of support, sharing past knowledge and/or experience, and agreeing with other group members using such comments as, “Yes,” “Exactly” and “Absolutely.” The total number of frequencies, along with the average/mean and standard deviation for this category are listed below in Table 21.

Similar to the earlier literature themes, the actions and behaviors characteristic of contributing were separated into seven sub-categories. As supported by Gibson and Laycock (2007), these sub-categories were: (1) giving help to group members; (2) asking questions; (3) generating ideas; (4) challenging group members; (5) exchanging resources, (6) answering questions and (7) agreeing/supporting group members. An explanation of the sub-categories where the majority of observations were noted is included, along with both the next sub-categories where higher frequencies were noted, and circumstances that may have contributed to these frequencies.

Table 21

Frequencies of observed instances contributing from the custom observation tool

Session/Group	**Q5_Contributing**
Group A	106
Group B	202
Group C	66
Group D	65
Group E	180
Group F	217
Group G	101
Group H	105
Group I	179
Group J	252
Totals	1473
Mean	147.30
Standard Deviation	66.59

The session that exhibited the highest frequencies of contributing was Group J with 252 frequencies. Group J included five Caucasian women whose age ranges were 25–34 (n = 2) and

55–64 (n = 3). Of the sub-categories defining contributing, this group exhibited the most frequencies of agreeing and supporting followed by elaborating and answering questions, and asking questions for clarification. While this group exhibited high frequencies of both verbal and non-verbal communication (specifically in the sub-categories of focused and excited), a comment made by one of the participants at the end of the session expressed disappointment with the group's uniformity and lack of diversity. This group member seemed to suspect that had the individual's group been more diverse, they would have been more successful in answering the questions in the activity:

> I think that an even more diverse group of people would have added to our discussion. We are all the same [white women] and to have someone in the group that was different may have helped our discussion and given us more resources.

Conversely, the group with the lowest instances of actions and behaviors supportive of contributing was Group D with 65 observed frequencies. This group, representing group members who all worked in the same department, also exhibited the lowest observed frequencies of positive non-verbal communication, and calm/relaxed and excited/enthused verbal communication. As mentioned earlier, this may have been caused by the pre-existing familiarity amongst the group members. Lastly, the group with the number of observed instances of contributing actions and behaviors closest to the average (147) was Group I with 179 frequencies.

As illustrated by the data, sub-categories with the highest observed frequencies were agreeing/supporting, followed by elaborating/answering questions. Only one group was the exception, and the difference in frequencies between the most observed categories among this group was only one. The next sub-categories with the most observed frequencies for contributing were generating ideas where group members would recommend answers and make suggestions,

followed by giving help to group members by clarifying responses and providing examples, and then exchanging resources and sharing existing knowledge and experience.

Contributing: Questionnaire data. Table 22 describes Rovai's CCS items that correspond with the next literature theme, *contributing*, which describes the various efforts, actions, and behaviors of participants that contributed to the overall success of their group's activity. These efforts, actions, and behaviors included giving help to group members, asking questions, generating ideas, politely challenging group members for clarification, exchanging resources, answering questions and elaborating, and agreeing with and supporting group members. This literature them is supported by the research of Curtis and Lawson (2001), Gibson-Langford and Laycock (2007), Johnson and Johnson (1996), Tutty and Klein (2008), and Rovai (2007).

Table 22

Rovai's CCS items pertaining to contributing: Contributing (3 items)

CCS #	Item	Min	Max	Mean	SD
2	I felt encouraged to ask questions	1	4	3.33	0.79034
8	I felt uneasy exposing gaps in my understanding	1	4	3.02	0.95427
10	I felt reluctant to speak openly	1	4	3.39	0.74471

Contributing: Interview data. Also supported by the research of Ellis (2001), the three interview questions relevant to the literature theme of contributing sought to determine participants' self-perceptions of their levels of interaction and contributions made to their group's efforts, along with any relevant cognitive application revealed by sharing prior knowledge and experience. The first interview question asked, "Did you actively make contributions to your group's efforts?" This question yielded a positive response of 78.79% of participants while the remaining 21.21% shared feelings of uncertainty about their efforts to contribute. Slightly more

than half of these responded with, “I think so” or “I felt that I did,” while the others provided more specific self-reflections of their contributions:

> I didn’t feel I was the strongest voice but was able to hear other’s views and then contribute, but not as the leader, just as a member of the group. I felt more of the moderator than as the strongest contributor.

The second interview question for this literature theme was supported by the research of Ellis (2001), and asked participants, “Did you feel comfortable making contributions to your group’s efforts? Please explain.” Of the total group, 84.85% answered, “Yes” while 15.15% expressed that they were “mostly” or “somewhat” comfortable, and that their level of comfort depended on either their confidence with their responses, or on how well they knew the other members of their group.

In terms of how participants’ comfort level affected their interactions, one participant remarked, “I just felt that I had a lack of knowledge.” Other participants mentioned that, “The uncertainty of being wrong made me uncomfortable,” “Most of the time [I was comfortable] although there were some questions that I did not feel comfortable about just because I had so little knowledge about it.” As it related to their comfort with the other participants, responses included, “Even though I knew most of the participants, I felt comfortable and even got to know the other participants better so I felt comfortable with everyone even when it came to disagreeing. No was negative or anything.” As previously mentioned, one respondent commented on the lack of diversity within the group, and how it may have hindered their group’s performance:

> I think that an even more diverse group of people would have added to our discussion. We are all the same (white women) and to have someone in the group that was different may have helped our discussion and given us more resources.

The third interview question for this literature theme, asked participants, “Did you have any previous insight or knowledge that helped your group with their responses? Please explain.”

Affirmative answers only accounted for 24% of responses to this question, while negative responses accounted for 64%, and other comments accounted for 12%. Nearly a quarter of respondents shared feelings of doubt and inadequacy about what they contributed since the lifeline guided their responses and eventually provided them with the correct answers. Responses to this question may have been more positive had it not contained the word "helped" as participants' comments indicated that they were willing to contribute, but ended up doubting the helpfulness of their contributions once they realized their inaccuracies. These comments included: "Yes, even though it may not have been the right answer," "No, I used my own judgment thought it may not have been right," "I did but I was wrong," "I tried to rely on my current knowledge but it seemed to be limited," "My memory from high school was extremely limited," "My data was not global enough," and "No, not really. I just contributed where I could with what I knew."

Planning: Observation and researcher's journal data. Data collected from the researcher's journal during the observations supported this literature theme, and these data assisted in addressing RQ1, *Are social interaction, social presence and collaboration present among professional workplace participants engaged in a problem activity using synchronous communication.* Whereas the first literature four literature themes (verbal communication, non-verbal communication, sense of community and contributing) only referenced certain participant groups that were relevant to that particular theme, this literature theme noted consistent actions from all groups. Altogether, these data pointed to the original seating arrangements of the groups, and the subsequent seating arrangements once the groups began their activity. The literature described how collaboration and interaction are more likely to occur as a result of particular arrangements in the learning environment, and in the levels of control that learners have over that environment. The research of both Martin (2003) and Robertson and Huang (2006) is essential for

this particular study, as they each described the necessity of integrating both intentional arrangement for social interaction, and participant control of the environment all for the purposes of identifying and measuring collaboration and social interaction.

As participants arrived for their sessions, the primary investigator intentionally arranged their seating in a format that was contrary to that described in the literature as ideal for collaboration and social interaction. This original seating arrangement represented a typical lecture hall or traditional classroom-style setup where all participants faced the front of the room. However, as each group began their activity, each one voluntarily rearranged their seating. Groupings of both seating arrangements (initial and subsequent) for each group are in included in Appendix G.

At the beginning of each session, the primary investigator read the instructions to each group, and then presented each participant with a hard copy of the exact same instructions. As groups began working on their activity, with the only direction that they were to "work together as a group to complete the activity," each group (100% of the sample population) immediately rearranged their environment to enable collaboration and social interaction by creating a face-to-face dynamic. This was conducted without any prompting from, or even permission given by the primary investigator. Additionally, participants ensured that they were all sitting at the same table since some of them initially took a seat at different tables (see Appendix G).

Participant perspective: Questionnaire data. Data collected as it relates to this literature theme supported both RQ2, *In what ways, and how often, do groups apply the identified themes of collaboration when participating in a problem activity* and RQ3, *What factors contribute to the variations of identified themes of collaboration among groups participating in a problem activity.* According to Krejins et al. (2002), there is a strong relationship between social interaction and the

learner experience. Walther (1996) explained that without this relationship, consensus and agreement in the learning process are unlikely to occur. Krejins et al. (2002) wrote that "Once positive affective relationships and a sense of community have been established, enhanced task accomplishment may be achieved" (p. 5). The literature for this particular theme explained that one of the major components of the learner experience is learner satisfaction and that social presence is a good predictor of this satisfaction (Gunawardena, 1995; Walther, 1996; Rovai, 2007; Krejins, 2002). Table 23 below list the items on Rovai's CCS that correspond with this literature theme, and is followed by how participants viewed their overall interactions, the success of their group's activity, and the extent to which they were satisfied with learning experience.

Table 23

Participant Perspective (6 items)

CCS #	Item	Min	Max	Mean	SD
4	I felt that it was hard to get help when I had a question	0	4	3.15	0.94204
6	I felt that I received timely feedback	2	4	3.52	0.62322
12	I felt that this [activity] resulted in only modest learning	0	4	2.37	1.08236
16	I felt I was given ample opportunities to learn	1	4	2.96	0.75884
18	I felt that my educational needs are not being met	1	4	2.85	0.78789
20	I felt that this [activity] did not promote a desire to learn	0	4	3.07	0.85381

Participant perspective: Interview data. Supported by the literature of Rovai (2002), Warkentin et al. (1997), Corbitt, Gardiner, and Wright (2004), and Kapp and O'Driscoll (2010), five interview questions for this literature theme sought to uncover four objectives: (1) seeking to establish value for professional workplace employees; (2) looking for the construction or

acquisition of new knowledge; (3) seeking to discover levels of confidence during, and perceived value of, a synchronous problem activity; and (4) seeking to discover levels of self and group learning.

The first interview question sought to establish value for professional workplace employees, and asked participants, "Did you find value in this activity? If so, please briefly describe that value." 88% of participants responded, "Yes" while 6% responded, "No" and "Not really," and the last 6% responded, "Somewhat." Three themes emerged in the analysis of these responses. The first was in the levels of learning as 30% of respondents made positive comments regarding what they learned during the activity:

> "Yes, in learning things that I didn't know."
> "Yes, informative, educational, eye-opening."
> "Yes, in learning something new, things I had no idea about."
> "Yes, it made me feel really dumb. Really uneducated but in a good way [laughter]."
> "Yes… learning about what I didn't know about our world."
> "Yes… it was also educational."
> "Yes, the value was that in any group, the combined knowledge made us all smarter than any one person."
> "Yes, I learned a lot really."
> "Yeah, I learned a lot about the world…"

The second theme addressed how participants gained a different perspective as a result of the activity. One respondent shared that this activity, "Made me think about my life and how lucky I am," while another mentioned that it "Gave me a different perspective in what I thought about the world." Appreciating the exposure to a new perspective, one respondent mentioned, "Yes, opening my eyes to things outside my personal bubble" and another shared, "Absolutely, was good to gain a global view and get out of your small community."

The third theme described how participants felt about the levels of interactions with the other participants during their activity. One of the respondents who answered, "Somewhat," indicated that the individual found value in some regard: "Somewhat. It was valuable in showing

how people can work together." Another respondent indicated, "Yes, it was useful interacting with other people. Gaining more practice on working with other people." Two respondents shared how they gained value interacting with the other participants: "I always find value in teamwork and in collaborating;" "Working together is always good."

