

EXPLORING THE ROLE OF MULTIMEDIA IN ENHANCING SOCIAL PRESENCE  
IN AN ASYNCHRONOUS ONLINE COURSE

By

CHESTA KHURANA

A dissertation submitted to the  
Graduate School-New Brunswick  
Rutgers, The State University of New Jersey

In partial fulfillment of the requirements

For the degree of

Doctor of Philosophy,

Graduate Program in Education

Written under the direction of

Dr. Erica C. Boling

And approved by

---

---

---

---

New Brunswick, New Jersey

May 2016

## **ABSTRACT OF THE DISSERTATION**

### **EXPLORING THE ROLE OF MULTIMEDIA IN ENHANCING SOCIAL PRESENCE IN AN ASYNCHRONOUS ONLINE COURSE**

by: CHESTA KHURANA

Dissertation Chair: Erica C. Boling

The demand for online education is growing and with it there is a growing concern about the quality of online education. One of the major shortcomings of online education is the experienced social isolation. To minimize this feeling of isolation, research in the past recommends focusing on strategies that enhance social presence in an online course. However, there are many challenges to creating an online learning experience where learners experience a high degree of social presence. This is may be because the nature of the social presence construct is ambiguous and most of the research in past has measured social presence through self-report surveys.

The purpose of this study was to examine the growth of social presence in a multimodal discussion forum, and understand how multimedia supports the development of social presence in an asynchronous online course. Additionally, the aim was to know the views of students and the instructor about using multimedia in an online course for various purposes. Through mixed method exploratory case study method, this study explored the role of multimedia in enhancing social presence in an online course. The study made use of three different frameworks i.e. Social constructivism, Community of Inquiry, and Social Network Analysis to understand the use of multimedia and the pattern of development of social presence.

The study demonstrated various ways in which multimedia could enhance social presence in an online learning community. The findings indicated the even though some multimodal tools like VoiceThread increased the amount of interaction but it did not result in the increase of social presence. Additionally, the study revealed the inability of the social presence coding protocol developed by Rourke et al. (2001) to capture certain social presence indicators in a multimodal discussion forum. Several conjectures were developed in this study to understand the popularity of a student within a learning network.

INDEX WORDS: Multimedia, social presence, Social Network Analysis, Community of Inquiry

## **Acknowledgements**

First, I would like to thank my mentor, my advisor, Dr. Erica Boling for this dissertation. Erica gave me a chance to teach online and steered me into the fascinating world of online education. Her guidance and expertise are the main reasons behind why I am writing this today. Her timely feedback, constant reminders, lively meetings, and continual words of encouragement were very crucial to the success of this project. For all this and much more, I am forever indebted.

I am also thankful to all my committee members. I would like to thank Dr. Hmelo-Silver for an opportunity to work on a project back in 2012 that sparked my initial interest in online pedagogy and the affordances of multimodal tools. I would also like to thank Dr. Hmelo-Silver, Dr. Novak, and Dr. Francois for their initial guidance in setting up the project and feedback. Appreciation is also due for Dr. Deborah Beaudry, the instructor of the online course. Debbie's willingness to help me during the phase of data collection was commendable.

A huge thanks is due to my husband for supporting me in this journey. Vivek is my rock, my safe place when things go wrong. His unshakeable faith in my ability to succeed kept me going. I came to the United States with a dream of completing a doctorate. Vivek helped me realize it. Next, much of the credit also goes to my parents and parents' in law. I am grateful to them, as over this five years journey they flew multiple times from India to allow me to focus on my work while they took care of the rest. I am grateful for their continuous prayers, and hours and hours of babysitting.

## **Dedication**

I dedicate this study to my life's greatest gift, my daughter Sia. For what I have achieved today and whatever I will ever achieve in this life, it is all because of her.

## Table of Contents

<b><i>ABSTRACT OF THE DISSERTATION</i></b>	<b><i>ii</i></b>
<b><i>Acknowledgements</i></b>	<b><i>iv</i></b>
<b><i>Dedication</i></b>	<b><i>v</i></b>
<b><i>Table of Contents</i></b>	<b><i>vi</i></b>
<b><i>List of Figures</i></b>	<b><i>viii</i></b>
<b><i>List of Tables</i></b>	<b><i>ix</i></b>
<b><i>Chapter 1</i></b>	<b><i>1</i></b>
<b><i>Introduction</i></b>	<b><i>1</i></b>
Conceptual Framework	<b><i>4</i></b>
<b><i>Chapter 2</i></b>	<b><i>20</i></b>
<b><i>Literature Review</i></b>	<b><i>20</i></b>
Social Isolation	<b><i>20</i></b>
Theory of Transactional Distance	<b><i>22</i></b>
Social Presence	<b><i>26</i></b>
Research on Social Presence	<b><i>32</i></b>
Limitations of Previous Research	<b><i>41</i></b>
Significance of the Current Study	<b><i>43</i></b>
<b><i>Chapter 3</i></b>	<b><i>46</i></b>
<b><i>Research Design</i></b>	<b><i>46</i></b>
Context	<b><i>46</i></b>
Data Collection	<b><i>53</i></b>
Data Sources	<b><i>57</i></b>
Data Analysis	<b><i>61</i></b>
Positioning of the Researcher	<b><i>76</i></b>
Reliability	<b><i>78</i></b>
Validity	<b><i>81</i></b>
<b><i>Chapter 4</i></b>	<b><i>83</i></b>
<b><i>Findings</i></b>	<b><i>83</i></b>
Question 1. How Is Social Presence Manifested In Different Modality Online Discussions?	<b><i>83</i></b>
Question 2. How Did Students and Instructor Use Multimedia To Support The Development Of Social Presence?	<b><i>97</i></b>

<b>Question 3. What Were Students' Views Of Using Multimedia In An Online Course?</b>	<b>112</b>
<b>Chapter 5</b>	<b>118</b>
<b>DISCUSSION</b>	<b>118</b>
<b>Significant Findings</b>	<b>119</b>
<b>Limitations of the Study</b>	<b>125</b>
<b>Implications</b>	<b>126</b>
<b>Suggestions for Further Research</b>	<b>128</b>
<b>Conclusion</b>	<b>130</b>
<b>References</b>	<b>132</b>
<b>Appendix A</b>	<b>149</b>
<b>Appendix B</b>	<b>151</b>
<b>Appendix C</b>	<b>153</b>
<b>Appendix D</b>	<b>155</b>
<b>Appendix E</b>	<b>159</b>

## List of Figures

<i>Figure 1.</i> The three eras of conceptualization of social presence by Oztok and Brett (2011).....	8
<i>Figure 2.</i> The Community of Inquiry framework from Garrison, Anderson & Archer (2000).....	10
<i>Figure 3.</i> Screenshot of eCollege course shell.....	48
<i>Figure 4.</i> Screenshot of the Module 1 discussion in eCollege. ....	71
<i>Figure 5.</i> Number of comments made by students to the initial posts for Module 1 discussion.....	71
<i>Figure 6.</i> Andrew's Voki .....	85
<i>Figure 7.</i> Categories of Social Presence exhibited in all six discussions. ....	86
<i>Figure 8.</i> Progression of Social Presence Categories over time.....	88
<i>Figure 9.</i> Comparison of Social Presence Density between Text-Based and Multimodal Discussions .....	89
<i>Figure 10.</i> Comparison of Indicators of Cohesive Category between Text-Based and Multimodal Discussions .....	93
<i>Figure 11.</i> Comparison of Interactive Category Indicators between Text-Based and Multimodal Discussions .....	95
<i>Figure 12.</i> Comparison of Indicators of Affective Category between Text-Based and Multimodal Discussions .....	96
<i>Figure 14.</i> Total Posts and Social Density of Each Student.....	109
<i>Figure 15.</i> Distribution of social presence indicators in Timica's posts.....	110



## **List of Tables**

1. Elements of CoI framework from Garrison, Anderson & Archer (2000).....	13
2. The categories and indicators of Social Presence from Rourke, Garrison & Archer (2001).....	13
3. The Course Objectives.....	49
4. Percentage Grade allotted to each assignment.....	50
5. Instructions for online discussion assignment .....	52
6. The Topics and Modality for each Discussion Assignment .....	53
7. Details of the focus participants.....	55
8. List of the Instructor created videos.....	61
9. Abridged version Rourke et al. (2001)'s social presence coding template .....	64
10. A list of categories generated through constant comparative analysis .....	75
11. Overview of Data Analysis.....	76
12. The inter-rater reliability at the category and indicator level .....	81
13. Social Presence Categories per Module Discussion .....	84

## **Chapter 1**

### **Introduction**

During the Fall of 2010 more than 6.1 million students were enrolled in at least one online class (Going the Distance: Online Education in the United States, 2011). The demand for online learning is growing significantly and there are many reasons for its growth (Allen & Seaman, 2013; McBrien, Jones, & Cheng, 2009; Moller, Foshay, & Huett, 2008; King, Walpole, & Lamon, 2007; Lowenthal & Leech, 2009; Shea & Bidjerano, 2010; Tallent-Runnels, Thomas, Lan, Cooper, Ahern, Shaw, & Liu, 2006). Evolving connective technology, convenient schedule, flexible hours, greater accessibility, low financial cost, and the ability to network with professionals are a few of the reasons why students embrace this new learning environment (Bolliger & Inan, 2012; Braun, 2008; Jensen, 2011; Sun, Tsai, Finger, Chen, & Yeh, 2008). However, one of the major shortcomings of online education is reported to be the experienced social isolation (Borup et al., 2011; Lambert & Fisher, 2013; Lane & Shelton, 2001, Ludwig-Hardman & Dunlap, 2003; Rovai & Wighting, 2005; Velasquez, Graham & West, 2013). As online learning environments are evolving, understanding different ways to bridge the distance between students and instructors has become complex.

For online education to succeed, understanding students' communication and their feelings in an online environment are vital. One prime variable that helps in understanding the interaction within an online environment is 'social presence.' Jusoff and Khodabandelou (2009) argue "social presence concept is the key of success or failure of any new innovation or change in teaching and learning environments" (p. 79). Studies

have shown that social presence impacts the development of community and collaboration in online courses, improves instructional effectiveness, enhances student satisfaction, develops student persistence, and boosts student motivation (Jusoff & Khodabandelou, 2009; Richardson & Swan, 2003; Swan & Shih, 2005). The existence of social presence is crucial as it acts as a mediating variable between cognitive and teaching presence (Garrison, Anderson, & Archer, 2010). A low social presence in any learning community yields less interaction and more frustration (Dallinger & Hample, 1995; Garramone, Harris, & Anderson, 1986).

Although the importance of social presence is well documented in the research, its definitions and approaches or measures to develop social presence is ambiguous and lacks clarity (Yamada & Goda, 2012). Oztek & Brett, (2011) explain, "the current conceptualizations of social presence do not adequately support the broad exploration and explanation of technologically-mediated perceptions, behaviors, and interactions"(para. 1). Many researchers blame the text-based environments for the existing social, psychological, and transactional distance between learners and instructors (Lowenthal & Dunlap, 2010). Text-based discussions are critiqued for being static, text heavy, and their limited appeal to different kinds of learners (Pawan et al., 2003). Many researchers in the past have concluded that social presence could be enhanced in an online environment by using more multimedia-based strategies that encourage interaction. Even though the importance of multimedia in enhancing social presence is widely understood, the research available to validate this claim is anecdotal and exploratory in nature.

Use of interactive elements in online learning increases student achievement and motivation (Craincross & Manion, 2001), enhances social presence (Aragon, 2003), and

reduces the cognitive load on students (Homer et al., 2008). However, providing access to technology does not ensure quality interactions (Liu et al., 2007). What kind of technology is used, how it is used, and for what purposes determines the degree of social presence generated in online learning environments (Liu et al., 2007). To develop social presence, instructors have to choose appropriate media from a wide range for different activities in an online course (Biocca, Harms & Burgoon, 2003). The challenge lies in finding a good match between the affordances of the medium and the task at hand. The better the match, the better are the chances of establishing a higher social presence (Rice, 1993). However, one has to be cautious about the erroneous use of media as it may hinder the progress of social presence (Mayer, Griffith, Jurkowitz, & Rothman, 2008).

Havice, Davis, Foxx and Havice (2010) define multimedia as “a blending of text, audio, video, and dynamic motion” (p.54). Multimodal discussion forums include both auditory and visual messages. These forums are different from the traditional text-based forums as they support a variety of media to support engaging conversations. The broader aim of this research is to investigate the social presence and compare its manifestation within different modality online discussions. Additionally, the study explores how the students and instructor used multimedia to establish their social presence. To achieve this objective, I draw on a broader definition of social presence and focus on both the media based pedagogical strategies and the media tools that enhance instructors’ and their students’ social presence. A socio-constructivist lens was used to view the teaching-learning environment, and answer the following three inter-related questions:

1. How is social presence manifested in different modality online discussions?
2. How do students and instructors use multimedia to support the development of

social presence?

3. What were students' views on using multimedia in an online course?

### **Conceptual Framework**

Online education is relatively a young field in the area of research. Many frameworks have informed the growth of online education over the years. Three popular theories shape the development of this study, the theory of social constructivism (Vygotsky, 1978), the social presence theory (Short et al., 1976), and the social network analysis (Moreno, 1934). The theory of social constructivism was used as a lens to view the teaching-learning environment. The social presence theory was used to understand the communication behaviors that contribute to the development of social presence in an online course. The social network analysis was used to determine the patterns of interaction within the community.

**Social constructivism.** Distance education has evolved over the years from its first generation postal correspondence to the fifth generation flexible online learning that incorporates web 2.0 tools (Anderson & Dron, 2011). An epistemological and theoretical foundation of socio-constructivist view of learning has influenced the design of present generation online learning. Socio-constructivist principles provide a useful framework to understand online courses that are collaborative, learner-centered, experiential in nature, and provide numerous opportunities for interaction and reflection (Huang, 2002).

There are various models and theories that are placed together under the umbrella term of 'social constructivism' and these theories primarily stem from the work of Dewey and Lev Vygotsky (Anderson & Dron, 2011). Anderson and Dron (2011) have summarized the common themes found under the socio-constructive view of learning as:

New knowledge as building upon the foundation of previous learning, context in shaping learners' knowledge development, learning as an active rather than passive process, language and other social tools in constructing knowledge, metacognition and evaluation as a means to develop learners' capacity to assess their own learning, learning environment as learner-centered and stressing the importance of multiple perspectives, knowledge needing to be subject to social discussion, validation, and application in real world contexts. (para. 13)

The role of the instructor within the socio-constructive paradigm is that of a facilitator and a guide. When beginning an activity, the learner depends on the experience of a more abled individual with more experience (Steiner & Mahn, 1996, p.192). An online instructor usually allows a learner to be autonomous, self-directed, and provides opportunities to create a custom learning environment. Kanuka and Anderson (1999) explain the role of an online educator as someone who plays the role of a guide and a facilitator. The role of an instructor is similar to a designer of learning experiences.

According to social constructivists, interaction is central to learning, and participation in discourse leads to the construction of knowledge (Ling, 2007). The technology helps a learner to draw on thousands of resources from real life and reflect on his or her learning. The distinct feature of the design of online courses influenced by the socio-constructivist view of learning is innumerable opportunities for interaction and collaboration within an online course. Discussion forums become a pivotal tool by providing a space for community and relationship building. Most of the meaning making happens through discussion forums in these online courses. Discussion forums is a critical piece of these online courses as it allows individuals to explain their previous knowledge, defend their viewpoint, explore issues, elaborate thoughts, and integrate ideas that lead to higher order thinking (Rourke & Anderson, 2002). Additionally, reviewing other members' previous posts provides an opportunity for students to reflect on the

course and what they learned (Mac Knight, 2000).

Social interaction is a central tenet of all the socio-constructivist theories. However, not much attention is paid to developing quality social interaction in online courses, as it is a common belief that interaction will happen by default (Kriejns et al., 2003). One construct that influences the nature of interaction and formation of a community in online courses is the social presence (Swan, Garrison & Richardson, 2009). Social presence is the glue that binds the community together by making its members feel acknowledged and safe in a trusted environment. Social presence theory discusses the evolution of the construct and how it informs interaction.

**Social presence theory.** The construct of social presence has evolved over the years and has been understood differently. The trajectory of social presence is described under three different eras where the researchers and theorists built upon the previous understanding of the concept (Oztek & Brett, 2011).

The first era of social presence (the 1960s and 1970s) began with the conceptualization of this abstract concept. Stemming from the field of social psychology, the social presence theory proposed by Short, Williams, and Christie (1976) defined social presence as the “degree of salience of the other person in a mediated communication and the consequent salience of their interpersonal interactions” (p. 65). Short et al. (1976) viewed social presence as an attribute of communication media. Certain communication media such as television, with both video and audio capabilities, were perceived to have a higher social presence than others. They suggested that every communication medium has a social presence that contributes to the level of intimacy. The two psychological concepts ‘immediacy’ (Wiener & Mehrabian, 1968) and

‘intimacy’ (Argyle & Dean, 1965) are related, and both contribute to social presence.