The second interview question relevant to this literature theme asked participants, "Did you learn anything new during the activity? Please explain." For this interview question, 100% of participants indicated that they did, and 15.15% shared what they learned in terms of perspective:

> "It was interesting how different people see the world in a different light; different ethnicities as an example."
> "Perspective and where I may have been skewed in my thinking as well as others."
> "It was eye-opening to see how the world sees things, and other people's experiences."
> "Gave me a world of knowledge about my assumptions on the balances and demographics of the world."
> "I thought I knew some things but others were a complete 180 of what I thought."

The third interview question relevant to this literature theme asked participants, "How confident did you feel with your group's final responses?" 79% of respondents indicated that they were only somewhat confident with their groups final responses with comments such as, "Somewhat," "50/50," I would say about 60/40," "65% confident," "I felt less confident initially but then more confident after the lifeline," and "Overall confidence was about 60% in our general answers and assumptions. Felt we were in the neighborhood." Only 3% (one respondent) indicated a negative response, "Not entirely. Felt there were no experts but that this group made the best efforts," and 18% of respondents provided positive a response in terms of confidence with comments such as, "Pretty good," "I felt pretty confident," and "Very; I thought there were only a couple that we had issues with. The others we felt confident about."

The fourth interview question relevant to this literature theme asked participants, "How successful do you think your group would have been had you used an asynchronous

communication method (such as email or a bulletin board) as opposed to face-to-face?" 94% of respondents indicated that they believed their group would not have been as successful using an asynchronous communication method over a synchronous communication method. None of the respondents thought that their group would have been more successful, and only one respondent (3%) thought that the individual's group would have been as successful using an asynchronous communication method. While expressing their thoughts on the varying levels of success using the synchronous method, 90.91% also expressed favor toward the synchronous method.

From the comments, three themes emerged regarding using an asynchronous communication method: (1) concerns about integrity and honesty, (2) concerns over the lack of social interaction, and (3) concerns about timeliness. In terms of integrity and honesty, 21% of respondents suspected that group members would simply "look up," or "Google" all of the answers which would be contrary to the instructions which did not allow for "any outside resources." One respondent shared, "I suspect that *'some people'* would likely cheat [laughter]. Not me but *'other people'* [laughter]."

Over half of respondents expressed concerns about the lack of interaction and accountability that would have resulted in using an asynchronous communication method. One respondent shared:

> I would have concerns about the accountability and not having someone right there in your face to hold you accountable to complete the activity and make all of the answers, or edit and update your answers as necessary in cohesion with the entire group.

Another respondent mentioned, "Not as much because there would not have been as much discussion. I would also not have cared so much." Sharing the value and even the admitted extra work noted in using synchronous communication methods, one respondent answered:

> Not nearly as successful. It would have been difficult as our group collaborated on every answer and needed that direct and constant input from all the group members. I don't think we would have the back-and-forth that actually got us to our answers.

Further supporting the value in their interactions, two respondents indicated, “We all had different answers and we had to discuss and respond as to why we had these responses. Probably would not have been as engaged using asynchronous,” “The learning may not have been as high without any discussion or interaction. Would have been more fact-driven.”

Participants also described the value in the richness of the face-to-face interaction that they experienced during their activity: “Facial expressions between you and the other people also helped,” “I found more value in the face-to-face interaction. I think we understood each other more using face-to-face.” Another respondent noted, “There was value in the FTF because even on the phone you cannot fully gauge the person. Easier to talk through reasoning's and provide explanations to responses.” While another respondent admitted:

> Probably not as successful as through FTF people are willing to work things out and work through disagreements whereas over email, people would not have been willing to work out issues or voice disagreements or work through them. You can see body language and facial expressions better in FTF too so that you can talk through situations when someone may not agree.

Attesting to how the lack of facial expressions and body language can hinder communication and understanding, one respondent shared, “Not nearly as successful due to the absence of real-time dialogue and body language” while another participant mentioned:

> I don't think we would have been as successful as if we were in a group. Email is not personal and there is more collaboration on a face-to-face team where you can see the facial expressions. Also communication through email can be misconstrued and you may misunderstand the question and not have the ability to provide clarity.

Other respondents expressed the adage of just having fun: “[It] would not have been successful or fun,” “It would not be as fun.”

Lastly, 18% of respondents expressed concerns over the timeliness using an asynchronous communication method: “It would have taken forever,” “there may be a delay using email,” “we would spend more time waiting on others to respond,” “using email among a group, there is a waiting time,” and “it would have taken longer.” Only one respondent indicated that asynchronous communication “may have been timelier.”

The fifth interview question relevant to this literature theme asked participants, “Did you experience any sort of an ‘aha learning moment?’ or were any of the answer shocking or surprising to you?” Similar to the earlier question asking if participants learned anything new during this activity, responses were mostly positive as 87.88% indicated, “Yes,” while 12.12% indicated, “No,” and of the four respondents that answered, “No,” three were participants in the same session, and also worked together (manager with two direct reports). Of those who answered, “Yes,” eight mentioned that they were shocked and/or surprised after receiving the lifeline. Referring to some of the answers provided during the lifeline, one respondent used the word, “unbelievable,” and six respondents shared how this learning made them feel. Some shared varying levels of ignorance, “Yes, I am dumb [laughter]. Lots of things made me feel really dumb…” “[The activity] made me feel stupid [laughter],” while other respondents shared varying realizations they experienced:

> “These are things I don’t think of on a regular basis.”
> “I realized how competitive I was even though there were no clear rewards for being right, I still wanted to be right.”
> This really made me think about how fortunate we are to live where we live and to have what we have.”
> “[The activity] made me realize that I am just one person in a very large world.”

Conclusion

This chapter presented the results of the data collected in this study and thematically analyzed these data within the framework of the research questions. Described here are summaries of that data organized by research question with a more detailed discussion in the final chapter.

Are social interaction, social presence and collaboration present among professional workplace participants engaged in a problem activity using synchronous communication? Data from both the researcher's journal and custom observation tool—which examined the specific actions and behaviors that identified and recorded the collaboration and social interaction of participants—supported the following five themes identified in the literature: (a) verbal communication, (b) non-verbal communication, (c) sense of community, (d) contributing, and (e) planning. While the researcher's journal assisted in collecting data for all five literature themes mentioned, the observation tool collected data specifically for the first four themes: (a) verbal communication, (b) non-verbal communication, (c) sense of community, and (d) contributing.

In what ways, and how often, do groups apply the identified themes of collaboration when participating in a problem activity? Together, responses to Rovai's CCS (2007) seem to support the three literature themes, sense of community, contributing and participant perspective, as illustrated by the small range in the standard deviations between the scores of the items. These data also seem to uncover a healthy relationship with data collected from the observation tool along these same literature themes.

What factors contribute to the variations of identified themes of collaboration among groups participating in a problem activity? Individual interviews conducted by the primary investigator with thirty-three participants after their activity, along with data from the researcher's journal, provided data for this research question. Interviews included both closed and open-ended questions, and gave participants an opportunity to share their thoughts and feedback as to how they viewed the collaboration and social interaction of their group during the activity. Interview questions were based on literature from the following three themes: (1) sense of community; (2) contributing; and (3) participant perspective.

In Chapter 5, the results presented in Chapter 4 from each of the literature themes are discussed as findings. Chapter 5 begins with an overview of significant findings from the observations and presents what was noted both in the literature and outside the scope of the literature. Next, the chapter discusses the implications of the study and how it integrates current theory, followed by an examination of findings as they relate to the research questions, followed by limitations that may have affected the validity of the study, and recommendations for future research.

CHAPTER 5: DISCUSSION

Introduction

This mixed-methods multiple-case research study attempted to identify and measure how synchronous communication supports the collaboration of professional workplace employees engaged in a problem activity. The research also sought to identify how synchronous communication methods—most specifically those that include rich media such as face-to-face collaboration—encouraged and supported social interaction. Both collaboration and social interaction have been shown to provide workplace benefits to include deeper-level learning, long-term retention of learned material, positive attitudes, group cohesion, interaction and inclusion, engagement, and learning that is actively constructed by the learners (Rovai, 2002; Rovai, 2007; Krejins, et al, 2002; Krejins, et al, 2003; Walther, 1996; Gunawerdena, et al, 1997). Leveraging the expertise captured in the literature, this study presented the observations of ten professional workplace groups engaged in a problem activity, in an effort to validate a custom observation tool. This literature identified and described key measurements that supported collaboration using the synchronous communication tool of face-to-face interaction. The observations made using this tool involved a learning community, both verbal and non-verbal communication, various instances of student interaction, social presence, and a constructivist learning environment; all of which the literature identified as measurable factors of collaboration. The data collected during these observations sought to answer the following research questions:

Q1. Are social interaction, social presence and collaboration present among professional workplace participants engaged in a problem activity using synchronous communication?

Q2. In what ways, and how often, do groups apply the identified themes of collaboration when participating in a problem activity?

Q3. What factors contribute to the variations of identified themes of collaboration among groups participating in a problem activity?

This final chapter discusses the overall results of the study and includes an overview of significant findings, implications of the study for current theory, examination of the findings as they support the research questions, limitations of the study that may have affected the validity of the results, and recommendations for further research.

Overview of Significant Findings

Overall, data that were collected and analyzed using the observation tool was consistent with the literature. The first significant finding was that the custom observation tool found the highest frequencies of participants' actions and behaviors in the category of verbal communication and sub-categories of focused/determined and excited/enthused. The next highest frequencies were noted in the actions and behaviors of participants that supported the category of contributing. These findings suggest that the observation tool accurately collected actions and behaviors consistent with collaboration and social interaction as described by Hatem (2012), Warkentin (1997), Ellis (2001), Dawson (2007), Kapp and Driscoll (2010), Nardi and Whittaker (2002), Rovai (2002, 2007), Curtis and Lawson (1999), and Gibson-Langford and Laycock (2007). The next significant finding showed that without exception, every participant group in this study voluntarily rearranged their learning environment to reflect a design that provided face-to-face interaction. This finding supports the research of Kapp and Driscoll (2010), Martin (2004) and Robertson and Huang (2006).

In addition, three noteworthy findings fell outside of the scope of literature. The first was the observation that every participant group in the study continued to work together on their activity beyond receiving the assistance provided using the lifeline. The lifeline provided groups with a method to check their progress and make any desired revisions. This determination on the part of groups to complete their activity, after receiving assistance via the lifeline, attested to the resolve of participants and the desire to not only complete their activity, but to successfully complete it with the most accurate answers possible. The second was shared in the words of participants as they described higher perceptions of self-engagement during the activity than they noted amongst the other participants within their group. The third, also illustrated in the words of participants, reflected increased levels of engagement during the activity once participants developed relationships and experienced higher levels of comfort with one another.

Implications of the Study for Current Theory

Both constructivist and social learning theories guided this study. Constructivist learning theory established the necessary framework for participants to not only acquire knowledge through the problem activity, but for them to also collaboratively construct that knowledge through personal interpretation and through learning based on personal experience (Smith & Ragan, 2005). While working to complete the activity, the application of social learning theory emerged as participant groups created a social context that involved interaction with other individuals. Without this interaction, completing the problem activity would have been fruitless. This is based on the assertions of both Vygotsky (2006) and Rovai (2007) that students do not learn in isolation but rather when they are working collaboratively. This reemphasizes the need for learning to be embedded in social experience and designed from a constructivist perspective. As Rovai (2007) explained, “The goal is to create a learning environment that motivates students to engage in

positive social interaction and active engagement of learning" (p. 79). In a continuous cyclical process, both constructivist and social learning theories permeated various aspects of this study and were equally essential.

Examination of the Findings as They Relate to the Research Questions

Research question one. *Are social interaction, social presence and collaboration present among professional workplace participants engaged in a problem activity using synchronous communication?* The custom observation tool and researcher's journal identified the actions and behaviors exhibited by participants during their problem activity that were indicative of collaboration and social interaction. The frequencies of these actions and behaviors that served to answer this research question were organized by the following five themes in the literature: (a) verbal communication; (b) non-verbal communication; (c) sense of community; (d) contributing; and (e) planning.

Social interaction and social presence were observed in several facets of the collaborative actions and behaviors of professional workplace employees that communicated synchronously to complete a problem activity. Altogether, there were 7,690 observed frequencies of collaboration collected using the observation tool; all of which indicated a significant relationship with social interaction and social presence. These frequencies were illustrated in the literature themes: verbal communication; non-verbal communication; sense of community; and contributing.

Of the total observed frequencies using the observation tool, 58% were noted in the first theme of verbal communication. Supported by the research of Hatem et al. (2012) and Warkentin et al. (1997) and emphasizing the power in the language of the spoken word, this theme was separated into five sub-categories: calm/relaxed; loud/impatient; focused/determined; exited/enthused; and bored/unenthused. Of these sub-categories, 82% of the total frequencies were

noted in focused/determined. Within this sub-category, participants exhibited actions and behaviors that included asking for the feedback and suggestions of all group members, expressing their own feedback and thoughts, and also asking questions. With participants having admitting little knowledge on the subject, the groups demonstrated supportive behaviors in terms of soliciting feedback from all group members, carefully vetting responses to each question, and making efforts to ensure that all groups members were engaged and participatory. The next highest frequencies of verbal communication (17%) were noted in the sub-category of excited/enthused in which participants demonstrated these behaviors by using positive affirmations and encouragements, along with variations in their paraverbal communication, which as described by Warkentin et al (1997) was noted when participants would speak louder, faster, and higher.

Capturing close to 12% of the total observed frequencies and supported by the research of Hatem, et al (2012), Warkentin, et al (1997) and Ellis (2001), the literature theme of non-verbal communication included observations that were divided into two categories, negative and positive. These observations included actions and behaviors in the unspoken language of participants such as their posture, eye contact and facial expressions. Regarding the frequencies of non-verbal communication, findings may suggest a correlation as the participant group with the highest instances of positive non-verbal communication also had the highest frequencies of focused/determined verbal communication actions and behaviors.

Supported by the research of Krejins (2002) and Rovai (2007), observed frequencies of actions and behaviors consistent with the literature theme of sense of community accounted for another 12% of the total observations. Actions and behaviors in this category that supported collaboration and social interaction included encouraging all group members to participate, making efforts to get to know other group members, exhibiting a competitive desire to successfully

complete the problem activity, laughing, and exchanging encouragements with other group members. While no distinguishing demographic characteristics could be determined amongst the groups that exhibited the highest frequencies, these groups were all supportive of one another and demonstrated the highest frequencies of securing a group consensus and exchanging positive feedback.

The literature theme of contributing, supported by the research of Curtis and Lawson (2001) and Gibson and Laycock (2007), described the second highest number of frequencies noted by the observation tool with 18.5% of the total frequencies. As identified by the data collected using the observation tool, participants exhibited frequencies of the following contributing actions and behaviors: (1) giving help to group members; (2) asking questions; (3) generating ideas; (4) challenging group members; (5) exchanging resources, (6) answering questions and (7) agreeing/supporting group members. Of these actions and behaviors, those observed in the highest instances were agreeing/supporting. The next highest instances were noted in elaborating/answering questions, followed by generating ideas where group members would recommend answers and make suggestions. The remaining highest instances were noted among giving help to group members by clarifying responses and providing examples, then exchanging resources and sharing existing knowledge and experience. With the second highest observed frequencies, next to verbal communication, these data suggest a high significance of the contributing actions and behaviors of participants collaborating using synchronous communication to complete a problem activity.

Both Martin (2003) and Robertson and Huang (2006) explained how collaboration and social interaction are more likely to occur as a result of particular arrangements in the physical learning environment and in participants having some level of control in determining that

environment. In the data collected using both the observation tool and the researcher's journal, every single participant group took the following actions to this effect: they voluntarily rearranged their learning environment to ensure that they were all seated at the same table; and that they were all facing one another. The data analyzed for this literature suggest a very high significance as it relates to the planning of the learning environment among participants collaborating using synchronous communication to complete a problem activity.

Research question two. *In what ways, and how often, do groups apply the identified themes of collaboration when participating in a problem activity?* Rovai's Classroom Community Scale (CCS; 2007), used as the questionnaire for this study, provided items that not only measured connectedness and learning among participants engaged in this problem activity, but also provided direct correlations to the three literature themes: sense of community, contributing, and participant perspective. The CCS questions that corresponded with sense of community reflected the overall sense of how participants created their own learning and learning community and allowed for social interaction, as described in the research of Ellis (2001), Dawson (2006), Kapp and Driscoll (2010), Krejins et al. (2003) and Rovai (2007). The CCS questions that corresponded to the literature theme of contributing described the various efforts, actions, and behaviors of participants that contributed to the overall success of their group's activity. Supported by the research of Curtis and Lawson (2001), Gibson-Langford and Laycock (2007), Johnson and Johnson (1996), Tutty and Klein (2008) and Rovai (2007), these efforts, actions, and behaviors included giving help to group members, asking questions, generating ideas, politely challenging group members for clarification, exchanging resources, answering questions and elaborating, and agreeing with and supporting group members. The CCS questions that corresponded with the literature theme of participant perspective described how participants viewed their overall interactions, the success of

their group's activity, and the extent to which they were satisfied with learning experience and was supported by the research of Krejins et al. (2002). Together, responses to Rovai's CCS (2007) support the three literature themes, as illustrated by the small range in the standard deviations between the items, and describe how participants applied the actions and behaviors that characterize collaboration while participating in a problem activity.

Research question three. *What factors contribute to the variations of identified themes of collaboration among groups participating in a problem activity?* Post-activity participant interviews, organized using research from the three literature themes of sense of community, contributing, and participant perspective, provided data that addressed this research question. Data analyzed from the interviews relevant to the literature theme of sense of community examined three objectives. With a favorable response rate of 85% of all participants, the first objective assessed practical connections and real-world applicability of the problem activity. The second assessed how participants viewed their own levels of interaction during the problem activity and reported a favorable response rate of 97% of all participants. The third objective assessed others' levels of interaction during the problem activity and saw a favorable response rate of 91% of all participants. Through the analysis of these data, participants shared in their own words how significant a sense of community, particularly as grounded in real-world experience enabling social interaction, is to collaboration during a problem activity.

Data analyzed from the interviews relevant to the literature theme of contributing examined three objectives. The first objective assessed how participants viewed the levels of their own contributions to their groups' efforts during the problem activity. In this instance, 78.79% responded affirmatively, while 21.21% expressed feelings of doubt and uncertainty about how they believed their contributions affected their group's efforts. The second objective, which

assessed participants' levels of comfort in making these contributions, yielded only slightly higher numbers of favorable responses at 84.85%. The third objective assessed participants' cognitive application through their sharing of previous insight and/or knowledge to assist their group in completing the problem activity. From the analysis of this data, only 24% of participants responded favorably while 64% responded negatively. Overall, participants expressed comfort making contributions to their group's efforts only when they had high levels of confidence that their contributions were accurate. This suggests that participants, while comfortable interacting and building a sense of community with other participants, were less comfortable contributing for fear of being wrong.

Data analyzed from the interviews that were relevant to the last literature theme, participant perspective, examined five objectives that focused on the learner experience including levels of satisfaction with the learning and learning outcomes. The first objective assessed the value of the problem activity to professional workplace employees. Eighty-eight percent of participants responded favorably and their comments uncovered additional themes that further defined how they viewed this value. Those themes were in what participants learned, the wider perspectives they gained, and their overall favorable feelings regarding the social interaction. The second objective assessed whether participants acquired new knowledge during the problem activity and 100% of participants responded favorably. The third objective assessed participant levels of confidence with their group's performance (final answers) during the problem activity to which 79% of participants responded favorably. The fourth objective assessed participants' perceived value of using a synchronous communication method as opposed to an asynchronous method to complete their problem activity to which 94% of participants responded in favor of the synchronous method. The fifth objective assessed participants' levels of self- and group-learning

in the form of an “aha learning moment,” to which 87.88% of participants responded favorably. Altogether, the data analyzed for this literature theme suggest that the following are factors that contributed to the variations of identified themes of the collaboration of participants during their problem activity: efforts of participants to create a sense of community; efforts of participants to actively contribute to the success of their group; and participant’s views of the value and success of their learning experience.

Implications on Learning Design and Technology

Like any field shaped by shifts in human and organizational performance, and driven by technological advances, professionals in the field of learning and design technology must stay current with these shifts and advances in order to remain relevant and provide the best products and services. Learning processes such as multiple intelligences and even today’s micro-learning are among these shifts in human and organizational performance, while mobile learning is among this generation’s most popular technological advances. And, as organizations begin to realize the value of collaboration and social interaction, particularly as it occurs during problem activities in the workplace, so will the need also rise for learning and design professionals to address these shifts and advances. What is critically necessary as it relates to design includes the translation of educational theory into practical application, and then integrating this translation into the professional realm to achieve collaboration and social interaction. Professionals in the field of learning and design technology must continue to create more learning opportunities to integrate grounded theory and foundation with practical or real-world application. Not only does this integration prepare students for what they will likely encounter in the professional world, it also informs our real-world clients that we have over a hundred years’ worth of practical research to support our understanding of what they need in order to improve their organizational performance.

It a masterful translation of academic language into colloquial language. This is supported by Unger (2012) as she writes that "implications for the field recommend that instructional designers incorporate relevant learning by doing activities that are structured to impact learners' perceptions of how their knowledge can be expanded by creating their own learning path in a situated contextual environment." In addition, the research of J. Michael Spector (2012) and the studies of Tracey and Unger (2010) demonstrate this process and applicability as they describe methods in which learners can connect to theory in practice. In one instance, Spector (2012) explains the necessary skills while Tracey and Unger (2013) apply them in their case study as they employ the constructivist ID model and instructional solution for a cross-cultural workforce for the Dubai Mall.

An example illustrating the necessity of this translation as it relates to the professional workplace is as follows. Not many people listened, or were even interested, when I explained that "synchronous communication supports the collaboration and social interaction of professional workplace employees while engaged in a problem-activity." Most asked that I repeat this to which I still received looks of bewilderment. However, once translated, people did become interested as I asked them to complete a real-world problem activity [Village of 100], working together as a group [collaborating and socially interacting], in a face-to-face format [using a synchronous communication method]. Afterwards, I shared with them how they chose to create their own face-to-face environment; employing synchronous communication. I shared the number of times they were focused, determined, excited and enthused, as they expressed in their words, body language and how they supported one another with their laughter and high-fives; demonstrating social interaction, social presence and collaboration. Lastly, I encouraged participants to learn by presenting them with a real-world problem activity. In essence, I explained to them that they were

bringing learning and design theory to life outside of academia. At this point, everyone was listening. It is in these ways that learning and design technology professionals should translate learning theory into practical application, and how we need to integrate this translation into the professional realm to achieve collaboration and social interaction.

Limitations of the Study that May Affect the Validity of the Results

Limitations of this study that may affect the validity of the generalizability of the results involved two unexpected variations that occurred during the execution of the problem activity. Potential volunteers were randomly selected using the company's Farmington Hills' location roster which lists every Kaufman employee that works at any Kaufman company located at the headquarters center in Farmington Hills, Michigan. Volunteers who accepted the invitation to participate were provided with a listing of all possible session days and times. To allow for appropriate scheduling, these participants were allowed to make their own selection as to the day and time that worked best with their schedule. Unfortunately, this scheduling freedom did not consider pre-existing relationships among these employees, and that several of them would schedule sessions with other employees that they already knew; thus accomplishing for themselves a higher level of comfort, while inadvertently decreasing the purity of the results of their group's social interaction. This first limitation enabled two outcomes that may have affected the validity of the results. One outcome was that half of the participant groups contained varying degrees of associations between group members. While these associations were unbeknownst to the primary investigator until the actual start of the groups' activity, these associations may have affected their sense of community as the literature contends that getting to know other group members helps to build this community. The second outcome was that one participant group contained a manager and two direct reports which, according to the data, may have impacted the study as one of the

direct reports seemed to withhold participation though it could not be determined if this was her normal behavior. A thorough examination of this outcome could assist in determining how professional roles and titles might affect the levels of interaction among participants, particularly those who may have a reporting relationship.