When social presence theory was used to understand Computer-Mediated Communication (CMC), researchers concluded that the lack of non-verbal cues made the environment highly impersonal and hostile (Walther & Parks, 2002).

In the second era (the early 1990s), researchers contended that earlier social presence research did not account for different social settings, processes, and purposes (Walther, 1992). Gunawardena (1995) defined social presence as a degree to which people are perceived as ‘real’ in a CMC environment. She argued that social presence is a determinant of students’ perception of presence rather than its medium capabilities (Gunawardena, 1995; Gunawardena & Zittle, 1997). Gunawardena and Zittle (1997) conclude that:

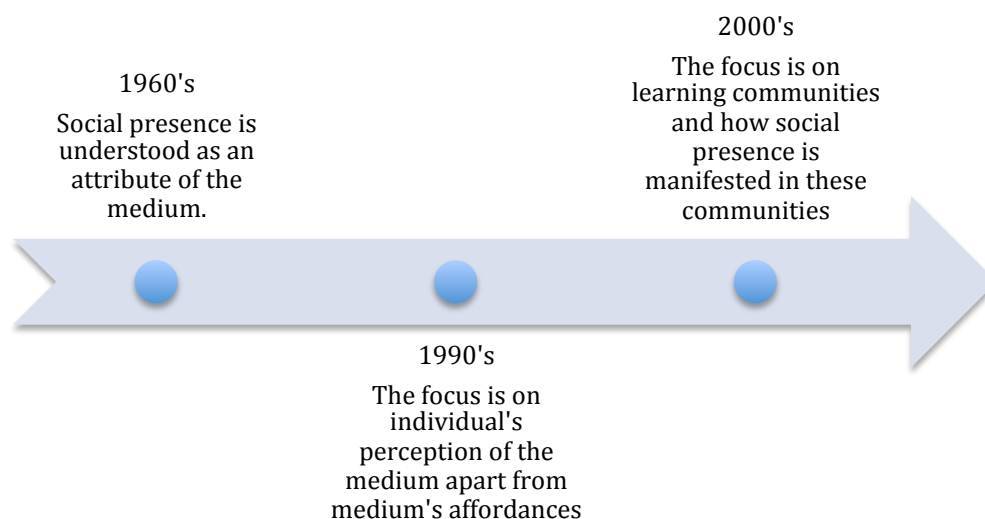
Despite the low social bandwidth of the medium [Text-based discussion forum], users of computer networks are able to project their identities, whether ‘real’ or ‘pseudo’, feel the presence of others online, and create communities with commonly agreed upon conventions and norms that bind them together in exploring issues of common interest. (p. 11)

Williams (1976) discussed how the appropriateness of the communication medium could not be measured or assessed on a single dimension. The choice of communication medium should depend on the degree of the medium’s social presence and the task. For those tasks that require more intimacy, the medium that affords less immediacy is more suitable for example a telephone instead of a television (Williams, 1976).

The third and the current era defines social presence as a construct focused less on the medium itself, but more on how individuals work with the medium based on their prior experiences (Gunawardena, 1995; Tu, 2000). The focus of this era is more on how



an individual uses the tools available to him to collaborate and learn (Oztok and Brett, 2011). Figure 1 below illustrates these three eras and conceptions of social presence on a timeline.



*Figure 1.* The three eras of conceptualization of social presence by Oztok and Brett (2011).

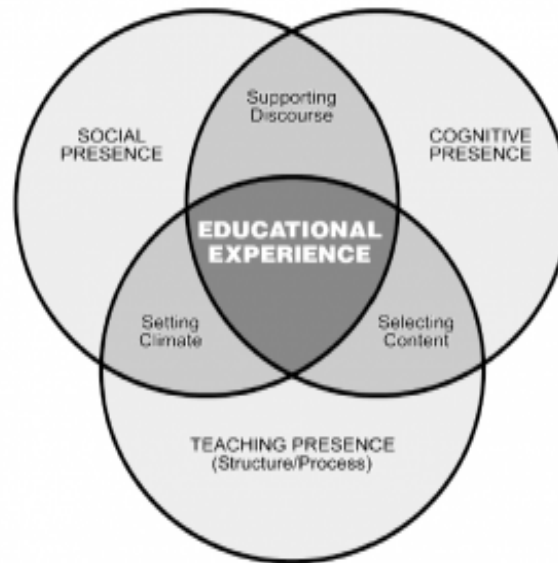
Garrison, et al. (2000) defined social presence as the ability of the students to present themselves in an online environment as ‘real people’. Garrison, et al. (2000) state:

We do not believe that the effect of media per se is the most salient factor in determining the degree of social presence that participants develop and share through the mediated discourse. Rather, the communication context created through familiarity, skills, motivation, organizational commitment, activities, and length of time in using the media directly influence the social presence that develops (p. 94)

Online interactions are mediated through technology. Therefore, a discussion forum is a pivotal space for students enrolled in an online course to make themselves visible and engage in discourse. Grounded in a socio-constructive theory of learning, the Community of Inquiry (CoI) framework focuses on ways by which meaning is

constructed through online discussions. Annand (2011, p. 49) states that the CoI framework “has evolved from the description of a learning process within a social constructivist paradigm to an empirically testable construct in an objectivist paradigm.” The model provides a process-oriented approach to understanding the elements of online learning experiences. According to the framework, the online community exists to support constructive learning experiences, and social presence is an integral part of the framework.

There are several reasons for choosing the CoI framework for this study. First, it is one of the most commonly referenced frameworks to study online environments and social presence (Annand, 2011; Maddrell, Morrison & Watson, 2011; Oztek & Brett, 2011; Swan et al., 2008). Second, the CoI framework has been specifically developed to understand inquiry-based learning in online environments (Stein et al., 2007). Third, the CoI framework is aligned with the pedagogical and epistemological orientation of the online course, which is the focus of this study. The online course that is the focus of the study adopts a collaborative-constructivist approach towards learning and is in alignment with the core of the framework (Swan, Garrison & Richardson, 2009). According to the framework, online community emerges because of the relationship between three interdependent elements of online learning: social presence, teaching presence and cognitive presence (Arbaugh, Bangert & Cleveland-Innes, 2010). Therefore, all three elements are essential for a valuable online learning experience. Additionally, each element is interdependent and overlaps with the other two elements.



*Figure 2.* The Community of Inquiry framework from Garrison, Anderson & Archer (2000).

Social presence defines the ability of students to present themselves in an online environment as “real people” (Rourke, Anderson, Garrison & Archer, 2001). Analyzing text-based communication through quantitative content analysis technique, Garrison et al. (2000) posited three categories of social presence: affective expression, open communication, and group cohesion. Rourke et al. (2000) took the concept further and revised these categories for easier identification through content analysis. They explained that an affective expression could be indicated by the number of affective responses, open communication by the number of interactive responses, and group cohesion by the number of cohesive responses. Affective responses include those responses that exhibit cordiality, intimacy, and openness in a discussion forum. Use of emoticons, humor, and disclosure of personal information are examples of affective expression. Interactive responses are those responses that are in response to others in a thread. Building upon someone’s response, complimenting, referring to others, expressing agreement, and

appreciation are all examples of open communication (Rourke et al., 2001). Lastly, cohesive responses are those responses, which display a sense of community. Examples of this kind of response are the use of inclusive pronouns and comments that refer to the group as a whole. Garrison (2011, p. 34) defines the revised social presence as “the ability of participants to identify with the group or course of study, communicate purposefully in a trusting environment, and develop personal and affective relationships progressively by way of projecting their individual personalities.” Social presence contributes to the development of cognitive presence by creating safe spaces where learners can freely connect to discuss problems and develop a sense of community (Garrison, 2007).

The second component of the framework is the cognitive presence that is defined as the ability of students to construct meaning and create knowledge in the online learning environment. Garrison et al. (2001) by using content analysis technique assessed the quality of discourse within online forums. Cognitive presence is operationalized and represented through a practical inquiry model that includes four phases of inquiry: triggering event, exploration, integration, and resolution (Garrison et al., 2001). To understand and assess the level of discourse in online courses, researchers have used a practical inquiry model. Garrison et al. (2001) contend that practical inquiry model develops sequentially: first, a 'triggering event' causes students acknowledge a problem or face some confusion 'exploration' provides an opportunity to understand the problem individually and collectively through discussions. 'Integration' follows through a construction of meaning. Finally, 'resolution' comes about when learners apply knowledge to some other relevant context or defend their solution. To prevent the

discussions from becoming 'serial monologues,' constant reviewing, steering, and feedback are required; hence, there is a need for a facilitator or a teacher (Pawan et al., 2003).

The last element of CoI framework is the teaching presence. Teaching presence defines the tasks and the role of an online teacher that is instructional design and organization, facilitation, and direct instruction (Anderson, Rourke, Garrison & Archer, 2001; Arbaugh, Bangert & Cleveland-Innes, 2010). Establishing curriculum, designing rules of engagement, providing timely information and monitoring are all activities associated with active teaching presence (Anderson et al., 2001). Zhan and DeMontes (2007) explain each category and its indicators under teaching presence.

The prime responsibility for providing teaching presence vests with the instructor, even though multiple participants may provide teaching presence as the course progresses (Marks, Sibley & Arbaugh, 2005). Shea et al. (2006) suggest that 'teaching presence' forms the core of the instructor's role. Garrison et al. (2010) explain the responsibilities under 'teaching presence' in order of priority. The first responsibility of the online instructor is to establish curriculum, timelines and learning activities. The second responsibility includes tasks such as monitoring and fostering collaboration. The third responsibility is to help learners reach the intended learning outcome and to provide timely information.

Table 1 below shows the categories underneath each of the three presences required to the development of CoI. These categories describe the nature of the

composition of elements. The indicators help the coders to identify these elements in an online learning environment.

Table 1.

Elements of CoI framework from Garrison, Anderson & Archer (2000).

Elements	Categories	Indicators (Examples only)
Cognitive presence	Triggering Event Exploration Integration Resolution	Sense of puzzlement Information exchange Connecting ideas Apply new ideas
Social Presence	Emotional Expression Open Communication Group Cohesion	Emotions Risk-free expression Encouraging collaboration
Teaching Presence	Instructional Management Building Understanding Direct Instruction	Defining and initiating discussion topics Sharing personal meaning Focusing discussion

To identify these three presences in an online learning environment, Garrison et al. (2000) have identified a set of key indicators for each presence. Indicators are described as certain keywords or phrases to identify each element and were developed from the transcript analysis of computer conferencing. Through an iterative content analysis process, the indicators are further explained by examples and operational definitions. The indicators described in Table 1 above serve as a guide for researchers to locate and distinguish these elements from each other. Table 2 below explains definitions and examples of each indicator under social presence.

Table 2.

The categories and indicators of Social Presence from Rourke, Garrison & Archer (2001)

Category	Indicators	Definition	Example
Affective	Expression of Emotions	Conventional expressions of emotion or unconventional expressions of emotion, includes repetitious punctuation, conspicuous capitalization, emotions.	"I just can't stand it when ....!!!!" "ANYBODY OUT THERE !"
	Use of Humor	Teasing, cajoling, irony, understatements, sarcasm	The banana crop in Edmonton is looking good this year
	Self-disclosure	Presents details of life outside of class, or expresses vulnerability.	"Where I work, this is what we do ..." "I just don't understand this question"
Interactive	Continuing a thread	Using reply feature of software, rather than starting a new thread	Software dependent, e.g., "Subject: Re" or "Branch from"
	Quoting from others' message	Using software features to quote others entire message or cutting and pasting selections of others' messages	Software dependent, e.g., "Martha writes:" or text prefaces by less-than symbol <.
	Referring explicitly to others' messages	Direct references to contents of others' posts	"In your message, you talked about Moore's distinction between ..."
	Asking questions	Student ask questions of other students or the moderator.	"Anyone else had experience with WEBCT?"
	Complimenting, expressing appreciation	Complementing others or contents of others' messages	"I really like your interpretation of the reading"
	Expressing agreement	Expressing agreement with others or content of others' messages.	"I was thinking the same thing, You really hit the nail on the head"
Cohesive	Vocatives	Addressing or referring to participants by name	"I think John made a good point." "John, what do you think?"
	Addresses or refers to the group using inclusive ...	Addresses the group as we, us, our, group	"Our textbook refers to ..." "I think we veered off track ..."
	Phatics/Salutations	Communication that serves a purely social function: greetings, closures	"Hi all" "That's it for now" "We are having the most beautiful weather here"

Social presence theory has proven to be helpful in comprehending how media can provide a rich, close, and connected experience to students (Frisby, Limperos, Record, Downs & Kerckmar, 2013). A large number of studies assess social presence in a community through content analysis, questionnaires or surveys. However, all these methods overlook an important element of community formation i.e. interaction patterns (Rabbany, Takaffoli & Zaïane, 2011). Research is consistent in advocating the use of various methods to capture the different forms of social presence in an online course (Cui, 2013; Lowenthal & Dunlap, 2009; Shea et al., 2010). One method that helps in understanding finer nuances of interaction patterns and complements the social presence-coding instrument is Social Network Analysis (SNA) (Choi & Strobel, 2012; De Laat et al., 2007).

**Social network analysis.** Research suggests that in a strong community, learners interact in a more cohesive manner. In this study, I have used SNA to determine the positions of individuals within a learning network. SNA helps in making sense of the social environment by uncovering the patterns of the relations between the participants (Wasserman & Faust, 1994). Social network analysis (SNA) is gaining popularity as a technique to determine both visual and statistical analyses of relationships (Shea et al., 2010). This methodology is especially useful in understanding community relationships, and relational patterns (Scott, 2013). Additionally, SNA is suggested to complement the content analysis to gain insight into online teaching and learning (Shea et al., 2010; Zhu et al., 2015).

A 'Social Network' is defined as "a set of socially relevant nodes connected by one or more relations" (Marin & Wellman, 2011, p.11). The relations are illustrated



visually through the edges in the network that connect the nodes. The relations have a direction representing the flow of information and a strength representing the importance of the node (Rabbany, Takaffoli & Zaïane, 2011). Succinctly, it is a technique to determine ‘who is talking to whom’ (Schreurs, 2014). The theory of social network dates back to early 1930’s and has been a relevant concept across disciplines and across social groups (Wasserman & Faust, 1994). Moreno’s invention of a ‘Sociogram’ in 1930’s laid the foundation for this technique of data analysis. A Sociogram is a visual representation of relationships between individuals in a network. Theoretically speaking, some researchers do not consider this as a theory but rather an overarching technique to study the social interaction patterns (Otte & Rousseau, 2002). However, others contend that SNA has a rich theoretical background embedded in the concepts such as social groups, isolation, social capital, position, cohesion, and popularity (Wasserman & Faust, 1994).

There are certain key concepts that are central to the discussion of SNA. The ‘constitution’ of the network determines who has access to what information and can help the researcher determine the power structure within a network. All ‘ties’ together define the ‘constitution’ of a network (Schreurs, 2014). The relationship ‘tie’ is the connection between various ‘actors’ within a network. A strong relationship ‘tie’ between actors helps in providing emotional support and intimacy (Kivran-Swaine et al., 2011). ‘Actors’ are social entities engaged in a conversation. These entities could be individuals, groups, organizations, cities, or nations (Wasserman & Faust, 1994). Thus, the social network analysis can help understand the position of individuals in the group, the strength of the ties in the group, and the overall constitution of the network i.e. denseness or sparseness

of a network (Schreurs, 2014). In this study, I have used SNA to determine the positions of individuals within a learning network.

Recently, SNA is gaining momentum as a method to understand the patterns of interaction within communities of inquiry. A few recent studies reported in the next few paragraphs made use of SNA along with content analysis to understand the development of a 'presence' in an online environment. In a study conducted by Shea et al. (2013), the researchers utilized both SNA and content analysis to study the new construct called 'learning presence' within the CoI framework. They concluded that students who exhibited more learning presence were able to hold more central positions in the discussion forums.

Similarly, Kovonic et al. (2014) used SNA to explore the links between the social network position and social presence. The data comprised of 1751 online discussion posts made in six different semesters of a graduate level engineering course. A total of 81 students participated in this study. The researchers concluded that the degree centrality measure was significantly related to all the three categories of social presence. However, they found that the strongest predictive relationship was between interactive presence category of social presence and the degree centrality measure. Kovanović et al. (2014, p.6) argue that "the students who exhibit a high level of interactive social presence have higher chances of 'provoking' a response from the other students."

Cho and colleagues conducted a study to determine the antecedents of a collaborative social network (Cho et al., 2007). The data for their study came from a multiyear Computer Supported Collaborative Learning (CSCL) project that aimed at the

development of communications skills of its participants who were located in two different locations. The researchers concluded that personal communication style and pre-existing social networks influenced the development of a collaborative social network. However, they found that personal communication style has no influence on an individual's degree of centrality in a network. Students' who enjoyed a central position in the learning network demonstrated a "higher rate of learning performance (p. 314)."