The second limitation was in the sample size. While ten groups was an adequate sample size for sufficient qualitative analysis, the total numbers were insufficient for a more in-depth quantitative analysis that could include hypotheticals on correlations between both the data from the observation tool and Rovai's CCS. For example, did these data present circumstances where frequencies coincided between the literature themes? When frequencies of one literature theme were high, was there a consistent relationship with another theme that could be illustrated using Pearson's product moment correlation coefficient?

Existing in between the limitations of this study and recommendations for further research is how closely collaboration, as represented by the groups' high levels of getting everyone involved, and ensuring all voices were heard during their activity, actually exists in the culture of the Kaufman Financial Group. This doubt emerged in the fear that participants experienced in being wrong as they shared their previous insight and existing knowledge; a significant indicator of social interaction, social presence and collaboration. What are the origins of this fear and what does this fear represent? Have employees experienced negative effects of being wrong in the workplace, or have employees witnessed the negative experiences of other employees who were wrong in the workplace? Since measurement of the current collaborative culture of Kaufman was not included in this study, such an assessment is suggested for a similar study to assist in determining how close the situations during the activities actually represent what occurs in the workplace.

Recommendations for Further Research

There are two recommendations for further research. The first would be for a similar study using professional workplace employees to analyze levels of accuracy, or success, in the groups' solutions to the problem activity. While this was not a measured factor to the groups' collaboration and social interaction for this particular study, another study could examine how collaboration using a synchronous communication method might affect levels of accuracy and efficiency between groups working on a problem activity.

The second recommendation would be for a similar study to analyze data collected through the observations to determine possible relationships and correlations based on the demographics of the participant groups. This could include variations in the groups as they relate to gender, race/ethnicity, age, and level of education. An additional variation could include professional role or title. This variation could examine the dynamics between participants in different levels within an organization such as how participants in higher roles interact with participants in similar roles and also with participants in lower roles, particularly those who have a direct reporting relationship. Conducting a similar study with a larger sample size could provide adequate data for such an analysis.

Integrated with both constructivist and social learning theories, this mixed-methods multiple-case research study condensed to a learning and design principle would be the following: current studies on collaboration exclusively focus on learners in academia, though in any successful business organization employees are also learners and as business organizations continue to grow and focus on their future, these employees-learners must be prepared. This means that research such as this cannot continue to be limited only to students. To best equip our future leaders with the knowledge, skills, and abilities they will need to lead, organizations must provide

better learning opportunities in the most appropriate learning environments, where participants are encouraged to use old-fashioned methods of communication and conduct real-world learning and real-world problem-solving through social interaction.

As O'Donnell (2017) explained it, despite the new technological advances in communication, employees still seem to favor (and continue) using the good old-fashioned communication methods of phone calls and emails (para. 5). Sinar and Ray (2017) suggested a similar position with learning as they explained that the new self-paced mobile learning tools rate low on the list of how organizations can develop the next generation of leaders. They criticized these programs by saying that they "go too far and disconnect a leader from chances to practice, receive feedback, and engage in shared learning experiences with peers" (para. 18). The authors claim that the "learning payoff simply isn't there" and that "when it comes to leadership, social interaction is an important facet of the learning environment" (para. 18); one facet that has the potential to bring with it memorable learning experiences, contributing and engaged learners, and improved collaborative and social interaction.

Summary

The collaboration and social interaction of professional workplace employees engaged in a problem activity using a synchronous communication method is exhibited in multiple ways as described in the literature, and as demonstrated in this study. As it occurs in the workplace, this study suggests that verbal communication is the most significant way in which employees collaborate and socially interact. This was observed in how focused and determined participants were, followed by their levels of excitement and enthusiasm. Contributory actions, such as participants agreeing with, and supporting one another, and assessing varying levels of both their own, and others' interaction, were observed as the next most significant way in which employees

collaborated. Participants created and maintained their own sense of community by encouraging all group members to participate, making efforts to get to know other group members, exhibiting a competitive desire to successfully complete the problem activity, laughing, and exchanging encouragements. Participants also created their own synchronous environment as they planned and executed their own face-to-face seating arrangements prior to beginning their problem activity. Lastly, participants expressed satisfaction with both the levels of learning and the learning outcomes, along with a strong preference for a synchronous communication method for completing a problem activity.

APPENDIX A

Letter of Consent

November 28, 2016

Renee S. Lerche, Ed.D.
Senior Corporate Vice President, Human Resources
Kaufman Financial Group
220 Kaufman Financial Center
30833 Northwestern Highway
Farmington Hills, MI 48334

Dear Dr. Lerche,

My name is Michele Rochester and I am a PhD candidate at Wayne State University. As you know, I am also a current Kaufman Financial Group (KFG) employee. I have recently received approval of my dissertation proposal. My study will examine the effects of synchronous communication, specifically face-to-face communication, on the collaboration and social interaction of professional workplace employees engaged in a problem activity. I am writing to request your permission to allow fifty Kaufman employees to participate in this study. Upon receiving your permission, I would request a meeting with you at which time you and I would determine the names of each participant.

The purpose of this mixed-methods multiple-case research study is to validate both the current research and a custom observation tool that examines how synchronous communication, in collusion with rich media, encourages collaboration and supports social interaction of professional workplace employees engaged in a problem activity, which can provide several workplace benefits. Specifically, my study seeks to answer the following research questions:

1. Are social interaction, social presence and collaboration present among professional workplace participants engaged in a problem activity using synchronous communication?
2. In what ways, and how often, do groups apply the identified themes of collaboration when participating in a problem activity?
3. What factors contribute to the variations of identified themes of collaboration among groups participating in a problem activity?

For this study, I am requesting to schedule time to observe fifty Kaufman Financial Group employees in ten individual 60-minute sessions of five participants each. Suggested KFG participant list is attached.

Once selected, I will personally speak with each participant to: (a) confirm they meet the selection criteria, (b) secure full informed consent, and (c) review the study activity objectives and

answer any questions. Participants will also select the day and time for their session, as each session will have no more than five participants. Sessions are tentatively scheduled for January 4th, 6th 9th 10th and 11th.

At each session, participants will work together synchronously (using face-to-face communication) to solve a problem activity involving information-gathering in which the only resources they are allowed to use will be each other. The use of cell phones, tablets, computers, or any other electronic devices will not be allowed.

Participants will have exactly one hour to complete the activity to the best of their ability. Time for each session will be allocated as such: (a) five minutes for instructions, (b) thirty minutes for completion of activity, (c) five minutes for debriefing, (d) ten minutes to schedule the individual post-activity interview, and (e) ten minutes for miscellaneous circumstances (late arrivals, technical difficulties, etc.). The post-activity interview should take no longer than fifteen minutes.

Altogether, the time commitment for each KFG participant is expected to be no more than 90 minutes over the course of two weeks.

This research study has both scholarly significance and practical application. In terms of scholarly significance, this study will validate the current research on the effects of synchronous communication on collaboration. It will also validate a tool designed to measure collaboration in a professional workplace environment. In terms of practical application, the results of this study will provide professional workplace organizations with an understanding of the relationship between, and value of, synchronous communication and collaboration.

Thank you for considering my request. I plan to follow up with you by Friday, December 19, 2016 to receive your support of my request.

Best Regards,

Michele Rochester
248-910-0111

APPENDIX B

Written Consent Sheet and Study Overview Form

Principal Investigator (PI): Michele Rochester
Wayne State University
College of Education, Learning & Design
248-910-0111, michelej226@gmail.com

Purpose:

You are being asked to participate in a research study on how face-to-face communication can impact the collaboration of professional employees. This study seeks to do this by having you, and a few of your co-workers, complete an exercise. How you and your co-workers collaborate to complete this exercise, will assist the primary investigator in understanding the effects of synchronous communication on collaboration in the professional workplace.

Study Procedures:

If you take part in the study, you will be asked to participate in a total of three meetings:

1. A one-on-one meeting with the principal investigator to review study objectives and secure full informed consent. This meeting should take no longer than ten minutes and can be conducted over the phone.
2. The actual study activity which is estimated to take sixty minutes.
3. An individual post-activity interview with the principal investigator. This meeting should take no longer than fifteen minutes.

Benefits:

As a participant in this research study, there will be no direct benefit for you; however, information from this study may benefit other people now or in the future including those with whom you frequently work.

Risks:

There is the risk for a potential breach of confidentiality. Potential data included in such a risk would be the basic statistical information that will be collected from each participant. This information includes your name, race/ethnicity, gender, age, highest level of education and length of service with Kaufman Financial Group.

Costs:

There are no financial costs to you for participating in this study. The principal investigator (PI) is asking for 90 minutes of your time over the course of one-to-two weeks.

Compensation:

You will not receive any financial compensation for taking part in this study.

Confidentiality:

All information collected about you during the course of this study will be kept in confidence by the primary investigator (PI). The principal investigator (PI) will keep raw and developed data secured, and will limit access to the data to the principal investigator (PI) and the principal investigator's advisor. The data will not contain any direct identifying information such as your name as all participants will be referred to in the study as "participant #1," "participant #2," "participant #3," etc.

Voluntary Participation /Withdrawal:

Taking part in this study is voluntary. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with Wayne State University and its affiliates, or Kaufman Financial Group and its affiliates.

Questions:

If you have any questions about this study now or in the future, you may contact Michele Rochester at the following phone number: 248-910-0111. If you have questions or concerns about your rights as a research participant, the Chair of the Human Investigation Committee can be contacted at (313) 577-1628.

Use of Direct Quotes:

In this study, the principal investigator (PI) may use direct quotes from participants. By signing below, you recognize and agree to allow the principal investigator (PI) to use direct quotes.

Participation:

By signing this form, you recognize and agree to this written consent form.

_____	_____	_____
Participant Name (PRINTED)	Participant Signature	Date

APPENDIX C

Participant Activity Worksheet

Village of 100

Instructions: READ CAREFULLY!

If we could shrink the Earth's population to a village of precisely 100 people, with all existing ratios remaining the same, what would this village look like?

Work together to answer each question. Your team will have one opportunity to have your answers confirmed for accuracy. You may use this opportunity at any time while you are completing the activity.

At the end of this exercise, your team will submit **one document** that contains the answers **your group** has chosen. In other words, this is not an individual activity that will result in multiple answers to each question, but rather a group activity where your group will submit the answers that you have chosen together.

Your expertise will come only from the combined knowledge of your team and nowhere else. **No cell phones, tablets, computers or any other electronic devices are allowed.**

You have sixty minutes to answer all questions but are not penalized for completing the activity earlier. Good luck!