There are several researchers who have used both Social Network Analysis (SNA) and content analysis to understand the finer nuances of interaction patterns in a community (See An, Shin, & Lim, 2009; Choi & Strobel, 2012; De Laat et al. 2007; Tirado, Hernando, & Aguaded, 2015; Wu, Gao, & Zhang, 2014). SNA is one of the techniques to determine the patterns of the social engagements and better understand the flow of the conversations. This data analysis technique is gaining momentum to determine the manifestation of social presence in online learning networks (Choi & Strobel, 2012). Since the interactive category of social presence focuses on follow-up responses made to original posts, the use of SNA in this study will strengthen the understanding of the manifestation of social presence by capturing the interaction patterns.

To summarize, Chapter 1 situated the study within the broader field of inquiry. In this chapter, I gave an overview of my study by going over the research questions, and the theoretical frameworks used to guide the development of this study. The next chapter reviews the relevant literature. Furthermore, I discuss the limitations of the previous studies and the significance of the current study. Chapter 3 discusses the methodology used to answer the research questions. Chapter 4 will uncover the findings from the data

analysis, and the last chapter discusses the significant findings in detail and situates them within the current body of literature.

## **Chapter 2**

### **Literature Review**

In this chapter, I review social presence and various variables associated with it. I begin by reviewing the growing issue of social isolation in the field of online education. Later, I discuss the definitions and measures of social presence. Finally, I review the role of multimedia in fostering social presence within online courses. To conclude this chapter and to situate my study, I identify gaps in the current research.

#### **Social Isolation**

Four decades ago, social constructivists argued that learning is essentially a social endeavor (Vygotsky, 1978). However, online education is still critiqued for the lack of a community or social connections. Student connections and building a community in online courses is often an ignored endeavor, as it believed to just happen on its own (McInnerney & Roberts, 2004). Many researchers have defined connectedness or the lack of it in many different ways. According to Bollinger and Inan (2012, para. 6), “Connectedness is the sense of belonging and acceptance. It refers to a person’s belief that a relationship exists between him or her and at least one other individual.” Biordi and Nicholson (2008, p.85) define social isolation as “distancing of an individual either physically or psychologically, or both, from his or her network of desired relationships or needed relationships with other persons.” Bunn (2004) specified two kinds of isolation in online courses a) isolation from faculty and b) isolation from fellow students. Isolation from faculty is experienced when students feel distanced from the faculty due to the lack

of face-to-face contact or facial cues and delayed feedback. Isolation from fellow students occurs due to lack of peer support and absence of a community.

This feeling of isolation has an enormous impact on student satisfaction and learning from online courses (Daughtery & Funke, 1998; Sikora & Carroll, 2002). Some researchers claim that this feeling of isolation is a critical factor in differentiating the successful online courses from the unsuccessful ones (McInnerney & Roberts, 2004). Since, the feeling of isolation has a deep impact on the attitude of student learners, many researchers argue that high attrition rate in distance education is also due to the sense of social isolation experienced in these courses (Boulos, Taylor, & Breton, 2005; Bunn, 2004; Carr, 2000; Curry, 2000; Rovai & Whighting, 2005; Song, Singleton, Hill & Koh, 2004; Tsai, Kim, Liu, Goggins, Kumalasari & Laffey, 2008; Wegrif, 1998). There is a growing body of literature that discusses the reasons for experienced isolation in online courses and the measures that should be in place to help alleviate this feeling.

There are many reasons for the experienced feeling of isolation in an online learning environment. Some researchers argue that isolated assignments and limited opportunities for interactions lead to a lack of shared values hence inhibiting the formation of a community (Barr & Miller, 2013). Students also feel frustration and anxiety due to technical difficulties and a lack of clear feedback from online instructors (Hara & Kling, 2001; Mark & Anthony, 2007). Students' reasons for taking the course and employment status were also found to be contributing to this feeling (Shea, 2006). Students' previous experience with technology and students' personality are also cited as the determinant factors of this feeling (Cereijo, Young & Wilhelm, 2001).

There is no confirmed formula or a ‘mix’ in place to diminish the feeling of isolation experienced by students in an online environment. The review of literature confirms that interaction is not only a primary variable in the distance education literature, but it also holds a prominent place in all the measures suggested to reduce the feeling of isolation (Arbaugh, 2002; Bunn, 2004; Muilenburg & Berge, 2005; Rovai, 2001; Vrasidas & McIssac, 1999). However, not all kinds of interaction curb the feeling of isolation.

Research suggests that the two variables that help in understanding the quality of interactions in online environments are social presence and transactional distance (Rovai, 2001; Vrasidas & McIssac, 1999). Both these variables help in understanding the psychological distance experienced by learners and the instructor in distance education on a continuum. In the next section, I discuss the theory of transactional distance followed by the definitions and measures of social presence.

### **Theory of Transactional Distance**

Michael Moore introduced the theory of transactional distance to explain the geographic separation of an instructor and his/her students as a pedagogical and psychological concept. The greater the transactional distance, the greater is the scope for misunderstandings, confusions, and feelings of isolation. “Transactional distance is a continuous rather than a discrete variable, a relative rather than absolute term” (Moore, 1992, p.22). Moore (1992) suggested that transactional distance varies with every learner, course, and instructor. Students enrolled in the same course may experience different levels of transactional distance. Additionally, increased perception of social presence will

also lead to decreased transactional distance. The goal of any online instructor should be to reduce this transactional distance by manipulating the determinants of transactional distance. Moore (1993) postulated three variables, 'structure,' 'dialogue,' and 'autonomy,' as the determinants of transactional distance. He writes:

The extent of transactional distance in an educational programme is a function of these three sets of variables. These are not technological or communications variables but variables in teaching and in learning and in the interaction of teaching and learning. These clusters of variables are named Dialogue, Structure, and Learner Autonomy (p. 23)

A dialogue defines the positive interactions aimed towards improving the quality of the course, eliminating confusions, and misunderstandings. Therefore, no negative interaction can be termed as a dialogue. Dialogues are appreciated and valued by both teachers and learners, and such interactions are usually built upon each other's contributions. Dialogues are not social conversations but the interaction that aims to improve student understanding. Lowell (2004) differentiates between dialogue and social presence. Since social presence includes social conversations, social presence is not equivalent to dialogues but a much broader concept (Lowell, 2004). As Moore (1993) argues that modification of communication media can impact interaction and transactional distance. Therefore, it can be concluded that increased social presence may foster dialogue in online courses.

According to the theory of transactional distance, there are three distinct types of interactions in distance education, learner-content, learner-learner, and learner-instructor (Moore, 1993). The learner-content interaction being central to education is considered the most important variable and carries more weight during the process of course design. The second kind of interaction is between an expert and a novice or between a learner and



an instructor. The third type of interaction, the learner-learner interaction, becomes extremely crucial for those online courses that are collaborative and interactive in nature (Moore, 1989). However, some argued that Moore failed to consider the fourth type of interaction that happens between learner and the channel. Hence, the learner-interface interaction was suggested as an addition to the already existing three types of interactions (Hillman, Willis, & Gunawardena, 1994)

The second element of transactional distance is the structure or how an online course is designed. The extent of the structure is dependent upon many variables like the communication medium used, and personality traits of the instructor and the students, and instructor's teaching philosophy, course objectives, etc. (Moore, 1993). The programs that are less structured are flexible in nature and offer more opportunities for the instructor and students to engage in a discourse and negotiate meanings. Rigid programs are more structured with prescribed course goals and activities, and are less accommodating to individual needs (Falloon, 2011).

Contingent upon the first two determinants is the third determinant of transactional distance, i.e. 'learner autonomy' (Falloon, 2011). On a continuum, absolute learner autonomy is defined as a situation where "in the teaching/learning relationship it is the learner rather than the teacher who determines the goals, the learning experiences, and the evaluation decisions of the learning programme" (Moore, 1993, p. 31). Simply defined, learner autonomy is the ability of the students to take control of their learning and make decisions about their learning preferences and experiences. Traditionally, due to the lack of interactive technologies, distance education pedagogy was teacher-centered

and gave little to no control to the learner (Moore, 1993). However, with the proliferation of new technologies, students can now customize their own online education.

The theory of transactional distance discusses the interplay of these three interdependent variables and how these variables affect each other. Increased structure in the course will lead to less dialogue, thus increasing the transactional distance between learner and teacher (Saba & Shearer, 1994). Consequently, a decrease in structure will yield more interaction leading to a reduced transactional distance. Moore (1993) writes, "When a program is highly structured, and teacher learner dialogue is non-existent the transactional distance between learners and teachers is high" (p. 27). On the other hand, transactional distance and learner autonomy are directly related. An increase in dialogue also leads to an increase in autonomy.

Both Transactional distance theory and social presence theory focus on learner experience in online environments and complement each other. The theory of transactional distance provides a wider framework for understanding the elements of distance education. In one way, Social presence theory could be seen as a part of the transactional theory focusing on the interaction that reduces social isolation and builds community. However, some researchers also contend that Garrison et al. (2001)'s conception of the intersection of social presence and teaching presence within the CoI framework includes all the three elements (dialogue, structure, and autonomy) of transactional distance theory (Shearer, 2009). The next section discusses the definition, measurement, and relevant literature related to social presence.

## Social Presence

**Definition.** Social presence is a broad, multidimensional construct. Researchers and theorists have understood the construct differently with the definitions of the construct still evolving (Lowenthal, 2010; Rettie 2003; Tu, 2002). There are so many amorphous variables related to the social presence that, “it is often hard to distinguish between whether someone is talking about social interaction, immediacy, intimacy, emotion, and/or connectedness when they talk about social presence” (Lowenthal, 2010, p. 125). There are two common viewpoints prevalent when it comes to understanding the concept. The first refers to social presence as an attribute of the medium; the second refers to the behaviors and perceptions of individuals when interacting in a mediated environment (Gunawardena, 1995).

Initially, Short et al. (1976) defined social presence as “the salience of the other in a mediated communication and the consequent salience of their interpersonal interactions” (p. 65). They hypothesized that every medium had its associated social presence. The degree of perceived social presence is based on the ability of a medium to transmit nonverbal and verbal cues (Gunawardena, 1995). The spatial notion of social presence was linked to the quality of the media, i.e. a certain kind of media may have a high or low social presence. For example, television was hypothesized to have a higher degree of social presence as compared to radio (Short et al., 1976). Short et al. (1976) acknowledge that the premise of social presence rests on two psychological concepts of 'intimacy' and 'immediacy'.

Intimacy is influenced by eye contact, physical proximity and the theme of the discussion (Tu, 2002). These are non-verbal gestures made by an individual such as a

smile, a gaze or a head nod to maintain closeness in an interaction (Argyle & Dean, 1965). To avoid an awkward or uncomfortable situation, individuals keep altering their behaviors to maintain an optimal level of comfort in the conversation. This process is called equilibrium (Argyle & Dean, 1965). Social presence of the communication medium contributes to this intimacy by its ability to transmit these cues such as a gaze, etc.

According to Gunawardena (1995, p.151), “Immediacy is a measure of the psychological distance which a communicator puts between himself or herself and the object of his/her communication.” An individual can convey immediacy verbally or non-verbally. Verbal immediacy is produced by the choice of certain words and inflection in tone, for e.g. using ‘we’ instead of ‘I’ and ‘you’. Verbal behaviors like asking questions, referring people by their names, sharing personal stories, and initiating conversations lead to the development of immediacy and a "sense of psychological closeness" (Woods & Baker, 2004, para. 13). Non-verbal immediacy discusses physical behavior that communicates immediacy or psychological closeness, i.e. smiling, leaning in when talking to someone (Mehrabian, 1968). Immediacy was later understood in two different forms, technological and social. Technological immediacy is related to the capacity of the medium to carry a maximum amount of message. While technological immediacy is fixed and inherent, social immediacy can be altered by verbal and non-verbal behaviors (Heilbronn & Libby, 1973). Immediacy behaviors contribute to intimacy and thus impact social presence.

The second definition of social presence emerged with the evolution of technology. Social presence also came to be understood as a factor of the medium as well

as participants' perceptions of the medium (Gunawardena & Zittle, 1997). Social presence emerged as a multidimensional concept, instead of how it was conceived earlier (Biocca, Burgoon, Harms & Stoner, 2001; Richardson & Swan, 2003; Rourke et al., 2001; Swan & Shih, 2005). Tu and McIssac (2002, p. 2) defined social presence as a degree of "perception", "reaction" and "feelings" to another entity in a CMC environment. Tu (2002) discussed three dimensions of social presence as social context, online communication, and interactivity.

The first dimension 'social context' describes the qualities of students and the environment in which communication takes place. Variables like experience with computers, student interest, tasks at hand, privacy, etc. will fall into this dimension. For example, a more private setting will lead to a higher degree of perceived social presence. The second dimension 'online communication' refers to attributes and applications of the language used in an online environment. People comfortable with an online environment will be less stressed about communicating in the new medium. Tu (2002) suggests training students to work with computers and icebreakers to get students comfortable with the online environment. Finally, the third dimension 'interactivity' includes all the communication activities and user's communication styles. He suggests that delayed responses in asynchronous communication lead to a feeling of low interactivity, thereby decreasing the perception of social presence.

Many other definitions of social presence evolved in the later years. Biocca, Burgoon, Harms, and Stoner (2001) in their study argue that social presence should not be only dependent on the medium but all the other essential properties of communication. They discuss social presence as a result of four variables. These variables are the social

richness of the medium, social involvement, social relations, and behavior. Nowak (2001) introduced the concept of co-presence and described it as a medium attribute and ‘social presence’ as a concept related to the psychological connection. Rourke et al. (2001) discussed social presence as the ability of students to project themselves as ‘real’ people in a community of inquiry. This ability of participants is further explained by Garrison (2009) as “the ability of participants to identify with the community (e.g., a course of study), communicate purposefully in a trusting environment, and develop interpersonal relationships by way of projecting their individual personalities” (p. 352). In summary, Lowenthal (2010) suggests that the concept of social presence falls on a continuum with a sense of physical existence on one end and interpersonal emotional connection on the other end.

Though minor, the differences in defining social presence are essential (Ice, Gibson, Boston, & Becher, 2011). Oztok and Brett (2011) indicate a “need for a well-defined conceptualization of social presence to support systematic investigations” (para. 36). The definition of social presence lays a foundation for its measurement. The next section discusses different measures of social presence.

**Measures of social presence.** The measure of a construct is directly tied to the conceptual understanding of the construct. Just like the definition of social presence, there is no one-way to measure social presence (Lin, 2004; Stein & Wanstreet, 2003). Short et al. (1976) developed a self-report measure that asked participants to evaluate the properties of a medium to foster social presence. The questionnaire used a seven-point bipolar scale with options such as warm/cold, sensitive/insensitive etc. This measure was aimed to measure social presence as a determinant of the medium only and was later

critiqued by many researchers (Walther, 1992, Gunawardena, 1995; Gunawardena & Zittle, 1997). Critiquing the Short et al.'s (1976) social presence scale, Biocca, Harms, and Burgoon (2003, p. 470) shared that Short et al.'s scale measures "media appropriateness" more accurately than social presence .

Working on the criticisms of the earlier version of the social presence scale, Gunawardena (1995) developed her scale to measure social presence. Her first study (see Gunawardena, 1995) measured students' perceptions of CMC environment or the medium. She came up with a seventeen-item, self-report survey, which included bipolar items and asked students to rate these items using a five-point Likert scale. Her later study that measured the construct of social presence more directly and holistically, Gunawardena and Zittle (1997) developed 'Global Ed Questionnaire' that included fifty-two Likert-scale items in addition to the earlier seventeen five-point bi-polar item scale that measured students' feelings towards CMC environment or the medium.

Critiquing Gunawardena and Zittle's (1995) method to measure the social presence, Tu (2002) argued that their study overlooked including important variables like privacy and context. Tying the concept of social presence to privacy, Tu (2002) proposed a new measure called 'Social Presence and Privacy Questionnaire (SPPQ)' to measure perceptions of social presence. Tu's scale had fifty-nine items with Likert scale format. The scale measured social presence on three dimensions, social context, online communication and interactivity, and online privacy. Online privacy showed the weakest correlation with the social presence, and Tu concluded that he was uncertain whether online privacy should be included in the dimensions to measure the perception of social

presence. Tu's SPPQ scale was critiqued for its applicability only in a text-based environment (Henniger & Viswanathan, 2004).

In another related study, Tu (2002) used an ethnographic approach to assess Chinese students' perceptions of social presence. He observed and conducted in-depth interviews with six graduate level students studying in the United States. Using his earlier framework, he explained his findings based on the three dimensions of social presence. He concluded that the level of social presence depends on how a user utilizes the CMC environment. Even though an attribute of a medium cannot be changed, the social presence can be fostered and altered by changing teaching strategies.

Focusing on the ability of participants to use CMC environments, through transcript analysis, Rourke, Anderson, Garrison, and Archer (2001) proposed a coding scheme to assess social presence. The difference was not only in terms of methodology but also, what was being measured. Instead of measuring participants' perception of social presence, Rourke et al. (2001) attempted to measure the communication behaviors that contributed to this presence. Through content analysis technique, they arrived at three different categories to measure social presence. A final set of categories included interactive expression, affective expression, and cohesive expression. They explain the process as:

First, behavioral indices were derived from the three categories of social presence articulated by Garrison et al. (2000), i.e., emotional expression, open communication, and group cohesion. Second, indicators of social interaction that had been derived from the media capacity, teacher presence, and group interaction literature were applied deductively to the analysis. Third, additional indices were deduced from careful readings of the transcripts and then added to the coding scheme. (p. 56)



No one method can adequately measure social presence. Many social presence scales measure other amorphous constructs along with social presence (Kreijns, Kirschner, Jochems, & Van Buuren, 2011). Research in the past recommends multiple measures should be used to understand the phenomenon more closely (Cui, 2013; IJsselsteijn et al., 2000; Lowenthal, 2012). In addition to conducting content analysis, this research includes students and instructor interviews to understand their viewpoint regarding the use of multimedia in the online course. The next section discusses the relevant research related to social presence.

### **Research on Social Presence**

There is an increasing body of research exhibiting the importance of social presence in online education (Cobb, 2009; Lowenthal & Dunlap, 2010). A review of literature confirms that there are several variables that influence the development of social presence in an online course. Subsequently, the degree of social presence in an online environment has numerous pedagogical implications.

Researchers in the past have studied the relationship between gender and social presence (Gefen & Straub, 1997; Richardson & Swan, 2003; Schermerhorn, Scheutz & Crowell, 2008), course design and social presence (Khurana & Boling, 2012; Swan & Shih, 2005; Tu & McIssac, 2002), instructor's facilitation strategies and social presence (Anderson et al., 2001; Aragon, 2003; Lowenthal & Parscal, 2008; Stacey, 2002), perceived cognitive learning and social presence (Richardson & Swan, 2003); student satisfaction and social presence (Gunawardena, 1995; Gunawardena & Zittle, 1997; Richardson & Swan, 2003), interaction and social presence (Swan & Shih, 2005; Tu &

McIssac, 2002) and the development of a community of learners and social presence (Rourke, Anderson, Garrison, & Archer, 2001; Rovai, 2002).

Since the aim of this study is to understand how multimedia contributes to the development of social presence. This section focuses on the on the definitions and the use of multimedia to develop social presence

**Definitions of multimedia.** Like social presence, there is no one definition of multimedia. Multimedia in education has been defined in a variety of ways. Simply explained multimedia is a combination of various forms of media such as text, image, picture, video, sound, graphic and more to communicate a message. Maddux, Johnson and Willis (2001) discuss that multimedia has to be created with a computer program and includes “text along with at least one of the following: audio or sophisticated sound, music, video, photographs, 3-D graphics, animation, or high-resolution graphics” (p. 253). Richard Mayer (2001) defines multimedia in his book, *Multimedia Learning*, stating,

I define multimedia as presenting both words (such as spoken text or printed text) and pictures (such as illustrations, photos, animation, or video). By words, I mean that the material is presented in verbal form, such as using printed text or spoken text. By pictures, I mean that the material is presented in pictorial form, such as using static graphics, including illustrations, graphs, diagrams, maps, or photos, or using dynamic graphics, including animation or video (p. 2)

Mayer (2001) further explains that it is important to understand the distinction between three different modes in order to understand the definition. The delivery mode describes the technology side of a multimedia message that is the hardware required to experience the multimedia, for example, a computer, projector, speakers, etc. The presentation mode discusses the media used to communicate a message, such as words

with graphics and text. The sensory mode focuses on the recipient of the information processing channels that an individual uses to process the information (Mayer, 2001).

**Research related to multimedia and social presence.** Mutation of both media content and media form influences social presence in different ways (Dillon, Keogh, & Freeman, 2002). Digital tools provide an opportunity to instructors to instill a sense of their personality in online learning environments without actually being there (Cunnigham, 2015). However, the success of creating social presence through these digital tools is dependent on the how the tools were used, for what purposes, and who used them.

Research suggests that development of social presence requires less effort when the learning environment has more social and emotional cues (Tu & McIssac, 2002). Therefore, many instructors and instructional designers have used multimodal tools to inject these cues in their text-based online learning environments. In this section, I review the studies that focus on the use of multimedia to develop the social presence. I review the literature in four separate sub-sections and then review the literature on the comparison of the manifestation social presence in different modalities. These sub-sections are a) Social media; b) Audio tools ; c)Video tools; and d) other multimodal tools.

***Social media.*** Social media tools are the tools that allow users to network and collaborate with others by a way of sharing information, pictures, interests, and ideas. Dunlap and Lowenthal (2009) conducted a study to assess the ability of ‘Twitter’ to increase social presence in an online course. They invited the students enrolled in an instructional design and technology course to participate in Twitter conversations. Based

on how their students used Twitter to communicate, they recommend using Twitter for free flowing, just-in-time interactions to create better social connections within an online course. However, their research is anecdotal in nature and lacks information about the sample.

DeSchryver, Mishra, Koehler, and Francis (2009) conducted a study to understand whether discussions hosted on a social media platform like Facebook instead of a LMS generates a higher perception of social presence among students. The study comprised of two online sections of an 'Introduction to Educational Psychology' course offered concurrently. The study found no difference between students' perception of social presence when posting messages on Facebook or the course LMS.

***Audio tools.*** Very few researchers have done work on understanding the relationship between social presence and audio tools. In a case study conducted by Ice et al. (2007), students received feedback in the form of text and asynchronous audio files. The audio feedback was shared publicly on the discussion forums and privately through emails via an attachment of .wav files. Seven online courses formed the sample for this study. Through a survey and interviews conducted at the end of the course (n=31), researchers found that most of the students felt that the audio feedback was more effective than the text feedback because of the vocal cues present in the instructor's voice. The findings indicate that students were extremely satisfied with embedded asynchronous audio feedback in comparison to the text only feedback. Student interviews revealed that the audio feedback had a strong association with enhanced learning, community interactions, and the perception of a more caring instructor. Additionally, the study reported that audio feedback helped students to retain the content.

These results were corroborated by a similar study conducted by Olesova et al. (2011) with an ESL/EFL audience. The study used a mixed method design with two groups of students studying in five weeklong online courses. During the first two weeks of online discussions, students received text-based individual feedback. In the latter two weeks, the text-based feedback was replaced by the audio feedback from the non-native English-speaking instructor. The results indicate that audio feedback was preferred over text-based feedback because students were clearer on the instructor's intent after hearing the tone and intonation of the instructor's voice. Additionally, students enjoyed the feedback and considered it more personal, and they were able to feel the instructor's care.

Keill and Johnson (2002) conducted a related study to compare feedback received via text-based email and through voice mail. Results indicated that students receiving feedback from voice mail had a significantly higher sense of social presence, but students preferred both methods of receiving feedback for their own merits.

Dringus et al. (2010) conducted a study to determine the use of Mini Audio Presentation (MAP) as an effective method of facilitation in discussion forums. The content of these MAPs included specific facilitation markers, specifically reinforcement, recognition, and reward. The sample for this study included thirty-four students studying in two online courses, namely educational technology and human computer interaction. The instructors posted audio files in the discussion forum at specific points, and a text summary of the same audio file was also posted in the discussion thread. The students responded to the survey created from the items from the facilitation discourse survey (Shea et al., 2006) and verbal immediacy survey (Arbaugh, 2001). The students' experiences with the audio indicated that they felt that the audio helped in clarifying the

content and provided a personal touch. Also, many students indicated that they preferred a combination of audio and text rather than just plain text-based discussions. Although the audio helped students to connect to the learning environment, students reported a low score on engagement.

***Video tools.*** Video tools have also proven to be helpful in establishing a perception of social presence in online courses. Griffiths and Graham (2009) assessed the use of asynchronous video as a channel of communication between instructor and students. Fifty pre-service teachers studying in the online section of ‘Effective integration of technology in teaching’ formed the sample for this study. Videos formed a major part of the instructional component of this online course, and students were also required to submit assignments in the form of videos. The instructor provided feedback to the students via private videos. Analysis of instructor satisfaction and student satisfaction surveys revealed that the instructors perceived that the use of asynchronous video allowed the instructors to establish immediacy, thus leading to a development of social presence in a community. Also, the use of online asynchronous videos strengthened the relationship between instructor and students, improved overall student learning, and provided context for one-on-one instructor student extended conversations.

Borup, Graham, and Velasquez (2011) conducted a study to understand the use of asynchronous videos to enhance social presence in blended courses. Through three different case studies in three different courses, where the students and instructor used different platforms (Facebook, VoiceThread, and a video blog) to communicate via private videos, the researchers concluded that the use of asynchronous video contributed towards students’ perception of social presence. However, the instructor reported that the

majority of the students appreciated one-on-one private video communication and personal connection. However, there were still a few students who did not appreciate the new mode of communication and still preferred text-based communication.

A recent study assessed the effects of presenting the instructor's face strategically instead of constantly in video lectures on social presence. Kizilcec, Bailenson, and Gomez (2015) conducted this two-part study. The first part involved an eight week long study in an open online course that required its 2951 registered learners to view instructor created lecture videos. Some students chose to watch the videos with the instructor's face some without the instructor's face. Building on this initial study, the next part of the study was a ten-week long study, which compared constant and strategic presentation of instructor's face in videos. In the strategic condition, the instructor's face appeared in the video to cover important parts of the content. In the constant condition video, the instructor's face was visible in the whole video. A majority of the learners confirmed that they prefer seeing instructor's face, but some students found it distracting. Learners in the strategic condition reported a higher perceived social presence as compared to the constant condition. However, this finding refutes the earlier understanding that higher the social cue higher is the perceived social presence. Kizilcec et al. (2015) state, "There could be a ceiling effect for the extent to which showing the instructor's face increases feelings of social presence." This may be an important finding and has implications to shape the look and feel of future online courses.

***Other multimodal tools.*** Lowenthal and Dunlap (2010) used digital storytelling to establish social presence in an online course. They used digital storytelling at the beginning of the semester for introduction purposes. They recommend activities like

‘soundtracks of your life’ and ‘What makes you rock?’ to establish instructor’s and students’ social presence in an online course. In the first activity, the instructor shared six soundtracks, two describing his/her past, two songs describing future, and two songs for the present. In the second activity, the instructor asked students to pick one song that helped them unwind or relax. The study lacks information on data and sample.

DuVall, Powell, Hodge, and Ellis (2007) conducted a study to understand if adapting online courses to students’ lifestyles will help establish learners as a part of a learning community. They discuss the pilot project called ‘ECU Text<sup>2</sup>Phone’ that integrated the texting service within the LMS in their study. A survey was used to evaluate the effectiveness of text messaging in an online environment. Students from three online courses participated in the study, and the study concluded that the affordances of text messaging to sustain communication and collaboration were instrumental in supporting a community. .

Cunnigham (2015) conducted a study to understand how Voki contributed to the perceptions of 40 students enrolled in an online writing course. Voki is an avatar-based program that lets users create their own custom avatars. The instructor in this study required students to post their Voki responses on a discussion thread. Through a self-report questionnaire, Cunnigham concluded that students felt that instructor's individual emails and feedback created a sense of presence way more than using Voki in discussion threads.

***Comparison of manifestation of social presence and modalities.*** Not much research is available that compares social presence communication behaviors in different modalities. King and Ellis (2009) conducted a study to compare social presence exhibited



in voice-based and text-based discussion threads in an online course. This quasi-experimental study had 86 undergraduate student participants. The students were required to make at least one voice-based post and one text-based post for every topic. In this online course, there was a total of seven discussion topics, and a total 4527 total discussion posts were created. All the voice-based posts were transcribed, and all the discussion posts were then coded for social presence using the scheme developed by Rourke et al. (2001). The researchers found higher social presence levels in the text-based discussions as compared to the voice-based discussions. However, cohesive indicators were considerably higher in the voice-based posts as compared to the text-based posts. The study also indicated that students preferred to create text-based posts to voice-based posts. One plausible reason for recorded low social presence in the voice-based discussions could be related to the transcription of voice-based messages into the text. Transcribing the voice messages into the text eliminates all the social and emotional cues in the voice that contribute to the development of social presence. Also, a reason for fewer voice messages as compared to the text-based messages could be related to the lack of training or hesitation to work with the new tool (Ching & Hsu, 2013).

Wu (2015) compared the social presence categories and the indicators within the voice-based and text-based discussions. All the discussions threads were transcribed and coded using social presence coding scheme. The study reported a higher level of cohesive and the affective categories within the text-based discussions as compared to the voice-based conversations. The researcher cites the inadequacy of the CoI framework for problems in identifying emotions in mediated communication as a reason for the witnessed low cohesive and affective responses. Wu (2015) writes, " If these elements

[pitch, timing, tone] which were used to express emotions are lost in the interaction data, the measurement of the affective categories may not be accurate for the voice-based interaction" (p. 257).

To summarize, most of the studies reviewed in this section focused on participants' perceptions of the tools or the medium rather than how they used the medium to project their real personalities. Most of the reported research relies heavily on self-report surveys and anecdotal experiences. Self-reporting tools such as surveys or questionnaires may not reflect participants' actual online behavior and therefore, may be ineffective in understanding social presence (Kizilcec et al., 2015). Also, in all these studies the instructors used these digital tools to meet the course objectives rather than the students. Online courses where students are given opportunities to use these digital tools to self-disclose or project emotions manifest social presence differently.

### **Limitations of Previous Research**

Social presence research suffers from conceptual and methodological limitations. The initial research on social presence produced inconclusive results with no agreed upon definition of the construct (Walther, 1992). The review of the literature reveals that most of the research conducted to understand social presence lacks in the use of grounded conceptual frameworks and proper protocol for data analysis (Looi & Ang, 2000). The existing research available studies social presence in isolation with no connection to the teaching and learning environment within which it develops (Garrison et al., 2010).

From the methodological point of view, the majority of the studies in the past used self-report techniques in the form of questionnaires or surveys to report findings.

Additionally, the focus of these studies was on user's perception of social presence rather than actual communication behaviors that contribute to the development of social presence. Researchers in the past have discussed social presence using quantitative results, and no particular attention was given to the qualitative description of the development of the construct and how it relates to other variables within an online learning environment (Denzin & Lincoln, 2005; Geertz, 1973; Oztek and Brett, 2011).

Although the use of multimedia in online education is growing rapidly, there is a huge paucity of research that informs its application to create satisfactory online learning experiences (Stodel, Thompson & McDonald, 2006). Researchers have expressed the need to move beyond the text to create the social presence in an online course (Aragon, 2003). To create an interactive and dynamic environment, many course designers and instructors use multimedia without being adequately prepared and informed (Borup, West & Graham, 2012). This could be due to a couple of factors. First, multimedia as a strategy to enhance social presence is still at a nascent stage. Second, the limited research that is available in this area is anecdotal, exploratory in nature, and lacks in scope and application.

Much of the research in the past implements a single tool/web based application to develop social presence (Dunlap & Lowenthal, 2009; Ice et al., 2007; Keill and Johnson, 2002; Lowenthal & Dunlap, 2010; Olesova et al., 2011). Many studies focus on the multimedia users' perception of social presence rather than what they do with the tools to establish their social presence (Borup et al., 2011; Lowenthal & Dunlap, 2009; 2010). In a majority of the studies, instructors were primarily responsible for the use of multimedia tools, thereby reducing students' role to a mere audience (Dunlap &

Lowenthal, 2009; Gellevij, Meij, Jong & Pieters, 2002). This literature review indicates a paucity of social presence research that focuses on students' use of multimodal tools to establish their social presence. This study fills this gap in the literature by focusing on the students' use of multimedia to foster their social presence.

Furthermore, limited research available in multimodal environment transcribes the multimodal data in the community to assess the level of social presence (King, 2009). This leads to an elimination of all the non-verbal social and vocal cues present in the data. There is a lack of research that studies social presence in multimodal teaching-learning environment. The experience afforded by a dynamic multimedia discussion forum warrants an investigation of its own.

### **Significance of the Current Study**

Even with the growing demand for online learning, this relatively new medium of learning still has many problems to be resolved and much to be understood to provide an effective learning experience (Monahan et al., 2008). While understanding the importance of learning as a fundamentally social undertaking, many educators and designers are “still unsure of the best ways to help establish social presence, how much is needed, when it is needed, and how much effort instructors should spend on social presence” (Lowenthal & Dunlap, 2014, p.4). Ambiguous definitions, lack of reliable measurements, and the complex nature of the social presence construct make it difficult to understand the true nature of social presence and discover strategies to enhance it. However, problems with the methodology cannot undermine the importance and urgency of studying the concept of social presence in online education research.