1. How many people in our "Village of 100," come from the following continents?
   _____Asia
   _____Africa
   _____Europe
   _____South America, Central America (including Mexico), and the Caribbean
   _____Canada and the United States
   _____ = 100

2. Of the people in our village, how many are:
   _____Men
   _____Women
   _____ = 100

3. Of the people in our village, how many are of the following ages:
   _____0 – 14 years
   _____15 years – 64 years
   _____65 years and older
   _____ = 100

4. The skin color of villagers is as follows:
   _____White
   _____Non-white
   _____ = 100

5. Of the villagers, the literacy rate is as follows:
   _____Able to read and write (literate)
   _____Unable to read and write (illiterate)
   _____ = 100

6. About a third of the people in the village (38) speak the following languages:
   _____English
   _____Spanish
   _____Hindi
   _____Arabic
   _____Bengali
   _____A Chinese dialect
   _____Portuguese
   _____Russian
   _____Japanese
   _____**= 38**

7. Religions in the village are as follows:
   _____Muslims
   _____Christians
   _____Hindu
   _____Buddhists
   _____Other global religions, such as Baha'i faith, Confucianism, Shintoism, Sikhism or Jainism
   _____Non-religious
   _____ = 100

8. Access to education in the village is as follows:
   _____Has a college degree
   _____Does not
   _____ = 100

9. In terms of the wealth in the village:
   _____Would control 59% of the village's wealth (all are citizens of the United States)
   _____Would control a 2% percentage of the village's wealth
   _____Would control 39% of the village's wealth
   _____ = 100

APPENDIX D

Answer Worksheet

1. How many people in our "Village of 100," come from the following continents?
   - 60 Asia
   - 15 Africa
   - 11 Europe
   - 0 South America, Central America (including Mexico), and the Caribbean
   - 14 Canada and the United States
   - 100 = 100

2. Of the people in our village, how many are:
   - 50 Men
   - 50 Women
   - 100 = 100

3. Of the people in our village, how many are of the following ages:
   - 27 0 – 14 years
   - 66 15 years – 64 years
   - 7 65 years and older
   - 100 = 100

4. The skin color of villagers is as follows:
   - 30 White
   - 70 Non-white
   - 100 = 100

5. Of the villagers, the literacy rate is as follows:
   - 84 Able to read and write (literate)
   - 16 Unable to read and write (illiterate)
   - 100 = 100

6. About a third of the people in the village (38) speak the following languages:
   - 5 English
   - 5 Spanish
   - 3 Hindi
   - 3 Arabic
   - 3 Bengali
   - 12 A Chinese dialect
   - 3 Portuguese
   - 2 Russian
   - 2 Japanese
   - 38 = 38

7. Religions in the village are as follows:
   - 22 Muslims
   - 33 Christians
   - 14 Hindu
   - 7 Buddhists
   - 12 Other global religions, such as Baha'i faith, Confucianism, Shintoism, Sikhism or Jainism
   - 12 Non-religious
   - 100 = 100

8. Access to education is as follows:
   - 1 Has a college education
   - 99 Does not
   - 100 = 100

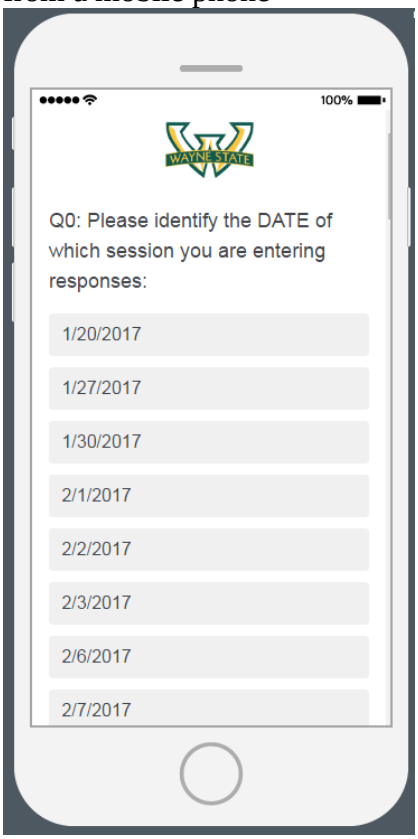
9. In terms of the wealth in the village:
   - 6 Would control 59% of the village's wealth (all are citizens of the United States)
   - 20 Would control a 2% percentage of the village's wealth
   - 74 Would control 39% of the village's wealth
   - 100 = 100

APPENDIX E

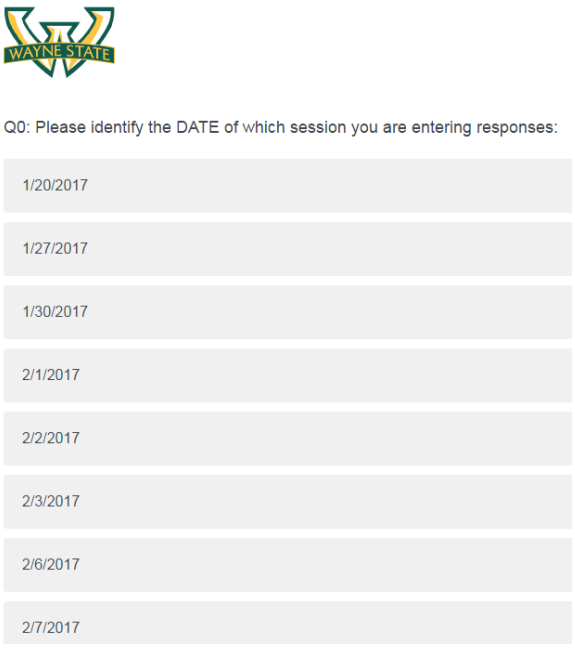
Screen shots of Qualtrics tools including data entry QR codes and screens for custom observation tool, questionnaire and participant demographics

Appendix E-1
QR code to access observation tool from a tablet or smart phone. Participants could also access the questionnaire by visiting the following website:
https://waynestate.az1.qualtrics.com/jfe/form/SV_a2FWPmm18OWPfc9

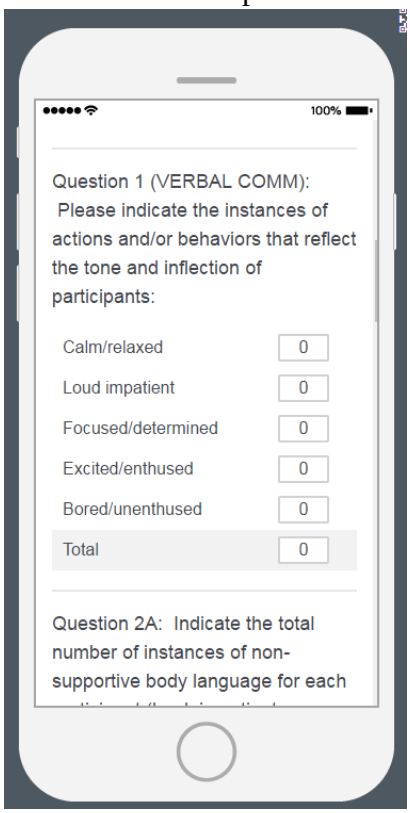
Appendix E-2
Screen shot of question 0 (date of problem activity session) as accessed on the observation tool from a mobile phone



Appendix E-3
Screen shot of question 0 (dates of session) as accessed on the observation tool from a laptop of PC

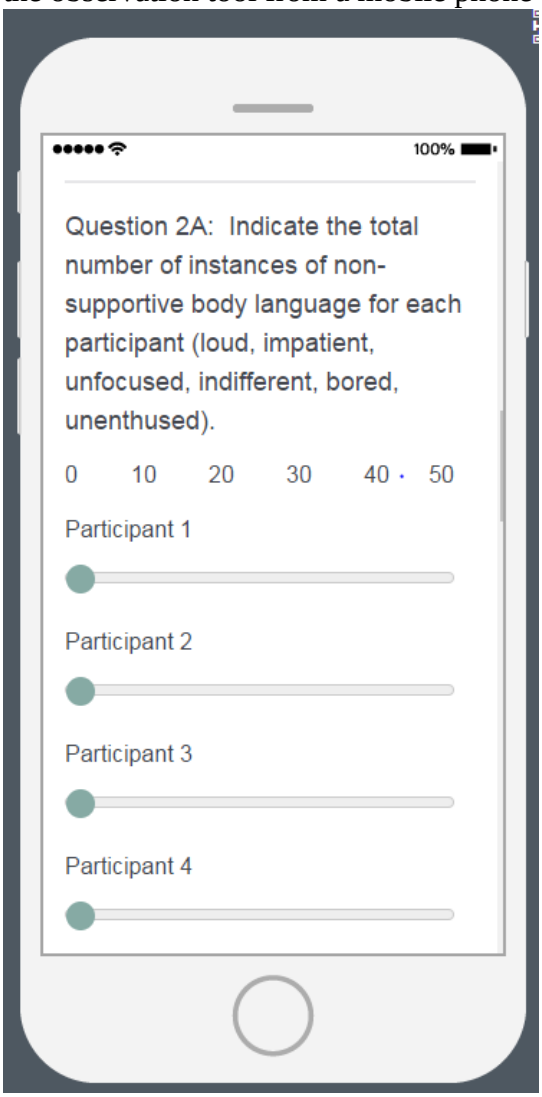


Appendix E-4
Screen shot of question 1 (frequencies of verbal communication) as accessed on the observation tool from a mobile phone

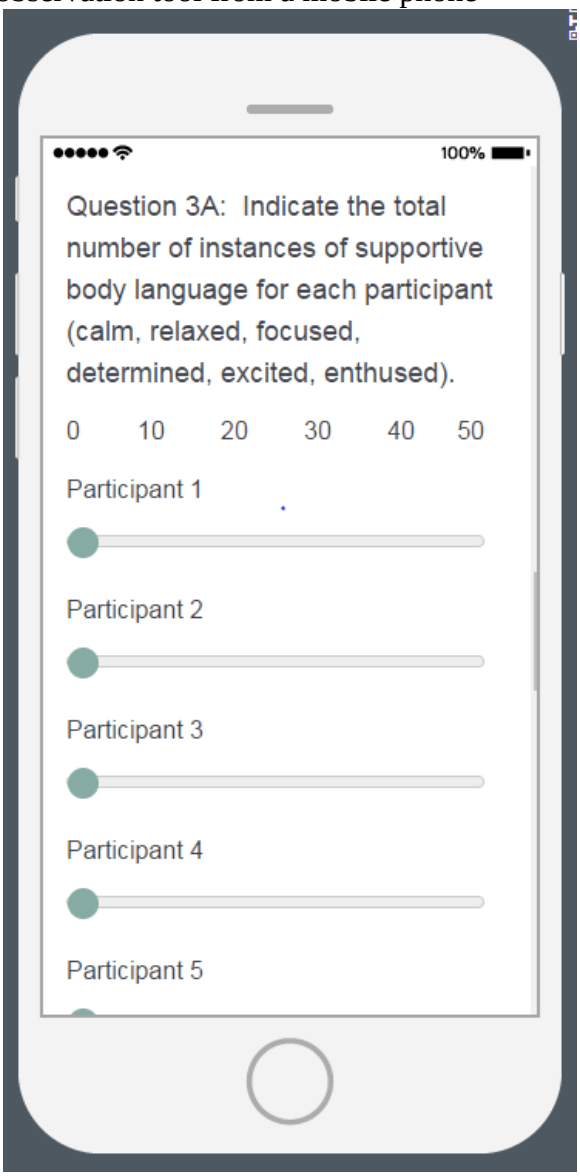


Appendix E-5

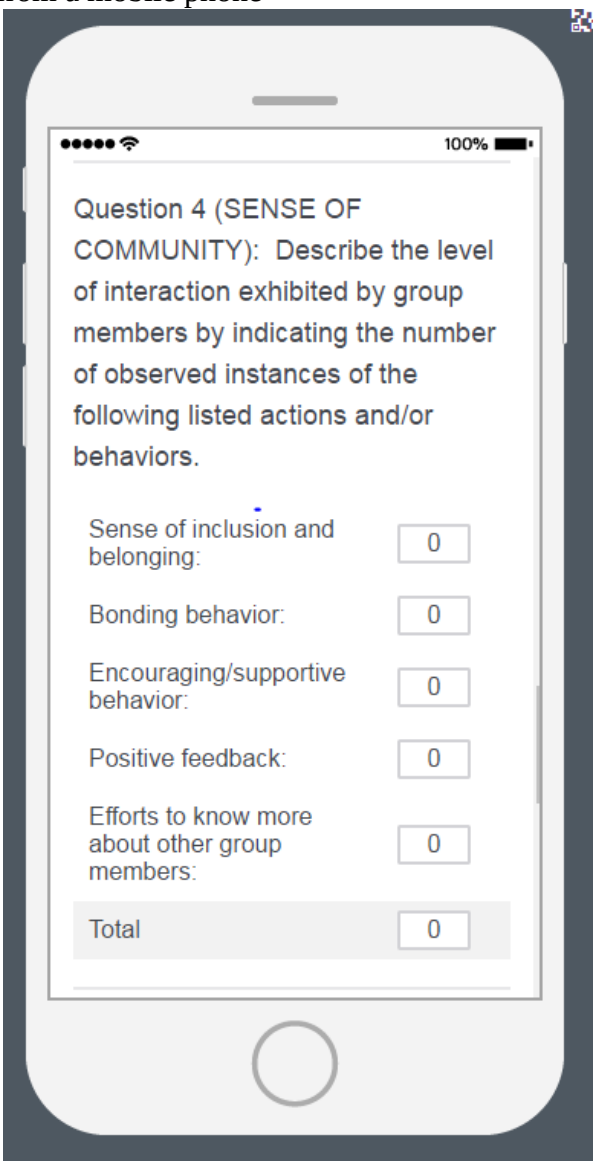
Screen shot of question 2A (frequencies of negative non-verbal communication) as accessed on the observation tool from a mobile phone