Even with the proliferation of multimodal tools, till date social presence has been investigated primarily in text-based online learning environments (Lambert & Fisher, 2013). The most significant contribution of this study is the expansion of the knowledge base in the area of multimedia and social presence. This research is first in informing the process of identification and assessment of social presence in multimodal learning environments. Moreover, the current study makes several conjectures related to the affordances of multimedia and certain communication behaviors that contribute to the development of social presence. The biggest contribution of this research is the extension of CoI theory to multimodal learning environments.

Additionally, this research is significant from the methodology standpoint because of two main reasons. First, as recommended in previous research, the current study uses multiple methods to understand various facets of social presence. Student perceptions, network density, and communication behaviors all inform the manifestation of social presence in this study. Second, researchers in the past transcribed the multimodal posts into the text to assess the level of social presence in multimodal discussions. This method omits all the verbal and non-verbal cues, such as vocal nods that create a sense of immediacy and contribute to social presence. To overcome this methodological problem, I coded the multimodal data directly to capture all the verbal and non-verbal cues in the communication.

Multimodal tools that could be used in teaching and learning environments are rapidly increasing in popularity. There is an immediate urgency to investigate the affordances and constraints of these tools and the best ways they could be applied in the teaching-learning environment. These tools do not work in isolation, but how instructors

use them, for what purposes, and when they were employed in a course contributes to this knowledge. Besides contributing to the theory, this research serves as a guide for designing and delivering engaging online courses. Moreover, this research informs educators about a selection of instructional tools, aligned pedagogical strategies, and tasks that lead to the development of social presence.

## **Chapter 3**

### **Research Design**

The primary goal of this study was to assess and compare the manifestation of social presence between text-based and multimodal discussions. To accomplish this objective, I employed an exploratory mixed-method case study design that used both qualitative and quantitative methods. To study the research problem in depth, the objective of this design was “to obtain different but complementary data on the same topic” (Morse, 1991, p. 122). Merriam (1998, p.27) defines a case as “a thing, single entity, and a unit around which there are boundaries.” ‘Introduction to Teaching with Digital Tools,’ a graduate level asynchronous online course, served as a single bounded case for this study. The purpose of this online course was to facilitate students in making connections between technology and its pedagogy through several assignments and projects.

The following questions served as a framework to guide this research.

1. How is social presence manifested in different modality online discussions?
2. How do students and instructors use multimedia to support the development of social presence?
3. What were students' views of using Multimedia in an online course?

### **Context**

“History has shown that context plays an important role in education” (Lowenthal, Wilson & Parish, 2009, p. 161). The need to specify the context is gaining importance in the field of online education to generalize and understand the applications

of research. Online learning can exist in so many different forms; therefore, it is crucial to discuss the context of the study in detail. In this section, I discuss in detail the purpose of the course, its objectives, and assignments.

**The course.** ‘Introduction to Teaching with Digital Tools’ is a graduate level, instructor-led, asynchronous online course. It is a part of the Rutgers Educational Technology Certificate program and is the first in a series of three courses designed both to help educators develop proficiency in educational technology and to address the challenges of preparing learners for the demands of our information rich, digital-age society. Specifically, the online course is designed to assist educators in acquiring the knowledge, skills, and dispositions, which are needed to effectively integrate technology and 21st century skills into K-12 classrooms. However, the course is open to anybody with an undergraduate degree interested in knowing more about using technology to teach. The candidates for this course were students enrolled in masters and doctoral programs in different disciplines. Additionally, working professionals with a background in disciplines such as engineering, architecture, physical therapy, and dentistry have also participated in this course. This course is an optional choice of the two alternative courses available to students (the other course is 05:300:350 Education and Computers) to fill the technology requirement for all five-year and Post-baccalaureate teacher certification programs. The course is popular with students and is offered every Spring, Summer, and Fall semester.

While participating in this course, students are given opportunities to engage in both individual and collaborative project-based activities that emphasize learning through inquiry. Students explore various theories of learning, and how they inform the effective



uses of technology in K-12 environments. Additionally, students investigate the latest research on the integration of technology in K-12 classrooms, with emphasis on the types of technical skills that are required to be successful in our digital age society. By engaging students in a variety of project-based activities, this course introduces them to the various online communication and collaboration tools. The course is delivered and managed within the eCollege Learning Management System. Below is the screenshot of the home page of the eCollege course shell.

The screenshot displays the eCollege course shell interface. At the top left, it identifies the 'Graduate School of Education' and the course 'INTRO TEACH DIGI TLS', with the instructor's name redacted. A 'Tools' sidebar on the left lists various resources like 'Course Author', 'Syllabus', and 'Start Here'. The main content area features a red banner with the Rutgers logo and the course title 'Introduction to Teaching with Digital Tools'. Below the banner, it shows the course number '15:255:503:91' and a 'Welcome to our Course!' message, followed by a directive to complete activities in the 'Start Here' section. On the right, there are sections for 'Announcements' (showing no unread items), 'Upcoming' (showing no events for the next 7 days), and 'For Review' (showing no submissions awaiting review).

*Figure 3.* Screenshot of eCollege course shell.

**Course objectives.** The course objectives clearly communicate the expected learning that will occur if a student chooses to enroll in the course. The below excerpt describes the learning goals of the course and has been taken from the eCollege course shell.

Table 3

## The Course Objectives

<p>In this course, we will explore how new technologies are changing the educational landscape, and we will also discuss the potential challenges and benefits that arise from these changes. By the end of the semester, all students who successfully complete the course should be able to do the following:</p> <ol style="list-style-type: none"> <li>1. Design an educational website that illustrates a working knowledge of online collaborative tools (e.g., wikis, blogs, discussion forums, etc.) and how these tools can be used to enhance teaching and/or learning.</li> <li>2. Create and respond to blog postings that require individuals to examine and reconsider their knowledge and beliefs about the role of technology in educational settings.</li> <li>3. Develop and respond to online discussions while drawing connections between course readings, individual assignments, group projects, and other uses of technology used in educational environments today.</li> <li>4. Create an online multimedia library that identifies and locates technology resources and evaluates them for accuracy and suitability for teaching and/or learning.</li> <li>5. Analyze and evaluate software, educational websites, and information and communication technologies (ICTs) for their suitability for instruction.</li> <li>6. Critique and design an instructional plan that illustrates how technology can be used to enhance learning through online communication and/or collaboration.</li> <li>7. Design an instructional plan and relevant resources that demonstrate knowledge of social, ethical, and human issues concerning use of computers and new technologies such as Web 2.0 tools.</li> <li>8. Identify computer and technological resources that facilitate lifelong learning and create emerging roles for the learner and educator.</li> </ol>
---

**Course assignments.** The course assignments comprised of six discussion threads, a blog, and two key projects (i.e. a website development project and a technology implementation project). Table 4 below discusses the details regarding the percentage of grade allotted to each assignment in this course.

Table 4

Percentage Grade allotted to each assignment

<b>Assignment</b>	<b>Percentage of Grade</b>
Class Discussions (6 discussions X 4 points each)	24
Peer feedback (2 peer feedback assignments X 3 points each)	6
Blogging	10
Website design project	30
Technology implementation project	30
Total	100

**Course projects.** Two key projects that students completed in this course were Website Design Project (WDP) and Technology Integration Project (TIP). The purpose of the WDP was to provide students an opportunity to design a website that meets their interests and needs while simultaneously allowing them to apply what they are learning in the course. For the TIP, students had to develop a unit plan that they could teach in the future. They were required to develop a unit, which could be enhanced with technology integration to augment student learning. This project gave an opportunity to students to reflect upon the ways technology might be used to enrich student learning.

Since this was an online course, both these projects were broken down into three major milestones, each serving as a checkpoint to ensure all the students were following the tasks and not falling behind. The projects had rubrics associated with each milestone to guide the students and clarify the expectations. The three major milestones for WPD

were a) website proposal b) draft of the website, and c) final website. Similarly, the three major milestones for TIP were a) search for a unit that can benefit from technology integration b) proposal and letter to parents, and c) final TIP unit plan.

**Discussion threads.** Students were required to respond to six discussion threads in total. They were required to participate in the discussion board in every Module. In total, there were six Modules. The instructor required them to make one initial comment and respond to the comments of any two peers. The first three discussion forums were primarily text-based whereas the next three discussion forums were multimodal in nature. In the last three discussion forum assignments, students were given options to respond through multimodal tools such as Voki, Vocaroo, and Voicethread. The instructor required students to make at least one comment using the multimedia in each of these three discussions. Since discussion data is central to this dissertation, it is crucial to understand the requirements of this assignment. Table 5 below describes the details of this assignment as explained by the instructor in the eCollege course shell.

Table 5

## Instructions for online discussion assignment

Your participation and collaboration are necessary for this course to be effective. To fully develop your understanding of the ideas and concepts reviewed in the Modules, you will be participating in online discussions. Online discussions with your classmates will take place on a regular basis with one discussion topic per Module.

In these discussions, you will construct responses to given topics and reply to the posts of the members in your group. These discussion topics will require you to not only demonstrate your understanding of the required readings, but to take that information and reflect on how it relates to your personal experiences with education, as well as the world around you. Each discussion board is a graded assignment. Although requirements for online discussions may differ per Module, the following are the general criteria I will be looking for in your responses:

1. Unless otherwise noted, your initial discussion posts should be approximately 250-300 words; responses should be approximately 100 words.
2. Discussion posts should be supported by your readings and properly cited, APA style.
3. All posts and responses to posts should be completed by the due dates that appear in the course schedule.
4. A minimum of two responses should be given for each original post that you share.
5. All responses should clearly and adequately answer the entire discussion prompt.
6. It is advisable to not use postings such as “I agree,” “I don’t know either,” “ditto,” etc. These types of responses take up space and do not add anything substantial to the conversation. It is important to know that such responses will not be counted for assignment credit.
7. Respect each others ideas, feelings, and experience when posting responses.

Remember your professional responsibility not to share confidential information on our discussion boards. Do not include any personally identifiable information (e.g., student names, colleague names) in your postings.

The discussion topics varied with every Module. Table 6 overviews the topics and modality for each discussion forum.

Table 6

The Topics and Modality for each Discussion Assignment

Class Discussions Assignment Topics	Modality
1. Introduce yourself	Text Based Discussion
2. Social bookmarking & website evaluation	Text Based Discussion
3. Locate & critique a technology integrated lesson plan	Text Based Discussion
4. Social networking	Multimedia: VoiceThread Discussion
5. Barriers to integrating educational technology	Multimedia: Voki/Vocaroo Discussion
6. Leadership & professional development	Multimedia: Voki/Vocaroo Discussion

**Peer feedback.** Students were also required to provide peer feedback to two peers twice during the course. The first feedback, a text-based assignment, required students to review the draft of TIP proposal (TIP step 2). The second feedback was a multimodal assignment. The students reviewed each other's websites' draft (WDP milestone 2) and created a screencast to share their comments and suggestions.

**Blog.** Students had to create a blog and posted an entry towards the end of the course, reflecting on their experience of creating a website. They were also expected to share their recommendations related to the website platform so that future students can benefit from their suggestions.

### **Data Collection**

The data was collected throughout the Spring 2015 semester. In the following paragraphs, I introduce the participants, and discuss the data collection process.

**Student participants.** Thirteen students enrolled in the ‘Introduction to Teaching with Digital Tools’ course participated in this study. The students enrolled in this course came from a variety of educational backgrounds, including Language Arts, Math Education, Advertising, and Science Education. Five of these students were practicing teachers while eight were pre-service teachers. Two of these pre-service teachers enrolled in this course were back in school to facilitate a career change. One of them had worked as a pediatric dentist for the past 20 years, and the other was in the field of advertising for the last five years. All the students acknowledged possessing knowledge about web 2.0 tools but faced difficulties in integrating these tools into their pedagogical practices.

The IRB granted permission to use the discussion thread data and interview students for this study. Three students gave consent to be general participants for this study. General participation required them to provide consent to allow access to all their course data. Additionally, three students volunteered to be focus participants for this study. All three students were interviewed at the end of the semester, and they all granted consent to access to their course data. All three of them had taken one or two online courses previously. Table 7 describes the details of the focus participants in this study. The names of the students were changed to protect their privacy, and from here on pseudonyms will be used in place of their actual names.

Table 7

Details of the focus participants

<b>Focus Students</b>	<b>Profession</b>	<b>Years of Teaching Experience</b>	<b>Gender</b>
Monica	Five year Ed.M student	0 (pre-service)	Female
Robin	Middle school Math teacher	12	Female
Tia	Student in Post-Baccalaureate Program K-6.	0 (pre-service)	Female

The first focus participant in this study was ‘Monica’. She graduated in May 2015, and she mentioned in her introduction blurb that she was interested in learning different ways to teach Mathematics by integrating technology in her classroom. During the interview, she mentioned that she had been offered a job to teach Mathematics at a high school and how resources from this course helped her succeed in her job interviews. When asked about her comfort level with online education, she discussed, “I have a hard time with online [education] because I like to see someone in person. But I think the way she [Instructor] set it up; I learned a lot of tools that I will use. More than what I was expecting because I have taken a technology course before, and I learned more than I was expecting to.”

The next focus participant in this study was ‘Robin’. At the time of data collection, Robin had twelve years of teaching experience and was teaching Math in a middle school in an urban district. She was working towards her Masters in Math Education and was completing her last semester in the program. She mentioned in her



introductory blurb, “I am taking this course because of my interest in learning strategies to identify and address the needs of students who have a difficult time achieving grade appropriate academic goals within the general education setting.” In her interview, she mentioned that really enjoyed and learned a lot from this course, and her experience differed greatly from her previous online course. She rated herself as a six on a scale of 1-10 regarding the use of technology in personal life, one being a newbie and ten being an expert. She mentioned that she was ‘functional’ with technology and works with smart boards and other essential technology in her classroom.

The third and final focus participant in this study was ‘Tia’. She was enrolled in the Post-Baccalaureate K-6 program and graduated in May 2015. She was a returning student with five years of professional experience in the advertising industry. She stated, “I always had teaching in the back of my mind and was very nervous to ‘start over’ but knew it would make me happy.” This was her second online course, and she expressed how she felt a bit hesitant at the beginning regarding the nature of online education. “I like going to classes you know to experience it, and I feel I learn better that way. So I was a bit worried [to be] on your own schedule, and may be like falling behind or not understanding things.” Later, she mentioned her anxiety stemmed from her previous experience of her first online course. She mentioned about her previous online course:

I didn’t really like it. I don’t think I got a lot out of it. So maybe that was why I was a bit reluctant. But this [Introduction to teaching with digital tools course] kind of really changed my mind...this was much better than the previous one.

She rated herself as a five when asked about her personal use of technology. She mentioned that she used all the social media websites, but she thought she did not use these resources to their “full potential” and often needed help with the computer.

**Instructor.** The instructor of this course had a doctorate in curriculum and instruction and had extensive experience in the field of technology and education. Besides teaching this course, she also worked as an instructional technology consultant at a local University. Before teaching this course, she worked as a computer teacher for four years and a library media specialist for a few years afterward. Technology had always been a big part of her teaching.

Since, the constructive theories had shaped the course design, the instructor of the course was required to play the role of a facilitator. The responsibilities of the instructor in this course included setting up the course, introducing the content, setting the norms for discussions, facilitating discussions, providing regular feedback, and responding to students' questions. On being asked about how the instructor rates herself regarding the use of technology in personal life, she mentioned, she was "comfortable figuring out most of the stuff."

### **Data Sources**

The data for this study came from various sources. Consent was sought from the instructor, general participants, and the focus students to access all their course material. Primary sources of the data were a) six threaded discussions that included all the instructor's and students' postings, b) interviews with the course instructor and the focus students, and c) course artifacts created by focus and general participants (six students) such as websites, screencasts, blogs, etc., as well as instructor-created multimedia artifacts. In the next few paragraphs, I discuss the data collection process in relation to the data source.

**Threaded discussions.** Threaded discussions were usually the first activity that was due in a Module. The instructor gave a week's time to students make initial postings for the discussion thread assignment. The two follow-up responses were due after four days of the initial posting deadline. The instructor introduced the first three text-based discussions through a text blurb and the next three multimodal discussions through a video, screencast, and a Voki respectively. Module 4 discussion was conducted through VoiceThread. In Module 5 and Module 6, students could choose to use Voki, Vocaroo, or any other familiar audio or video tool. The details about the prompts for each discussion assignment are shared under Appendix B.

**Interviews.** Informal semi-structured interviews were conducted with the instructor and focus participants. The instructor's interview focused on the perceived role of an online instructor, setting an online learning climate, communication patterns, and multimedia tools used. Student interviews largely revolved around students' learning experience in the course, with a particular focus on social comfort level experienced and multimedia tools used in the course. Instructor and Focus participants were interviewed at the end of the semester through web conferencing application called Webex. Each interview lasted for about 45 minutes. I have attached the interview protocols in the appendices section (see Appendix D).