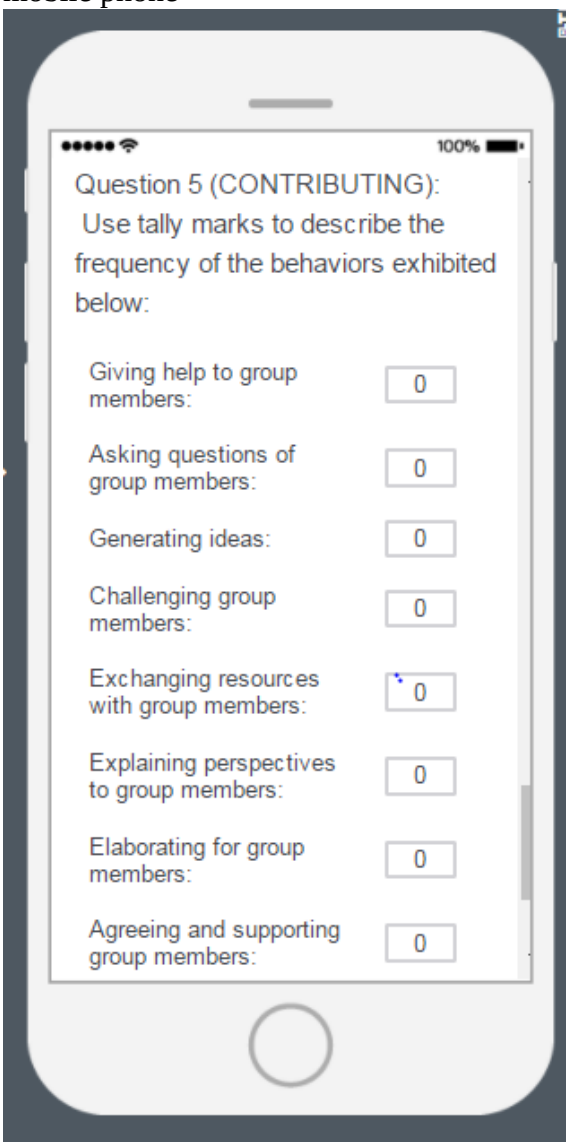
Appendix E-6
Screen shot of question 3A (frequencies of positive non-verbal communication) as accessed on the observation tool from a mobile phone



Appendix E-7
Screen shot of question 4 (frequencies of sense of community) as accessed on the observation tool from a mobile phone



Appendix E-8
Screen shot of question 5 (frequencies of contributing) as accessed on the observation tool from a mobile phone



Appendix E-9
Qualtrics data entry screen of observation tool for PC or laptop (2)

Question 4 (SENSE OF COMMUNITY): Describe the level of interaction exhibited by group members by indicating the number of observed instances of the following listed actions and/or behaviors.

Sense of inclusion and belonging:	0
Bonding behavior:	0
Encouraging/supportive behavior:	0
Positive feedback:	0
Efforts to know more about other group members:	0
Total	0

Question 5 (CONTRIBUTING): Use tally marks to describe the frequency of the behaviors exhibited below:

Giving help to group members:	0
Asking questions of group members:	0
Generating ideas:	0
Challenging group members:	0
Exchanging resources with group members:	0
Explaining perspectives to group members:	0

Appendix E-10
Qualtrics data entry screens of observation tool for tablet or smart phone

Question 10: Draw a diagram below that represents the physical environment to include the locations of: the front and back of the room; the facilitator's area; the screen; and how group members were seated.

Appendix E-11
Qualtrics QR code to access the questionnaire (Rovai's CCS 2007) from digital device (tablet or smart phone). Raters could also input data by visiting the website:
https://waynestate.az1.qualtrics.com/jfe/form/SV_39MMHhzRB6ydl9X

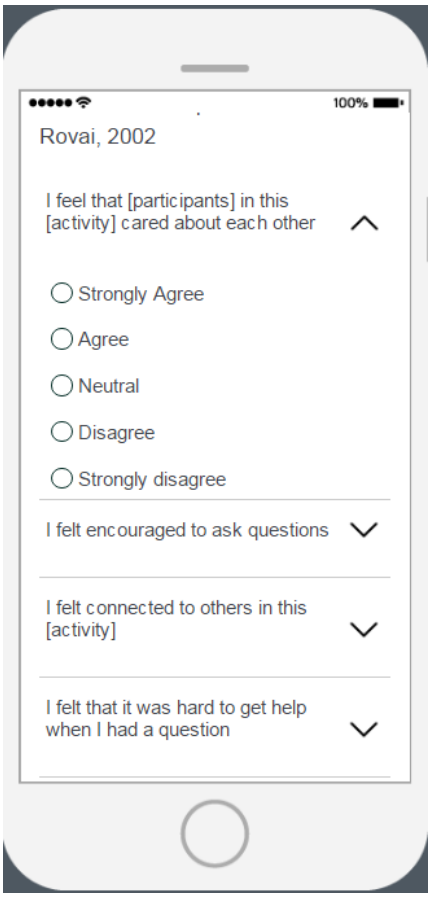
Appendix E-12
Screen shot of CCS questionnaire as seen on a PC or laptop

Classroom Community Scale (CCS) by Alfred P. Rovai (2002)

"Directions: Below, you will see a series of statements concerning a specific course or program you are presently taking or have recently completed. Read each statement carefully and place an X in the parenthesis to the right of the statement that comes closest to indicate how you feel about the course or program. You may use pencil or pen. There are no correct or incorrect responses. If you neither agree nor disagree with a statement or are uncertain, place an X in the neutral (N) area. Do not spend too much time on any one statement, but give the response that seems to describe how you feel. Please respond to all items." Rovai, 2002

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
I feel that [participants] in this [activity] cared about each other	○	○	○	○	○
I felt encouraged to ask questions	○	○	○	○	○
I felt connected to others in this [activity]	○	○	○	○	○
I felt that it was hard to get help when I had a question	○	○	○	○	○
I did not feel a spirit of community	○	○	○	○	○
I felt that I received timely feedback	○	○	○	○	○
I felt that this [activity] was like a family	○	○	○	○	○

Appendix E-13
Screen shot of CCS questionnaire as seen on a tablet or smart phone



Appendix E-14
QR code to access pre-activity participant demographics questionnaire.

Appendix E-15
Screen shot of pre-activity participant demographics questionnaire as seen on a PC or laptop

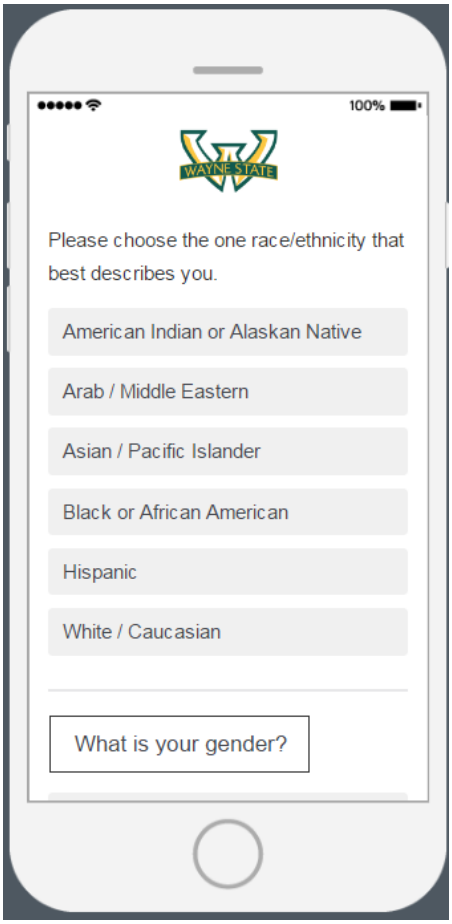
Please choose the one race/ethnicity that best describes you.

- American Indian or Alaskan Native
- Arab / Middle Eastern
- Asian / Pacific Islander
- Black or African American
- Hispanic
- White / Caucasian

What is your gender?

- Male
- Female

Appendix E-16
Screen shot of pre-activity participant demographics questionnaire as seen on a tablet or smart phone



APPENDIX F

Concurrence of Exemption from the WSU IRB

WAYNE STATE UNIVERSITY

IRB Administration Office
87 East Canfield, Second Floor
Detroit, Michigan 48201
Phone: (313) 577-1628
FAX: (313) 993-7122
http://irb.wayne.edu

CONCURRENCE OF EXEMPTION

To: Michele Rochester
Administration & Organization Stud

From: Dr. Deborah Ellis C. Johnelle PhD/RM
Chairperson, Behavioral Institutional Review Board (B3)

Date: December 19, 2016

RE: IRB #: 104516B3X

Protocol Title: Synchronous Communication and its Effects on the Collaboration of Workplace Employees Engaged in a Problem Activity

Sponsor:

Protocol #: 1610000038

The above-referenced protocol has been reviewed and found to qualify for **Exemption** according to paragraph #2 of the Department of Health and Human Services Code of Federal Regulations [45 CFR 46.101(b)].

- Social/Behavioral/Education Exempt Protocol Summary Form (received in the IRB office 10/19/2016)
- Research Protocol (received in the IRB Office 12/5/2016)
- Medical Records not being accessed therefore HIPAA does not apply.
- Written Consent Sheet and Study Overview Form
- Appendix E - Custom Observation Tool
- Appendix G - Post-Activity Interview
- Data Collection Tools (4): (I) Appendix C - Participant Activity Worksheet (II) Appendix D - Answer Worksheet, (III) Appendix F-Questionnaire, and (IV) Appendix I - Collection of Participant Social-Economic Information.

This proposal has not been evaluated for scientific merit, except to weigh the risk to the human subjects in relation to the potential benefits.

- Exempt protocols do not require annual review by the IRB.
- All changes or amendments to the above-referenced protocol require review and approval by the IRB **BEFORE** implementation.
- Adverse Reactions/Unexpected Events (AR/UE) must be submitted on the appropriate form within the timeframe specified in the IRB Administration Office Policy (http://irb.wayne.edu/policies-human-research.php).

NOTE: Forms should be downloaded from the IRB Administration Office website http://irb.wayne.edu at each use.

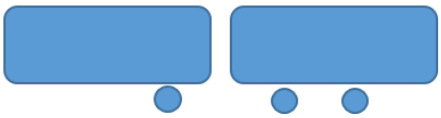
Notify the IRB of any changes to the funding status of the above-referenced protocol.

APPENDIX G

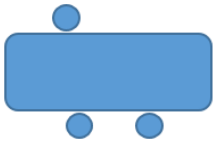
Initial and subsequent participant seating arrangements during each group's activity. In these arrangements, the solid rectangles represent the six-foot tables and the small solid circles represent each participant seated at each of the tables.