**Multimedia data.** The course required students to respond to three multimodal discussion threads and provide feedback to a peer on their websites through a screencast. Additionally, students in this course were given a choice to use multimedia to introduce themselves right at the beginning of the course. Only two students chose to introduce themselves through a picture and a screencast. Timica shared a picture of her family and

Veronica created a screencast that was primarily an audio file with a stock image of a child using a laptop taken off the Internet. Furthermore, students also created their websites and blogs over the semester. Below are the descriptions of the tools and how students utilized them in this online course.

***Voki (www.voki.com).*** Voki is a desktop application that allows a user to create an interactive, customized avatar. The application gives users a choice to record their voice for avatars or let an avatar read aloud the text in any chosen voice and accent. Users can publish these avatars anywhere through a link or embed code. Voki was one of the options given by the instructor to the students to respond to the discussion assignments in Modules 5 and 6.

***Screencasting (www.screencastomatic.com).*** This program records the screen of a computer. Sometimes, it is also known as video screen capture. Students in this course used a free web-based program called Screencastomatic.com to capture their screens and share their video with other students. Students used this tool to provide feedback to their peers on the draft of their websites.

***VoiceThread (www.voicethread.com).*** VoiceThread is a web-based program that allows for interactive collaboration. The users can comment on the slides within VoiceThread using a microphone, camera, text, phone, or an audio file upload. In this study, the instructor introduced this tool in Module 4 and used it to host Module 4 discussion. Students commented on the initial prompt using any one of the above five options. The majority of students commented through a phone, microphone, or uploaded

an audio file. None of the students faced the camera to create a video response to this discussion assignment.

***Vocaroo (www.vocaroo.com).*** Vocaroo is a free web-based audio recording program that allows users to record their voice and then share it with others. This voice recording service gives users a number of options to share their audio file through email, social media, or an embed code. It is also possible to download the recording on a computer in various file extensions like .mp3, .wav, .flacc, and .ogg. Some students recorded their responses to the discussion prompt using this service and shared it on the appropriate discussion thread via a link within the eCollege course shell.

***Blogs (www.blogspot.com).*** The students were required to create a blog and write a post towards the end of the semester. The purpose of this exercise was two-fold: it gave an opportunity to students to reflect on their learning from this course. Second, the experience of creating a website enabled students to share their thoughts with future students. All the students created their blogs using the web-based program Blogspot.com.

***Websites.*** Each student had to create a website as the final requirement of WDP. While the choice of platform to develop a website was completely open, students in this course preferred to work with Weebly (www.weebly.com) and Google sites.

Similar to the students, the instructor had created five multimodal pieces to either introduce herself or to explain instructions regarding completing the discussion assignments. Table 8 below discusses the kind of multimodal videos created by the instructor and where they were implemented in the course.

Table 8

List of the Instructor created videos

Module 1	A Screencast to explain introductory details on how the course functions
Module 4	A Screencast that modeled the use of VoiceThread tool
Module 5	A Screencast that modeled the use of Vocaroo
Module 6	A Voki that discussed the prompt and how to respond.

### Data Analysis

This mixed method case study used three techniques to analyze the data a) content analysis, b) social network analysis, and c) constant comparative analysis. The following section discusses each of these analyses in detail.

**Content analysis.** Content analysis of the threaded discussions was performed to answer the first question, "How is social presence manifested in different modality online discussions?" Content analysis is defined as "a research technique for making replicable and valid inferences from data to their context" (Kaplan, 1964, p. 21). Initially, content analysis of the discussion forums was used to gather quantitative data about the level of participation in terms of a number of postings (Henri, 1992). However, lately the focus has shifted, and discussion forums are now treated as a "Gold mine" that reveal information about the patterns of conversation, and social relationships (Henri, 1992).

According to Rourke et al. (2001), content analysis comprises of four steps. The first step requires an identification of a representative sample of communication. The second step involves the creation of a protocol to identify and categorize the target

variable, and training the coders. The third step includes the actual coding of the transcript. The fourth and final stage leads coders to discuss their analysis, infer relationships between the variables, and discuss reliability.

According to Boyatzis (1998), any good code should have five elements: a label, a definition of the label or a theme, a description of how to identify the theme, a description of inclusions/exclusions for the theme, and examples of the theme. Coding protocol developed by Rourke et al. (2001) matched the criteria, and hence the content analysis for this study was guided by their social presence coding protocol (see Table 9).

Since the coding scheme is “structured as a hierarchy of presences, categories, and indicators,” I began coding at the highest level with social presence (Garrison et al., 2006, p. 5). As this study focuses only on social presence, only data related to social presence was coded. Based on the literature, applicable categories (i.e. cohesive, interactive, and affective) were assigned to the message. In cases where two or more categories were equally prominent, messages were coded under both the categories. Each of these categories has many communication behaviors called ‘indicators’ underneath them that convey a sense of social presence. The last round of coding involved identifying these relevant indicators for every coded message. I purposefully adopted the sequential coding process to enable me the opportunity to look at the data again, and verify the coding categories assigned to each message. I did not limit the number of categories or indicators for any message.

Considering the social presence coding scheme developed by Rourke et al. (2001) was developed to study asynchronous text-based learning environments, some revisions to the protocol were made based on the pilot coding of the discussion data. Research in

the past suggests that emotions can be deduced from facial expressions, postures, and paralinguage (Banda & Robinson, 2011). The operational definition of 'expression of emotions' indicator under the coding scheme made it difficult to identify this indicator in multimodal communication. This indicator is defined as " Conventional expressions of emotion or unconventional expressions of emotion, includes repetitious punctuation, conspicuous capitalization, emotions." (Rourke et al., 2001, p.10). Therefore after reviewing the relevant literature, a multimodal equivalent of the indicator 'expression of emotion' was operationalized to identify emotions in multimodal conversations.

Rourke et al. (2001) write "the presence of replies and quoted messages may be a superficial artifact of conferencing communication rather than a defining indicator of social presence"(p. 14). Since the course required students to work with multiple programs to compose their discussion posts, the two software specific indicators under 'Interactive' category called 'continuing a thread,' and 'quoting from others' messages' was purposefully omitted from the revised coding scheme. The below table details the changes made to the original social presence coding scheme.



Table 9

Abridged version Rourke et al. (2001)'s social presence coding template

Category of social presence	Indicators	Operational Definition in text-based discussion	Examples	Operational Definition in Multimodal discussion	Examples
Affective	Expression of emotions	Conventional or unconventional expressions of emotion includes repetitious punctuation, conspicuous capitalization, emoticons	“ANYBODY OUT THERE!”	Expression of emotions through Vocal-NonVerbal Communication	A distinct change in the volume of the speaker, stress on a specific word, any extra speech sounds such as giggling, hushing, shooing, and Vocal nods.
Interactive	Continuing a thread	Using reply feature of software rather than starting a new thread	“Subject Re:” or “Branch from”	<b>Omitted from coding</b>	
Interactive	Quoting from others’ messages	Using software features to quote others entire message or cutting and pasting selection of others’ messages.	Martha writes: “” or text prefaced by less-than symbol <	<b>Omitted from coding</b>	

***Voki and audio posts.*** Unlike avatars in virtual worlds, in Voki the users do not control their avatars. These avatars do not allow users to transmit any facial cues, or allow control over their avatar to make any specific body movement. Additionally, users can choose the text to speech option instead of doing a voiceover for their Vokis. However, users can still project their personalities or choices by choosing their characters, clothing, hair, accessories and voice accent. Research suggests that social presence could nevertheless be established through Voki (Cunnigham, 2015). The indicator 'self disclosure' under the social presence coding scheme is defined as the process of "making self known to others"(Jourard and Lasakow, 1958, p.81). This projection of self in the discussions was manifested in the form of avatars. Therefore, apart from other relevant codes, all Voki posts were coded under the 'self disclosure' indicator of the social presence-coding scheme.

Audio posts comprised of posts made using VoiceThread, Vocaroo, and .mp3 files. Short et al. (1976) explain the concept of social presence through verbal and non-verbal communication. They further differentiate between non-vocal nonverbal communication and vocal nonverbal communication. Non-vocal nonverbal communication includes gaze, facial expression, posture, etc., and vocal nonverbal communication includes paralanguage such as tone, speed, any extra speech sounds such as laughter, shooing, etc. Since there were no video posts in the discussion, audio posts were coded for all the vocal nonverbal cues apparent in the discussion posts. All these vocal nonverbal cues were coded under 'expression of emotions' indicator under the affective category.

***Unit of analysis.*** Unit of analysis for the content analysis was chosen to be a single message, and there were many reasons behind this decision. Garrison et al. (2006, p. 2) argue “the message unit may be a good compromise; at least in terms of getting a sense of how each of the elements in a community of inquiry interacts to achieve the educational goals.” Garrison et al. (2006) recommend coding at a message level as it alleviates the need to “identify units in more subjective ways” (p. 5). Rourke et al. (2001) explain several advantages of this unit of analysis over others. Message as a unit of analysis is objectively identifiable, and it produces a manageable number of cases. I define a single message as a complete post that may comprise a few words, a sentence, a few sentences, or a paragraph or more. Another reason for choosing message as a unit of analysis was to avoid confusion because of the presence of a large amount of multimedia data in this study. It was very hard to parse the multimedia data by semantics. Hence, a message as a unit of analysis seemed like a reliable choice.

To compare the discussion threads that had different length, a number of postings, and word count, it was important to work with a variable that facilitates the comparison of the social presence found in these discussion threads. To compare different transcripts, Rourke et al. (2001) recommend calculating ‘social presence density.’ To calculate this variable, the total number of social presence instances are summed up and then divided by the total number of posts in the transcript. Social presence density can also be calculated for every 100 words for any discussion board. However, the unit of analysis of this study was a single post. Hence, the social presence density was calculated per post. For example, if there were a total of 180 instances of total social presence in a single

discussion thread and the total number of posts in this discussion thread was 90, the social presence density per post in this discussion thread will be calculated as  $180/90=2$ .

***Coding examples.*** To explain the coding process in detail, I discuss an example here. The below post was coded under all the three categories of social presence i.e. ‘affective’, ‘cohesive’, and ‘interactive’. I coded the below post under ‘cohesive’ category because of the presence of the word ‘hello’, ‘we’, and the name of the student ‘Andrew’. These words are highlighted in yellow in the post below. The three indicators coded in this message under ‘cohesive’ category were ‘Phatics/Salutations,’ ‘vocatives’ and ‘refers to the group using inclusive pronoun’. I coded the below post under the ‘interactive’ category because the person writing the post is ‘expressing an agreement’ regarding the “poor technology interrelation.” I have highlighted this in blue in the post below. Additionally, I coded the below post under the ‘affective’ category because of the element of ‘self-disclosure’ and ‘expression of emotions’ present in this message. Both ‘self-disclosure’ and ‘expression of emotions’ are indicators under the ‘affective’ category. These indicators are highlighted in green in the post below. I did not place a restriction on the number of codes that can be given to a single message, so this message was coded for three categories and six indicators.

Hello Andrew,

We are on the same page when it comes to poor technology interrelation. Technology has so many wonderful use like instant feedback, differentiation, and teaching 21st century skills. My district just bought Chromebooks for every student in my grade and I cannot stand when we are suggested to reinvent the wheel to integrate technology when it ends up being an expensive pencil and paper. Recently my students were doing research on owl food webs. For years students made elaborate posters which came out very well. This year our technology direct advised us to use Glogster. Which the district paid money for. Only 1 group out of 12 used it and it was much less engaging than the actual poster design the other students chose.

 Cohesive
  Interactive
  Affective

Research recommends paying attention to the context as well as the meaning of a message when coding for the indicators and categories under social presence (Akyol & Garrison, 2008). For instance, the below post was addressed to Jamie. The student who created this post used the word ‘we’ three times in this post. However, here ‘we’ and ‘our’ does not denote the instructor and students enrolled in this course but her colleagues at the school where she teaches. Hence, this ‘we’ and ‘our’ (highlighted in yellow) were not coded under the ‘cohesion’ category or under the ‘uses inclusive pronouns to refer to the group’ indicator under the 'cohesion' category.

Jamie....I am definitely going to pass this along to my ELL teacher here at our middle school!. Vocabulary weakness has been a big red flag evident in our school data. We are always looking for resources. I love the idea of each student creating an account. At my school, we have to advance a bit and get kids in that direction. The organizational element is crucial....what will be doing with all this information we have at our fingertips? Organization is key!!!

Another example of coding in context is the next message addressed to Tia. Here the word ‘we’ (highlighted in blue) refers to the instructor and students enrolled in the

course. Hence, this post was coded under ‘cohesion’ category and ‘uses inclusive pronouns to refer to the group’ indicator.

Tia, you make a great point that just because it's a low on the LoTi framework that **we** shouldn't dismiss it. Even technology at low levels can be effective use of a digital tool.

**Social network analysis.** Research is consistent in advocating the use of various methods to capture the different forms of social presence in an online course (Cui, 2013; Lowenthal & Dunlap, 2009; Shea et al., 2010; Wu, Gao, & Zhang, 2014). As social interaction plays a key role in determining the social presence experienced by the group, the importance of understanding interaction when studying social presence cannot be over emphasized. This analysis technique was specifically chosen to inform the second research questions of this study. The 'degree centrality measure' was used to identify the most central members in the learning network (i.e. discussion forums) in the online course and understand their use and choice of multimedia in those forums through constant comparative analysis.

SNA “offers the potential to explain the nature of networked relationships resulting from the flow of information and influence found among participants’ interactions” (Shea et al., 2013, p. 433). Additionally, SNA helps to both identify the participant’s position in a learning network and determine isolated students within the learning network (Dawson et al., 2010). This can be achieved by analyzing the number of ties or inflow and outflow of communication a participant has with others in a learning network (Wasserman & Faust, 2007).

The degree centrality measure is defined by the total number of ties or relationships a participant has with the rest of the group (Freeman, 1975). Degree centrality is the sum of both in-degree and out-degree centrality measures. An in-degree measure describes the number of messages an individual has received from other participants in a network. An out-degree measure is the count of messages an individual has posted to other people's responses in a network (De Laat, Lally, Lipponen & Simons, 2007). It is calculated by counting the number of ties or inflow and outflow of communication a participant has with others in a learning network (Wasserman & Faust, 2007). The assumption behind the degree of centrality within a social network is that actors who enjoy a high degree of centrality should be the most powerful and visible actors playing a leadership role within the network. The position of an actor is positively associated with the actor's perception of the community, the amount of support required to finish the course (Dawson, 2008), his or her learning performance (Cho et al., 2007), and access to information (Brass, 1984). The measure of degree centrality also helps in visualizing each actor's contribution to the learning network and identify the actors who enjoy a central position in the network as well as those who remain on the periphery. Through a Sociogram, SNA illustrates the position of the member within a group as leaders are usually in the center and the followers lurk on the periphery.

First, I discuss how these six discussion assignments were extracted from the eCollege discussion forum and later how a program called Netvis helped visualize these networks. As a part of this course, students were required to participate in all six discussions. The screenshot below (Figure 4) shows how one of these discussions was hosted within the eCollege course shell.

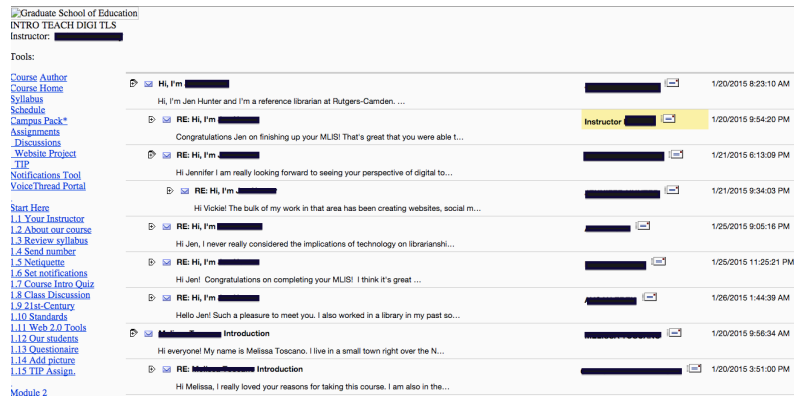


Figure 4. Screenshot of the Module 1 discussion in eCollege.