Appendix G-1:
Seating arrangements for Group A

Initial seating arrangement:

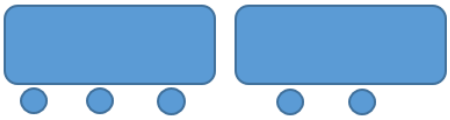


Subsequent seating arrangement:

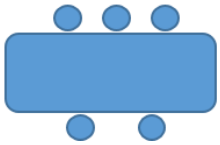


Appendix G-2:
Seating arrangements for Group B

Initial seating arrangement:

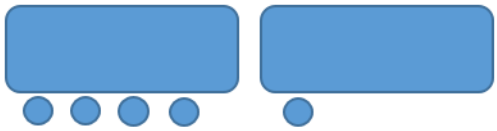


Subsequent seating arrangement:

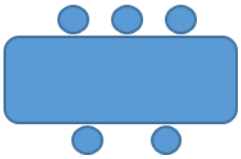


Appendix G-3:
Seating arrangements for Group C

Initial seating arrangement:

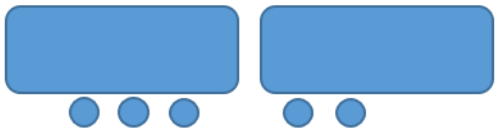


Subsequent seating arrangement:

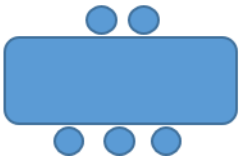


Appendix G-4:
Seating arrangements for Group D

Initial seating arrangement:

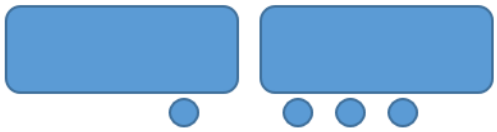


Subsequent seating arrangement:

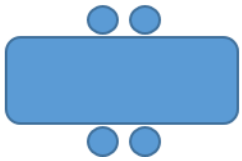


Appendix G-5:
Seating arrangements for Group E

Initial seating arrangement:



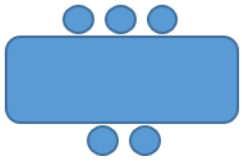
Subsequent seating arrangement:



Appendix G-6:
Seating arrangements for Group F

Initial seating arrangement:

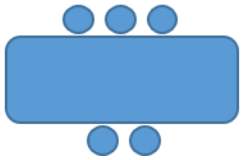
Subsequent seating arrangement:



Appendix G-7:
Seating arrangements for Group G

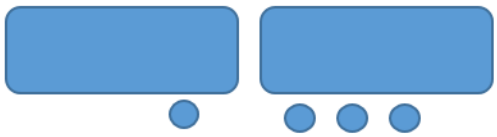
Initial seating arrangement:

Subsequent seating arrangement:

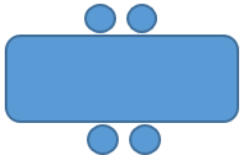


Appendix G-8:
Seating arrangements for Group H

Initial seating arrangement:

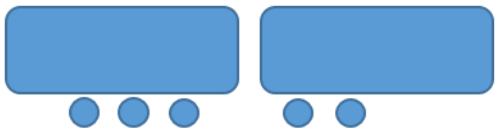


Subsequent seating arrangement:

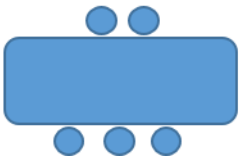


Appendix G-9:
Seating arrangements Group I

Initial seating arrangement:

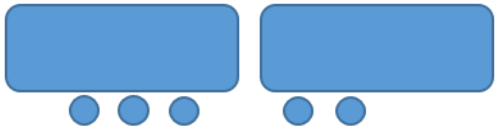


Subsequent seating arrangement:

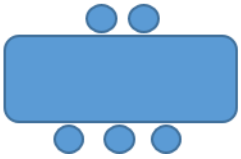


Appendix G-10:
Seating arrangements for Group J

Initial seating arrangement:



Subsequent seating arrangement:



APPENDIX H

Questionnaire (to give to each participant after the activity)

Classroom Community Scale (CCS) by Alfred P. Rovai (2002)

"Directions: Below, you will see a series of statements concerning a specific course or program you are presently taking or have recently completed. Read each statement carefully and place an X in the parenthesis to the right of the statement that comes closest to indicate how you feel about the course or program. You may use pencil or pen. There are no correct or incorrect responses. If you neither agree nor disagree with a statement or are uncertain, place an X in the neutral (N) area. Do not spend too much time on any one statement, but give the response that seems to describe how you feel. Please respond to all items." Rovai, 2002

		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	I feel that [participants] in this [activity] cared about each other					
2	I felt encouraged to ask questions					
3	I felt connected to others in this [activity]					
4	I felt that it was hard to get help when I had a question					
5	I did not feel a spirit of community					
6	I felt that I received timely feedback					
7	I felt that this [activity] was like a family					
8	I felt uneasy exposing gaps in my understanding					
9	I felt isolated in this course					
10	I felt reluctant to speak openly					
11	I trusted others in this [activity]					
12	I felt that this [activity] resulted in only modest learning					
13	I felt that I could rely on others in this [activity]					
14	I felt that other [participants] did not help me learn					
15	I felt that [participants] of this [activity] depended on me					
16	I felt that I was given ample opportunities to learn					

17	I felt uncertain about others in this [activity]					
18	I felt that my educational needs are not being met					
19	I felt confident that others supported me					
20	I felt that this [activity] did not promote a desire to learn					

Note: All verb tenses were changed from present to past, and references to “students” were replaced with “participants” and references to “course” were replaced with “activity.” No other edits were made.

APPENDIX I

Post-Activity Interview (to conduct with each individual participant)

	Questions	Objective	Literature Source
1	Did you find value in this activity? If so, please briefly describe that value.	Looking to establish value for a professional workplace employee	Rovai, 2002
2	Did this activity mimic any collaborative instances in your professional life, i.e. at work? Please explain.	Looking to establish practical applicability	Rovai, 2002
3	Did you feel fully-engaged in this activity? Please explain.	Looking to assess self-perceptions of interaction	Rovai, 2002
4	Did you actively make contributions to your group's efforts? Please explain.	Looking to assess self-perceptions of interaction/sense of community	Ellis, 2001
5	Did you feel comfortable making contributions to your group's efforts? Please explain.	Looking to assess self-perceptions of interaction/sense of community	Ellis, 2001
6	Do you feel that everyone in your group fully participated? Please explain.	Looking to assess perceptions of others' levels of interaction/sense of community	Ellis, 2001 Rovai, 2002 Warkentin, 1997
7	Did you have any previous insight or knowledge that helped your group with their responses? Please explain.	Looking to assess cognitive application	Rovai, 2002
8	Did you learn anything new during the activity? Please explain.	Looking for construction of new knowledge	Rovai, 2002
9	How confident did you feel with your group's final responses?	Looking to assess levels of confidence during a synchronous problem activity	Warkentin, 1997

10	How successful do you think your group would have been had you used an asynchronous communication method, i.e. if you had worked together virtually rather than face-to-face?	Looking to assess levels of confidence in, and value of synchronous communication as opposed to asynchronous communication	Corbitt, Gardiner & Wright, 2004
11	Did you or any members of your group experience an “aha learning moment?”	Looking to assess levels of self- and group-learning	Kapp and O’Driscoll, 2010

APPENDIX J

Raw Data Totals from Observation Tool

Q0	Q1_Calm	Q1_Loud	Q1_Focused	Q1_Excited	Q1_Bored	Q2A_Neg	Q3A_Pos	Q4_Sense	Q5_Contrib
1/20/2017	31	20	64	43	2	10	22	139	106
1/27/2017	6	1	321	15	0	52	98	31	202
1/30/2017	24	0	445	170	1	9	126	111	66
2/1/2017	0	0	132	6	1	31	98	68	65
2/2/2017	6	1	383	117	0	3	51	50	180
2/3/2017	5	0	462	102	0	7	72	76	217
2/6/2017	2	5	298	8	1	36	54	69	101
2/7/2017	6	0	530	87	0	31	178	105	105
2/9/2017	8	0	476	92	4	12	84	120	179
2/10/2017	6	0	530	92	0	0	300	125	252

APPENDIX K

Raw Participant Demographic Data

Q0_date	Q1_race_ethnicity	Q2_gender	Q3_age	Q4_education	Q5_length_of_service_with_kfg
1/23/2017 7:45	Black or African American	Male	55 to 64	University Degree	5 years or more
1/23/2017 7:46	Asian / Pacific Islander	Male	25 to 34	Advanced Degree	2 - 5 years
1/23/2017 7:46	White / Caucasian	Male	45 to 54	Advanced Degree	2 - 5 years
1/27/2017 9:49	White / Caucasian	Male	65 to 74	Advanced Degree	Other
1/27/2017 9:59	Black or African American	Female	45 to 54	University Degree	Less than 6 months
1/27/2017 9:58	White / Caucasian	Female	65 to 74	Advanced Degree	Other
1/27/2017 9:59	Black or African American	Male	55 to 64	University Degree	5 years or more
1/27/2017 10:02	White / Caucasian	Female	18 to 24	University Degree	1 - 2 years
1/30/2017 10:50	White / Caucasian	Male	25 to 34	University Degree	2 - 5 years
1/30/2017 11:00	White / Caucasian	Male	25 to 34	Advanced Degree	2 - 5 years
1/30/2017 11:00	Arab / Middle Eastern	Male	25 to 34	University Degree	Less than 6 months
1/30/2017 11:01	White / Caucasian	Female	18 to 24	University Degree	Less than 6 months
1/30/2017 11:02	White / Caucasian	Female	55 to 64	University Degree	Less than 6 months
2/1/2017 9:53	White / Caucasian	Female	25 to 34	University Degree	1 - 2 years
2/1/2017 9:57	White / Caucasian	Female	25 to 34	University Degree	2 - 5 years
2/1/2017 9:59	Hispanic	Female	25 to 34	University Degree	2 - 5 years
2/1/2017 10:00	White / Caucasian	Female	25 to 34	University Degree	5 years or more
2/1/2017 10:01	White / Caucasian	Female	45 to 54	University Degree	Other
2/2/2017 9:42	White / Caucasian Black or African	Female	75 or older	Advanced Degree	Other
2/2/2017 9:53	American	Female	45 to 54	University Degree	Other
2/2/2017 9:57	White / Caucasian	Female	25 to 34	University Degree	Less than 6 months
2/2/2017 9:59	White / Caucasian	Female	35 to 44	Post-Secondary/Vocational	5 years or more

2/3/2017 10:58	Black or African American	Female	35 to 44	University Degree	5 years or more
2/3/2017 11:00	White / Caucasian	Male	25 to 34	University Degree	2 - 5 years
2/3/2017 11:02	White / Caucasian	Female	25 to 34	University Degree	2 - 5 years
2/3/2017 11:01	White / Caucasian	Male	25 to 34	University Degree	5 years or more
2/3/2017 11:03	White / Caucasian	Male	25 to 34	Advanced Degree	2 - 5 years
2/6/2017 9:49	White / Caucasian	Male	65 to 74	Advanced Degree	Other
2/6/2017 9:52	White / Caucasian	Male	25 to 34	University Degree	Less than 6 months
2/6/2017 9:57	White / Caucasian	Male	45 to 54	University Degree	5 years or more
2/6/2017 10:03	White / Caucasian	Male	25 to 34	University Degree	2 - 5 years
2/6/2017 10:11	White / Caucasian	Male	18 to 24	University Degree	6 months - 1 year
2/7/2017 9:57	White / Caucasian	Male	45 to 54	Advanced Degree	2 - 5 years
2/7/2017 10:00	White / Caucasian	Female	25 to 34	University Degree	2 - 5 years
2/7/2017 10:01	White / Caucasian	Female	35 to 44	High School Diploma	5 years or more
2/7/2017 10:01	White / Caucasian	Male	25 to 34	University Degree	5 years or more
2/9/2017 9:49	White / Caucasian	Female	45 to 54	University Degree	Other
2/9/2017 9:54	White / Caucasian	Male	18 to 24	University Degree	1 - 2 years
2/9/2017 9:57	White / Caucasian	Female	45 to 54	Advanced Degree	5 years or more
2/9/2017 9:58	White / Caucasian	Male	45 to 54	Advanced Degree	2 - 5 years
2/9/2017 9:59	White / Caucasian	Female	18 to 24	University Degree	2 - 5 years
2/10/2017 9:59	White / Caucasian	Female	55 to 64	Post-Secondary/Vocational	5 years or more
2/10/2017 10:00	White / Caucasian	Female	25 to 34	University Degree	2 - 5 years
2/10/2017 10:00	White / Caucasian	Female	55 to 64	University Degree	5 years or more
2/10/2017 10:11	White / Caucasian	Female	25 to 34	University Degree	2 - 5 years
2/10/2017 10:15	White / Caucasian	Female	55 to 64	High School Diploma	5 years or more