Based on this discussion data, the number of comments made by each student to each other's initial posts was mapped onto a separate spreadsheet in a matrix form. For example, the first row in the matrix below (Figure 5), Jessica made one comment on Timica's initial post and one comment on Veronica's initial post. On the other hand, Timica, Veronica, Andrew, Amy, Renee, and the instructor commented on Jessica's initial post. Similar matrices were created for all the six discussion threads.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1		Jessica	Monica	Timica	Matthew	Christina	Samantha	Jamie	Veronica	Robin	Charlie	Andrew	Renee	Amy	tia	Instructor
2	Jessica		0	0	1	0	0	0	0	1	0	0	0	0	0	0
3	Monica		0	0	0	0	0	1	1	0	0	0	0	0	0	1
4	Timica		1	0	0	2	0	1	0	1	0	0	0	0	0	1
5	Matthew		0	0	1	0	0	0	0	1	0	0	0	0	0	1
6	Christina		0	1	0	0	0	0	0	0	0	1	0	0	0	0
7	Samantha		0	1	0	0	1	0	0	0	1	1	0	0	0	0
8	Jamie		0	1	0	0	1	0	0	0	0	0	0	0	0	0
9	Veronica		1	1	1	1	0	0	1	0	1	0	0	0	0	0
10	Robin		0	1	0	1	0	0	0	0	0	0	0	0	0	0
11	Charlie		0	0	0	1	0	1	0	0	0	0	0	0	0	0
12	Andrew		1	0	0	0	0	0	0	1	0	0	0	0	0	0
13	Renee		1	0	0	0	0	0	1	0	0	0	0	0	0	0
14	Amy		1	0	0	0	0	0	0	1	0	0	0	0	0	0
15	Tia		0	1	0	0	0	0	0	0	0	0	0	1	0	0
16	Instructor		1	1	1	2	1	0	1	1	1	2	1	1	1	0

Figure 5. Number of comments made by students to the initial posts for Module 1 discussion.



These matrices were then uploaded to the web-based program called Netvis.org to generate network graphs or sociograms. A network can be visualized in various ways (Huang, 2007). A Sociogram can be created in the form of a radial, circular, hierarchical or free layout. In this study, I chose a circular layout of a Sociogram as this layout is recommended to highlight the relationship patterns of the participants (Scott, 2000).

***Constant comparative analysis.*** Constant comparative analysis as a data analysis technique is seldom used to study online communications (Lowenthal, 2012). The social presence coding scheme used to assess the level of social presence was developed for a text-based community (Rourke et al., 2001). Therefore, inductive analysis was employed to search for themes especially related to multimedia that did not emerge from the content analysis process. I used this technique to answer the two research questions "How do students and instructors use multimedia to support the development of social presence?" and "What were students' views on using multimedia in an online course?" To achieve this goal, I analyzed the entire interview data as well as the digital artifacts created by the focus students and the instructor. Since the focus of this study was on multimedia and social presence, I was consciously looking for themes related to it.

"Inductive analysis means that the patterns, themes, and categories of analysis come from the data; they emerge out of the data rather than being imposed on them prior to data collection and analysis" (Patton, 1980, p. 306). Patton (1980) also indicated that cross-case analysis under constant comparative method is useful to understand different perspectives on the same issue. The current study included interviews of instructor and multiple students; hence, cross-case analysis was used to identify common themes. Inductive analysis of the data was guided by constant comparative method (Glaser &

Strauss, 1965). The constant comparative analysis in this study followed the four steps suggested by Glaser & Strauss (1967): “(1) Comparing incidents applicable to each category, (2) integrating categories and their properties, (3) delimiting the theory, and (4) writing the theory” (p. 105). I inductively analyzed focus and general participants' course work data (course artifacts like blogs, websites, screencasts), instructor created multimodal artifacts, and interviews.

After reading all the interviews thoroughly, I started coding the interviews first followed by other course artifacts. The codes were created to reflect the topics covered by the research questions guiding this study. Following the coding of the interviews, I coded the digital artifacts created by the students and the instructor. While doing this, I was constantly comparing the new codes with the old ones. During this process, I was consciously trying not to limit myself to the categories of social presence defined by CoI framework.

***Coding of multimedia data.*** Multimedia data outside of discussion threads was primarily in the form of screencasts. Each student had created one screencast to review the website of one assigned peer. Screencasts were coded inductively for both content and vocal non-verbal cues. The focus of this coding was on how students and the instructor made use of multimedia to express emotions and project their personalities in the multimodal learning environment. Since students created these screencasts to review the draft website of their peers, a part of this analysis was also to identify those parts of the website on which students concentrated during their review. Therefore, I made notes wherever students focused on the features of the website that communicated social presence, for example, students talking about improving the ‘About Me’ section or giving

suggestions regarding improving the interactivity of the website through the use of multimedia.

Two coders (other coder and I) coded a couple of these screencasts. The average length of these screencasts was around three to four minutes. Hence, the unit of analysis for coding screencasts was chosen to be a minute. Any communication behavior that indicated social presence like asking questions, introducing themselves, complementing, addressing by names, greetings, relating feedback to their own lives, closure, suggestions, humor was coded. Additionally, vocal non-verbal immediacy behaviors such as stressing on words, like a student said in her screencast "I just love, love, love, love the layout of your website", a distinct change in the tone, a friendly non-judgmental voice, vocal nods like hmm, umm, clearing throat, giggling, etc. were also coded.

A total of 45 codes were created in the first round of coding. The data analysis began with a close reading of all the documents (interviews) and taking a closer look at digital artifacts (screencasts and websites). I assigned relevant codes wherever applicable while constantly comparing new codes with the old ones. In the first round of coding, the codes were detailed and were grouped together to form a category in subsequent coding rounds of the documents. The data analysis process was cyclical, with every round of re-reading, I was able to reflect, sort, and categorize the codes, and discern the themes and patterns in the data (Lincoln & Guba, 1985). Through comparing and contrasting these codes, a below list of categories were created. Table 11 below discusses the categories developed through the process of constant comparative analysis.

Table 11

A list of categories generated through constant comparative analysis

Affordances of multimedia	Experience with Screencasting
Instructor's use of multimedia	Experience with Vocaroo
Benefits of using multimedia	Experience with VoiceThread
Previous experience with online education	Experience with Voki
Students use of multimedia	Importance of technology
Comparison of modalities Text vs. multimedia	Casual vs. Formal Responses
Problems associated with multimedia	

**Websites.** Unlike common perception, websites also have the ability to communicate social presence through their features (Albert, Goes & Gupta, 2004; Lambert & Fisher, 2013). Social presence could be inferred from how users use the features such as personal profiles and photographs to participate in discussions and connect with each other (Kear, Chetwynd & Jefferis, 2014). Therefore, I made a note of all the features that communicated social presence within the students' websites. The examples of these features could be applications that offered visual and auditory cues to the users such as the use of avatars on the website, an introduction video, etc.

The below table summarizes the type of analysis used for all the datasets collected in this study to answer the three research questions in this study.

Table 12  
Overview of Data Analysis

Research Question	Type of Data	Data Analysis
How is social presence manifested in different modality online discussions?	<ul style="list-style-type: none"> <li>• Discussion Threads</li> </ul>	<ul style="list-style-type: none"> <li>• Content analysis</li> </ul>
How do students and instructors use multimedia to support the development of social presence?	<ul style="list-style-type: none"> <li>• Instructor's &amp; general and focus Participants' multimodal course artifacts</li> <li>• Instructor Interview</li> <li>• Discussion posts</li> </ul>	<ul style="list-style-type: none"> <li>• Social network analysis (Degree centrality)_</li> <li>• Constant Comparative analysis</li> </ul>
What were students' views on using multimedia in an online course?	<ul style="list-style-type: none"> <li>• Focus participants interview</li> <li>• Discussion posts</li> </ul>	<ul style="list-style-type: none"> <li>• Constant Comparative analysis</li> </ul>

The relationship of the researcher with the research and its participants is a valuable one (Salmons, 2011). This relationship forms the foundation of the kind of data a researcher can collect and analyze. The next section discusses the positioning of the researcher, and related reliability and validity aspects of this study.

### Positioning of the Researcher

In online research, the boundaries between the position of the researcher as ‘outsider’ or ‘insider’ blur. My position as a researcher was a combination of both insider and outsider. As an insider, I was a part of the team that developed the ‘Introduction to Teaching with Digital Tools’ course. Additionally, I have been teaching this course for the last three years. While I was collecting data for this study, I was also teaching another section of the same course. Hence, I was very well versed with the content of the course, the ideological assumptions behind the course design, and the recommended pedagogical

practices associated with teaching online. Also, I have been researching similar online courses using the CoI framework as my lens for the past three years. My work has been published in various peer-reviewed conferences (see appendix C). My research and experience in teaching this course have helped me develop my own beliefs about online education and community of inquiry.

I think my experience in online education and various digital tools helped me probe more efficiently during interviews and understand the implicit content. For example, while I was conducting an interview, a student was not able to recall the name of the particular tool that she liked in this course. Due to this, the whole interview was being stalled. However, my familiarity with the technological tools and my experience as an instructor of this course helped me prod her with various names of the tools used in this course. This may sound trivial, but it allowed her to finish her thoughts and go deeper into why she preferred to work with that particular tool to the other tools introduced in this course.

Conversely, I occupied an outsider position in this research because I specifically chose not to study my own online course to gain valuable ‘outside perspective’ and avoid the risk of not understanding the broader picture. I had introduced myself to participants through a video and invited them to participate in my research. Perhaps, if I had studied my own course, knowing the participants too well would have affected the selection of participants for this study. Additionally, my bias might have pushed me to steer my course or the interviews in one direction.

Constant and conscious reflection during the data collection process also helped me understand my own biases and assumptions that I brought to this study. To avoid any

kind of recruitment bias, the invitation to participate as a focus participant was extended to all the students. To avoid interview bias, I tried to be as neutral as possible when I interviewed the participants of this study. A special focus was placed on the language of the interview questions to ensure the questions did not steer participants in any particular direction. I had also shared the draft of the interview protocol with my advisor for feedback, and revisions were made in order.

In the past three years of teaching this course, I have experienced ambiguities and conundrums related to the selection of tools and pedagogical practices for this course. Additionally, I have always wondered how instructor's actions like sharing feedback publically or commenting too many or too few times can hinder the progression of social presence in an online course. Asking several questions like, "Can multimedia help in creating a sustainable learning community?" or "Can some students improve the overall perception of social presence in an online course?" served as the motivation behind this dissertation.

### **Reliability**

Inter-rater reliability is defined as "the extent to which different coders, each coding the same content, come to the same coding decisions" (Rourke, Anderson, Garrison & Archer, 2001, p.11). Rourke et al. (2001) discuss the inter-rater reliability of the social presence coding scheme as 0.91 and 0.95. The current study utilizes this coding scheme to guide the content analysis of the data.

In the current study, two coders (another coder and I) coded 20% of the data to establish the inter-rater reliability in this study. The coders reported 100% inter-rater reliability for the identification of the unit of analysis. In addition, the coders established

inter-rater reliability as 86% at the indicator level and 95% at the category level. The coding process began with a two-hour training session in which the second coder was familiarized with the social presence coding scheme. Then, each coder coded seventy message posts in total from six discussion threads. The coders listened to the audio file and coded for all social presence categories and indicators. Since the social presence coding scheme stresses on the use of words, it was important to transcribe these posts. The transcription of the multimodal messages was shared with the second coder with explicit instructions to use it only when the voice in the message was unclear. The coders sat together to negotiate their understanding and the process of identification of social presence indicators in a multimodal learning environment. The coders met twice for these negotiated sessions.

In the first round, the coders coded the posts from the first three-discussion threads and then came together for the negotiated coding session. During this session, the coders discussed any discrepancies in their identification of indicators. The manifest indicators such as 'referring the group using inclusive pronoun' or 'vocatives' were easy to identify (Rourke et al., 2001). However, two indicators under the interactive category 'complimenting' and 'expressing agreement' had a relatively low inter-rater reliability. The conversation in this session revolved around differentiating between these indicators in messages such as the one below.

"You brought up an excellent point about how difficult it is to keep up to date with the multitude of technological tools and resources available, especially when it requires extra time to learn, explore, evaluate, and reflect on their usefulness and whether they can or should be integrated into your classroom."

The next negotiating session focused on the coding of the last three discussion threads that included many multimodal posts. Usually in audio posts, students used



multiple vocal, non-verbal cues such as vocal nods (uh, huh, um, err), stress on words, etc. to express emotions. The coders were mostly able to agree on the identification of the obvious change in tone and vocal nods. However, the coders largely disagreed on the identification of stress on a word that denoted emotional expression. Although trivial, since there were many non-verbal cues in a single audio post, both the coders agreed to negotiate their understanding of manifestation a 'stress on a word' within a message. Instead of focusing on a pitch or an accent, which tended to be more subjective, the 'stress on a word' for the purpose of this study was defined through emphasis cues such as repeating a word and spelling out a word. Additionally, during the coding process, several audio posts included short pauses that indicated a speaker's hesitation. These silent pauses were also included in the multimodal equivalent of the indicator 'expression of emotions'.

I used the percent agreement method to establish the inter-rater reliability. The percent agreement is the most frequently used method to calculate inter-rater reliability (De Wever et al., 2005). The percent agreement is the ratio of agreed upon codes over total codes. Since eCollege clearly identifies a message or a post, the inter-rater reliability of identifying a unit of analysis was 100%. Overall, the inter-rater reliability at the category level was 95% and at indicator level was 86%. There is no universally acceptable percentage agreement statistic. However, Rourke et al. (2001) indicate a value of 80% or above as reliable. The below table discusses the inter-rater reliability at the category and indicator level for all six discussions.

Table 10

The inter-rater reliability at the category and indicator level

	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Average
Indicator level	85.28%	80%	85.37%	85%	90%	90%	85.67
Category Level	90%	92%	100%	96%	96%	95%	94.83

### Validity

Citing the work of Schwandt (1997), Creswell (2001, p.124) defines validity as “how accurately the account represents participants’ realities of the social phenomena and is credible to them.” The validity of the study determines whether the data and the inferences drawn from it are true. Creswell (2001) suggests adopting measures to establish validity that is in agreement with the ‘lens’ adopted by the researcher. The following strategies were used to establish the validity of the results in my study.

1. Triangulation of the data: Creswell & Miller (2000, p. 126) define triangulation as “a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study.” I adopted three different ways of triangulation to establish the validity of results. I used various data sources, multiple frameworks to view the data, and a variety of data analysis techniques to draw inferences from the data.
2. Using peer debriefing: To avoid researcher bias, frequent debriefing sessions were arranged with the dissertation advisor to bring in a newer perspective and expand the vision of the researcher (Shenton, 2004).

3. Verification: Verification is defined as a “process of checking, confirming, making sure, and being certain” (Morse, Barrett, Mayan, Olson & Spiers, 2008, p. 17). I interviewed student participants and the instructor of the course to validate my understanding related to their responses in the discussion threads. Moreover, when in doubt about a certain response, what tool was used, or to understand how the events actually unfolded during the course, I spoke with the instructor to verify my understanding.

## **Chapter 4**

### **Findings**

In this chapter, I discuss the results of the data analysis of this study. In this mixed method exploratory case study, I used content analysis to identify the communicative behaviors that contribute to the development of social presence. Social Network Analysis helped me picture the conversation patterns and identify the most connected student. I used constant comparative analysis to understand the use of multimedia and views of the students regarding the use of multimedia in the graduate level asynchronous “Introduction to Teaching with Digital Tools” course.

I discuss the findings in three major sections where each section answers a research question. The three research questions that this study answers were:

1. How is social presence manifested in different modality online discussions?
2. How do students and instructors use multimedia to support the development of social presence?
3. What were students’ views on using multimedia in an online course?

#### **Question 1. How Is Social Presence Manifested In Different Modality Online Discussions?**

Findings from the quantitative content analysis revealed that the social presence manifested in multimodal discussions was higher than text-based discussions. In the following sections I explain the manifestation of social presence by its density at three different levels, i.e. overall social presence density, category level densities, and indicator level densities.

**Overall social presence.** In this section, I use the social presence density index to reveal information about the overall social presence. The maximum value of the social presence density index could be 3. Table 13 below reveals the overall total social presence in each discussion Module and its corresponding social presence density. Additionally, the mean social presence density of multimodal discussions was 1.99, higher than the text-based discussion at 1.86. The table indicates the higher manifestation of social presence in multimodal discussions as compared to text-based discussions.

Table 13

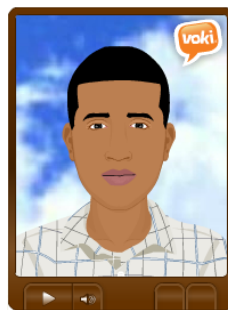
## Social Presence Categories per Module Discussion

Modality		Total social presence	Total Posts	Social Presence Density	Mean Social Presence Density
Text	Module 1	167	70	2.39	1.86
	Module 2	89	54	1.65	
	Module 3	100	65	1.54	
Multimodal	Module 4	117	60	1.95	1.99
	Module 5	106	50	2.12	
	Module 6	91	48	1.90	
	Total	670	347	1.93	

Module 1 had the highest level of social presence followed by Module 5, 4, and 6, which were all multimodal in nature. The high manifestation of social presence in Module 1 is not surprising considering the nature of the discussion prompt. Module 1 discussion asked students to introduce themselves with little to no focus on the content of the course. The students in this discussion used text to discuss information about their families, professional backgrounds, and goals for taking this course.