APPENDIX L

Raw Data Responses from the Classroom Community Scale (Items 1-10)

Q_0	Q1_1	Q1_2	Q1_3	Q1_4	Q1_5	Q1_6	Q1_7	Q1_8	Q1_9	Q1_10
1/20/2017 16:29	3	4	4	4	4	4	2	4	4	4
1/21/2017 13:20	3	2	3	4	3	4	1	3	4	3
1/23/2017 6:31	4	4	3	4	4	4	3	4	4	4
1/27/2017 11:05	3	3	3	1	3	3	1	1	3	1
1/27/2017 11:06	4	3	3	3	3	4	3	2	3	3
1/27/2017 11:06	4	4	4	4	4	4	3	4	4	4
1/27/2017 11:07	4	4	4	4	3	4	3	3	3	4
1/27/2017 11:06	3	3	3	1	3	3	2	3	2	2
1/30/2017 12:06	4	4	4	4	4	4	4	1	4	4
1/30/2017 12:06	4	4	3	4	4	4	4	4	4	4
1/30/2017 12:06	3	4	3	3	4	4	2	3	4	4
1/30/2017 12:08	4	4	3	4	3	4	3	1	4	3
1/30/2017 12:06	2	3	3	4	2	4	1	4	0	2
2/1/2017 10:59	2	3	2	3	2	3	1	3	3	3
2/1/2017 10:59	4	4	3	4	4	4	2	3	4	4
2/1/2017 11:01	4	4	4	0	0	4	4	3	3	3
2/1/2017 11:01	3	1	3	3	2	3	2	1	4	3
2/1/2017 11:02	4	3	3	3	3	2	2	3	4	4
2/2/2017 11:05	4	4	4	4	4	4	4	4	4	4
2/2/2017 11:05	4	4	3	4	3	4	3	4	4	4
2/2/2017 11:07	4	4	4	3	4	4	3	3	4	4
2/2/2017 11:08	3	4	4	3	4	3	2	3	4	4
2/3/2017 11:54	3	3	3	3	3	3	3	2	3	3
2/3/2017 11:55	4	4	4	3	3	3	3	3	4	4
2/3/2017 11:54	3	3	3	3	3	4	1	3	3	3
2/3/2017 11:56	3	3	3	3	3	3	1	1	3	3
2/3/2017 11:54	4	4	4	4	4	4	3	4	4	4
2/6/2017 11:07	4	4	2	3	2	3	1	3	2	3

2/6/2017 11:07	2	3	2	3	2	2	1	2	3	3
2/6/2017 11:09	3	3	4	3	3	3	2	3	3	3
2/6/2017 11:09	3	2	3	3	3	3	0	3	3	3
2/22/2017 5:57	3	3	1	2	3	2	0	4	4	4
2/7/2017 11:17	4	4	4	4	3	4	4	4	3	4
2/7/2017 11:18	4	3	4	4	0	3	3	4	4	4
2/7/2017 11:20	4	3	3	2	3	3	2	3	4	4
2/7/2017 11:20	4	2	4	3	3	4	3	4	4	4
2/9/2017 11:04	4	4	3	3	4	3	3	3	3	3
2/9/2017 11:04	3	4	4	4	4	4	2	4	4	4
2/9/2017 11:04	3	2	4	1	3	4	3	3	3	3
2/9/2017 11:04	3	3	3	3	3	3	2	3	3	2
2/9/2017 11:05	3	4	3	4	4	4	3	3	3	3
2/10/2017 11:16	3	4	3	3	3	3	3	4	3	3
2/10/2017 11:16	4	3	3	4	4	4	3	4	4	4
2/10/2017 11:16	3	2	3	3	4	4	4	2	4	4
2/10/2017 11:16	3	2	3	3	3	4	3	2	2	2
2/10/2017 11:18	4	4	4	3	4	4	4	4	4	4

APPENDIX M

Raw Data Responses from the Classroom Community Scale (Items 11-20)

Q_0	Q1_11	Q1_12	Q1_13	Q1_14	Q1_15	Q1_16	Q1_17	Q1_18	Q1_19	Q1_20
1/20/2017 16:29	4	4	4	4	3	4	4	4	3	4
1/21/2017 13:20	3	2	3	3	3	3	3	2	3	3
1/23/2017 6:31	4	4	4	4	3	3	3	4	4	4
1/27/2017 11:05	3	1	3	1	2	4	1	2	3	2
1/27/2017 11:06	3	1	4	3	1	3	3	3	3	3
1/27/2017 11:06	4	4	4	4	3	4	4	4	4	4
1/27/2017 11:07	4	3	4	4	2	3	4	3	4	3
1/27/2017 11:06	3	3	3	3	2	3	3	2	3	3
1/30/2017 12:06	4	0	4	4	3	4	4	4	4	4
1/30/2017 12:06	3	1	3	3	3	3	3	3	4	4
1/30/2017 12:06	3	1	3	3	0	3	3	3	3	3
1/30/2017 12:08	4	3	4	4	3	3	4	3	4	4
1/30/2017 12:06	2	2	3	0	3	2	2	2	2	2
2/1/2017 10:59	3	1	3	3	2	3	3	3	3	2
2/1/2017 10:59	4	3	4	4	3	4	4	2	3	4
2/1/2017 11:01	4	3	3	3	2	3	3	2	3	3
2/1/2017 11:01	3	3	3	3	3	2	1	3	2	3
2/1/2017 11:02	3	2	3	3	3	2	3	2	3	3
2/2/2017 11:05	4	4	4	4	2	4	3	4	4	4
2/2/2017 11:05	4	4	4	3	2	3	4	4	4	3
2/2/2017 11:07	4	3	4	4	2	4	3	3	4	4
2/2/2017 11:08	4	3	4	3	3	3	3	3	3	3
2/3/2017 11:54	3	3	3	3	1	3	3	3	3	3
2/3/2017 11:55	4	3	3	3	3	3	3	3	3	3
2/3/2017 11:54	4	2	3	2	2	2	1	3	3	3
2/3/2017 11:56	2	1	3	3	1	3	1	3	2	3
2/3/2017 11:54	4	1	4	4	4	4	4	4	4	4
2/6/2017 11:07	3	3	3	3	2	3	3	3	3	3

2/6/2017 11:07	2	2	3	3	1	2	2	2	2	3
2/6/2017 11:09	4	1	3	3	2	2	3	2	1	2
2/6/2017 11:09	2	3	1	3	3	1	0	3	3	3
2/22/2017 5:57	2	1	3	1	2	1	1	2	2	1
2/7/2017 11:17	4	3	4	4	4	4	4	4	4	4
2/7/2017 11:18	4	2	4	4	3	3	4	4	3	3
2/7/2017 11:20	3	2	3	3	3	3	3	2	3	4
2/7/2017 11:20	4	1	3	3	3	3	3	3	3	3
2/9/2017 11:04	3	3	3	3	3	3	3	3	3	3
2/9/2017 11:04	4	2	3	2	2	2	2	2	3	2
2/9/2017 11:04	3	1	3	3	3	3	2	3	3	3
2/9/2017 11:04	3	2	3	3	2	3	3	2	2	3
2/9/2017 11:05	2	2	3	3	1	3	3	2	3	2
2/10/2017 11:16	3	3	3	3	3	3	3	1	3	3
2/10/2017 11:16	3	3	3	4	3	3	3	3	3	4
2/10/2017 11:16	4	4	4	3	1	2	3	3	4	4
2/10/2017 11:16	3	2	3	3	2	3	3	2	3	3
2/10/2017 11:18	4	4	4	4	3	4	4	4	4	0

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ABSTRACT

SYNCHRONOUS COMMUNICATION AND ITS EFFECTS ON THE COLLABORATION OF PROFESSIONAL WORKPLACE EMPLOYEES ENGAGED IN A PROBLEM ACTIVITY

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Major: Learning & Design Technology

Degree: Doctor of Philosophy

Asynchronous communication may have a profound impact on employee collaboration and productivity in the workplace due to the loss of face-to-face interaction and the relationships these opportunities may foster. However, as broadly defined within the literature, synchronous communication is a rich media that supports this type of collaboration and social interaction. Synchronous communication methods that encourage collaboration lead to deeper level learning, critical thinking, shared understanding, and long-term retention of the learned material (Krejins et al., 2003). Schroder et al. (2011) described the benefits of collaboration to professional organizations as they relate to the interprofessional collaborative practice on healthcare. The authors described collaboration as a key factor in better patient and provider outcomes: “This approach to healthcare has been found to reduce errors, improve quality of care and patient outcomes, reduce healthcare workloads and cost, and increase job satisfaction and retention” (Schroder et al., 2011, p. 189).

The research for this study described the importance of collaboration and social interaction and the various benefits they provide, such as deeper-level learning, long-term retention of learned material, positive attitudes, group cohesion, interaction and inclusion, engagement, and learning that is actively created by the learners. In the business world, the need for effective collaboration exists as organizations seek to provide professionals with opportunities to engage in the practice of problem activities in an effort to improve efficiency and productivity in the workplace. This study, supportive of the literature, suggests that collaboration encourages interactions that make overall positive contributions to learning and the learner experience (Curtis and Lawson, 2007; Rovai, 2002; Rovai, 2007; Gunawerdena et al, 1995; Walther, 1996; Dawson, 2006; Krejins, 2002; Krejins, 2003). This literature employed for this study is synthesized into the following themes that describe actions and behaviors supportive of collaboration and social interaction: verbal communication; non-verbal communication; sense of community; contributing; planning; and participant perspective. These literature themes are then measured using a customer observation tool, Rovai's Classroom Community Scale (2007) as a questionnaire, post-activity participant interviews, and a researcher's journal.

AUTOBIOGRAPHICAL STATEMENT

Michele Rochester is the Director of Employee Education for the Kaufman Financial Group (Farmington Hills, MI). Her experience with adult learning grew out of the first job she started exactly thirty days after graduating from college as an Executive Human Resources Team Leader with Target Stores. In this role, Michele served as both a district human resources expert and new stores' specialist assisting with the opening of nearly a dozen new Target stores along the Eastern seaboard to include the Washington, D.C. and New York metropolitan areas. Michele's next role moved her into the realm of organizational development in the gaming and hospitality industries, where her career would progress with employers to include MGM Grand Detroit, MGM MIRAGE Las Vegas, Rock Gaming and Greektown Casino & Hotel. It was also during these nine years that Michele simultaneously began both her family and the pursuit of her educational dream to earn her doctorate degree.

Michele is a current member of both the Association for Training & Development (ATD) and the International Society for Performance Improvement (ISPI). She served for two years on the board of directors for the Detroit chapter of the ATD, and as Committee Member, Reviewer for Outstanding Practice Award for the 2010 Association for Educational Communications and Technology.

Michele holds a Bachelor of Arts degree in History and American Studies from the University of Michigan (Ann Arbor) and a Master of Arts degree in American Studies from the George Washington University (Washington D.C.). Michele has also earned recognition for her professional excellence to include earning the Outstanding Student Leader award presented by University of Michigan President James J. Duderstadt, acceptance by the United States Department of Justice into the Federal Bureau of Investigation's Citizen's Academy, and the Jimmy Settles Jimmy Settles' Award for Exemplary Diversity Facilitator's Training.

Michele currently resides in West Bloomfield, MI with her husband and two sons. If money and time were no concern for Michele, she would pursue three things:

1. A life of actionable behavioral science merged with social media, to continue to improve our social consciousness and responsibilities to one another;
2. Financial means and assistance for aspirational college-bound students who have achieved average academic success, and if given the opportunity, have a good chance to graduate and be successful, and join her in item #1;
3. Gardening and travelling with her family.