Module 4, 5, 6 were multimodal discussions, and students were required to share at least one post that was multimodal in nature. The Module 4 discussion was hosted using VoiceThread program. The Module 4 discussion registered the most number of multimodal messages. Twenty-seven student posts out of the total fifty-two student posts were audio posts. Voice-based discussions help in the development of a community by allowing students to express deep feelings (Xie, 2008). According to Lowenthal (2010), affordances of multimedia to transmit nonverbal social cues (such as those seen in Modules 4-6) could have enabled students to perceive other students as "real" and "there."

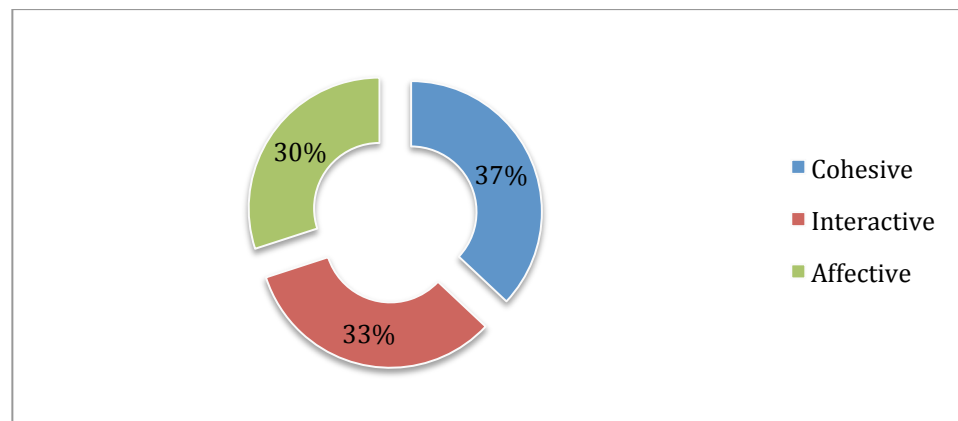
The Modules 5 and 6 discussion introduced students to two new tools (Vocaroo and Voki) that they could use to create their multimodal post to fulfill the requirement. Through the use of multimedia, students were able to share more about their personalities by creating voice-based posts and avatar-based posts (Voki). Although Voki does not allow users to create any facial cues or movements for their avatars, a lot of students' personalities came through with their choice of characters, colors, backgrounds, and clothing (Cuningham, 2015). Below is an image of Andrew's voki. He created this Voki in Module 5 discussion.



*Figure 6. Andrew's Voki*

The overall social presence density indicated that multimodal discussions had a higher social presence as compared with the text-based discussions. The next level of analysis (category level) focuses on the manifestation of social presence at the category level and discusses affordances of the medium that may have influenced certain kinds of social presence communication behaviors.

**Category level.** In this section, I discuss the manifestation of overall social presence at the category level and explain the differences in the manifestation between the text-based and multimodal discussions. Figure 7 below visually depicts the distribution of the three categories of social presence. It was evident that there was a good balance of all the three kinds of categories of overall social presence. Previous research has been consistent in reporting that, in order to create an efficient community of inquiry, online discourse should have balanced elements of social presence such as socio-emotional interactions and group cohesion (Garrison, 2007). The below figure also indicates that the ‘cohesive’ category of social presence was the leading category of social presence present in this online course.



*Figure 7.* Categories of Social Presence exhibited in all six discussions.

Overall ‘Affective’ responses were coded the least amount of times in this online course. This means that 30% of the online discourse related to the expression of emotions, self-disclosure, and humor. Lowenthal (2012) found a similar pattern regarding the categories of social presence with the affective category being coded the lowest. The affective category of social presence relates to the projection of personal presence in the online learning environment (Swan, 2003). The low overall affective communication may be due to the asynchronous nature of the interaction. Research suggests that emotionally involved conversations are better suited to a synchronous interaction that provides immediate feedback (Cui, 2015).

There are still many ambiguities related to understanding the progression of the three categories of social presence. As the progression of these categories is dependent on the context of learning, the lack of clarity in the progression of these categories of social presence could also be due to the different affordances of the medium used to facilitate threaded discussions. Swan (2003) reported that cohesive responses decline as the course progresses, whereas Akyol and Garrison (2008) reported that group cohesion increases and the other two categories decline over time. Cohesive responses are the responses that tie the community together and create a feeling of togetherness. However, no research reports the pattern of progression of these categories in a multimodal learning environment.

The below figure illustrates the progression of all three categories of social presence across the six discussions. The figure clearly illustrates the manifestation of these three categories of social presence in the text-based (Module 1-3) and multimodal discussions (Module 4-6).



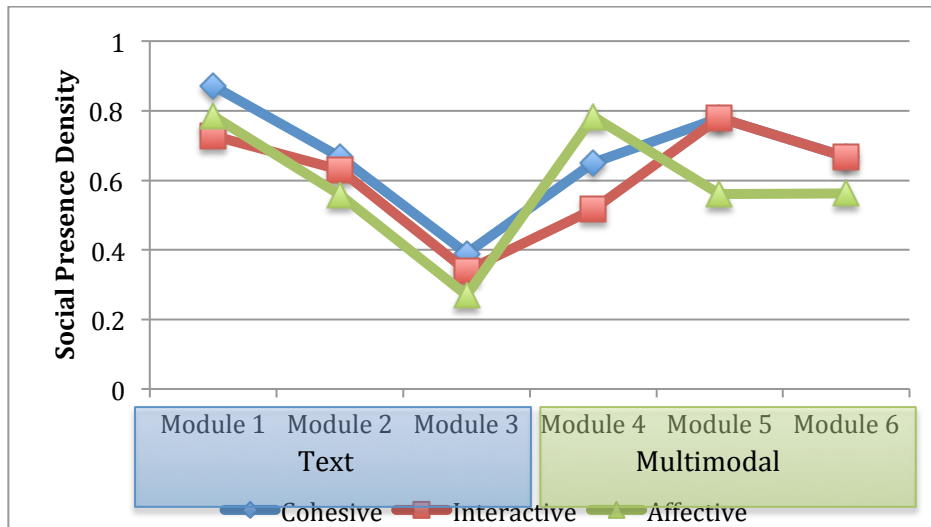
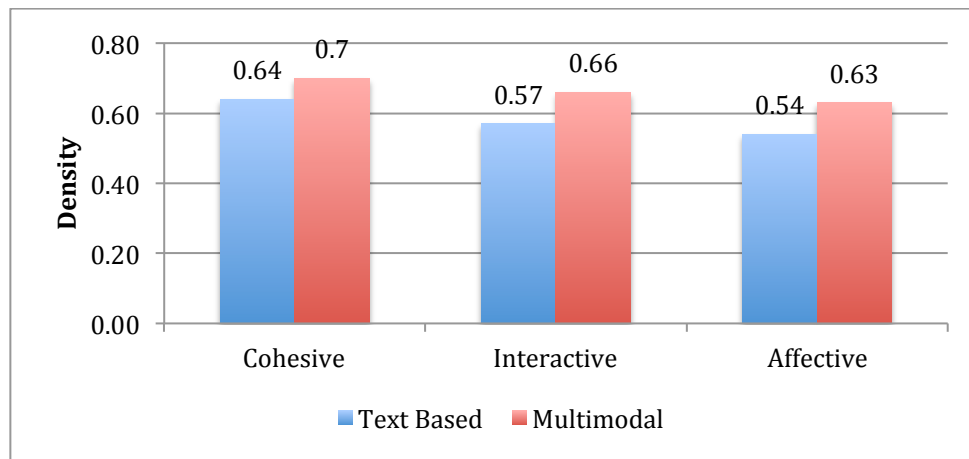


Figure 8. Progression of social presence categories over time.

Since the first discussion was an ‘introduce yourself’ discussion, all three categories of social presence were high. It is evident that there is an increase in all the categories of social presence in multimodal discussions. This is an interesting finding, which may be due to the maturity of the participants in the course, the use of multimedia as an option to respond, or the nature of the discussion prompts.

The affective category of social presence revolves around communication behaviors that demonstrate affect in the form of emotions, humor, or self-disclosure (Rourke et al., 2001). Akyol and Garrison (2014) report a decline in the affective category as group cohesion and open communication increase over time. However, the figure above indicates a steep increase in the social presence exhibited through the affective category in the Module 4 discussion. The Module 4 discussion had the highest amount of multimodal posts (27 posts) in this course. Perhaps a high affective category of social presence in this Module discussion could be due to the presence of emotions in voice-based posts that allowed students to establish their immediacy over the text.

Next, I compared social presence densities at the category level between the multimodal discussions and the text-based discussions. The below chart illustrates that all the categories of social presence had higher densities in multimodal discussions as compared to the text-based discussions.



*Figure 9.* Comparison of social presence density between text-based and multimodal discussions.

The affective category of social presence relates to the projection of emotions and self-disclosure in a community (Rourke et al., 2001). The reasons behind the higher manifestation of the affective category in multimodal discussions may be related to the richness of the medium (Borup et al., 2011).

It was evident that the text-based conversations were more formal and focused on the topic. However, the content of the multimodal posts indicated that students were comfortable discussing off task topics that revealed personal details about their lives. The below message is an example of Tia's voice-based post where she explained how her cousin had used social media in the past and the problems she encountered with it.

I actually rarely use social media. But I do not really like, or I do not post things on a continuous basis. Pictures are usually of my dog or you know what I made for dinner. So I know that a lot of teachers have concerns with having accounts personal accounts such as these because of getting jobs or their students requesting to be there friends and getting personal information. For example, my cousin she deleted her Facebook account because she just got so fearful. She had students requesting to be her friends and telling her that I saw pictures of your children. She has four young children. I saw the pictures of your children. They are so cute. And she got really nervous and scared and kind of freaked out as she thought that she had her privacy settings ok but, needless to say, she thought it was just wise to delete her account. Because she did not want to give her students, just you know, the wrong message. These are her students and not her friends. She wanted to keep her personal life separate from her teaching, which I can understand. Anyway, that is getting a bit off the topic. But, as far as privacy setting I keep everything private like I said I don't keep personal information up there. May be my birthday is there or and I have to use my real name.

When the students started creating multimodal posts, the instructor noticed the change in the quality of students' post. She mentioned in the interview that the tone of students' multimodal posts was more casual and the length of the responses was longer as compared to the text-based responses. She said:

Well, in terms of the responses, I think when they started going to audio or video, I feel like their personality started coming through more. They were I think more casual in their commenting whereas when it is text based they are writing in a more formal manner. So that's what I noticed that difference. It also seemed like for some of them, when they it did audio or video it was longer than what would have written.

A long threaded discussion that includes a lot of back and forth indicates high interactive social presence. Mehrabian's (1965) seminal work on immediacy suggests that the content that includes non-verbal social cues leads to more interaction. It was evident that media-rich posts that included nonverbal social cues received more follow-up responses as compared to the text-based posts. Below is an example of Timica's voice-based post and the follow-up response posts from her peers and the instructor of the

course. Notice, six follow-up posts were made in response to Timica's original voice-based post. Four out of six follow-up responses were audio-based posts.

Hi, this is Timica. I work at a school in XXXX in New York, and my principal is a big believer in social networking. So, our school has a Facebook account. We also have an Instagram account, and we also have a Twitter. We use that to keep our community, as Boling suggested in her lecture connected and collaborative. We do use it to even keep parents and the community informed with photos and announcements.

Instructor: Thank you Timica for being the first person to comment on our voice thread with audio.

Monica: Hi Timica, that is great that your school is using so much social media. Do you use it specifically in your classroom with kids? Do you have your own personal accounts set up?

Veronica: Timica your school is so up-to-date on the media outlets. Do you get any resistance from the parents being concerned about who may be data-mining your site for information? How do you reassure the parents? What steps does each teacher take to interact with the school sites? What goes onto your Instagram site?

Instructor: Hi Timica, I agree with Monica and Veronica that it is very forward thinking of your school to have all of those social networking sites up. I am curious too as well to know who gets to post to it who gets to post to it? And how do you make sure that content is appropriate?

Tia: Like some of our classmates do, I too agree with that your school seems very with it, very with technology. Also I think it is great. I like the use of using the technology to keep the community educated. I can see posting pictures and using the sites such as these in that capacity I think is a great thing. I know days of my parents going to parent teacher or PTA meetings such as that or going to night meetings I think that's a great way of having parents other family members involved in the school community that may be can't make on things such as these meetings or may be their work gets into their way.

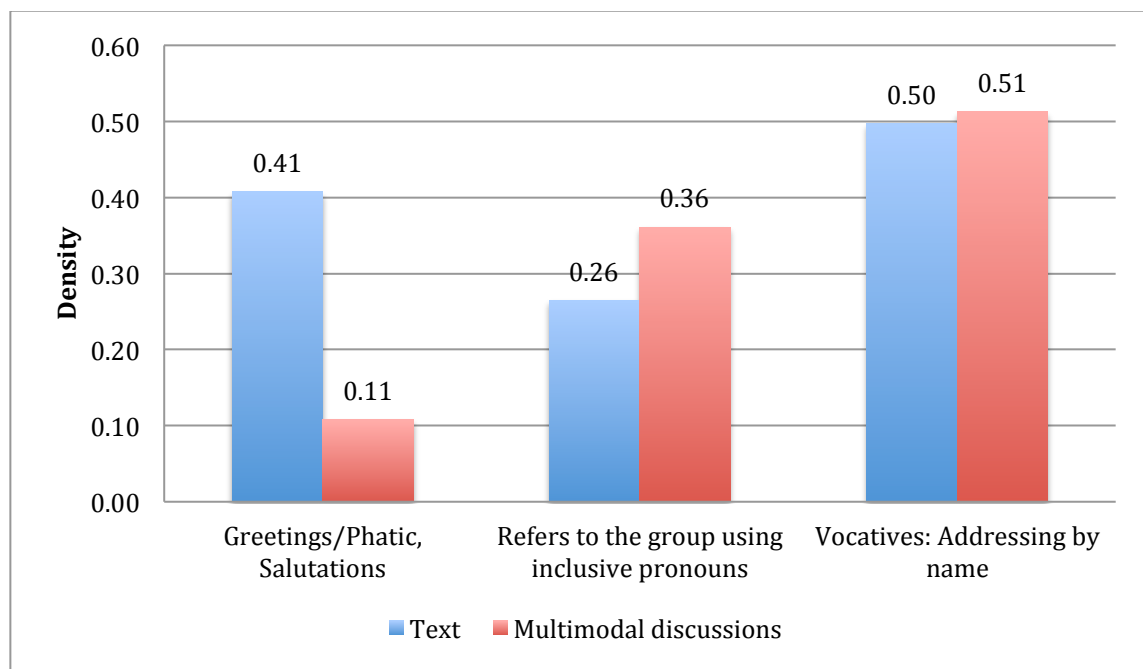
Robin: Timica the comments that you made in regards to the number of social networking is available to the teachers and your students, I think is very interesting. My only concern from our experience in or my experience in teaching in XXXX district is that a lot of times students are distracted and utilize the social networking as a means to engage in social conversations as opposed to academic conversations. The thing that they can choose to talk about will be something that will be difficult to explain to parents if something inappropriate comes up. In terms of a parent asking to login or have conversations with other students during a time where he or she was supposed to be learning.

The reasons for a higher cohesion in multimodal discussions as compared to the text-based discussions could be due to closeness or a sense of commitment illustrated through the videos created by the instructor (Borup et al., 2011). Students also confirmed in the interviews that watching the instructor multiple times in the course helped them build a sense of connection and rely on the instructor for any kind of support.

It was evident that there was a higher manifestation of all the three categories of social presence in multimodal discussions as compared to the text-based discussions. The higher affective category in multimodal discussions could have been due to affordances of the voice-based medium to express emotions through tone, speech quality, and intonation. The higher interactive category in multimodal discussions was demonstrated through a high number of follow-up posts created in response to multimodal posts. Higher cohesion could be due to the perception of closeness due the use of videos by the instructor in the course.

**Indicator level.** In this section, I discuss the manifestation of social presence at the indicator level. Additionally, I discuss the differences in the manifestation of social presence between the text-based and multimodal discussions through social presence indicator density. The social presence indicator density index reveals information about the average frequency of the use of indicators for every post in the six discussions. Therefore, the maximum value for the social presence indicator density index could be 1. According to the CoI framework, there are several social presence indicators under each of the three categories of social presence (Rourke et al., 2001). These indicators are essentially communicative behaviors that support the development of social presence in a community.

The earlier analysis confirmed the higher manifestation of the cohesive category in multimodal discussions. Figure 10 illustrates the comparison of indicators of the cohesive category between text-based and multimodal discussions. It is evident from Figure 10 that 'refers to the group using inclusive pronouns' and 'Vocatives' indicators were higher, whereas, the 'greeting/phatics' indicator was lower in the multimodal discussions as compared to the text-based discussions.

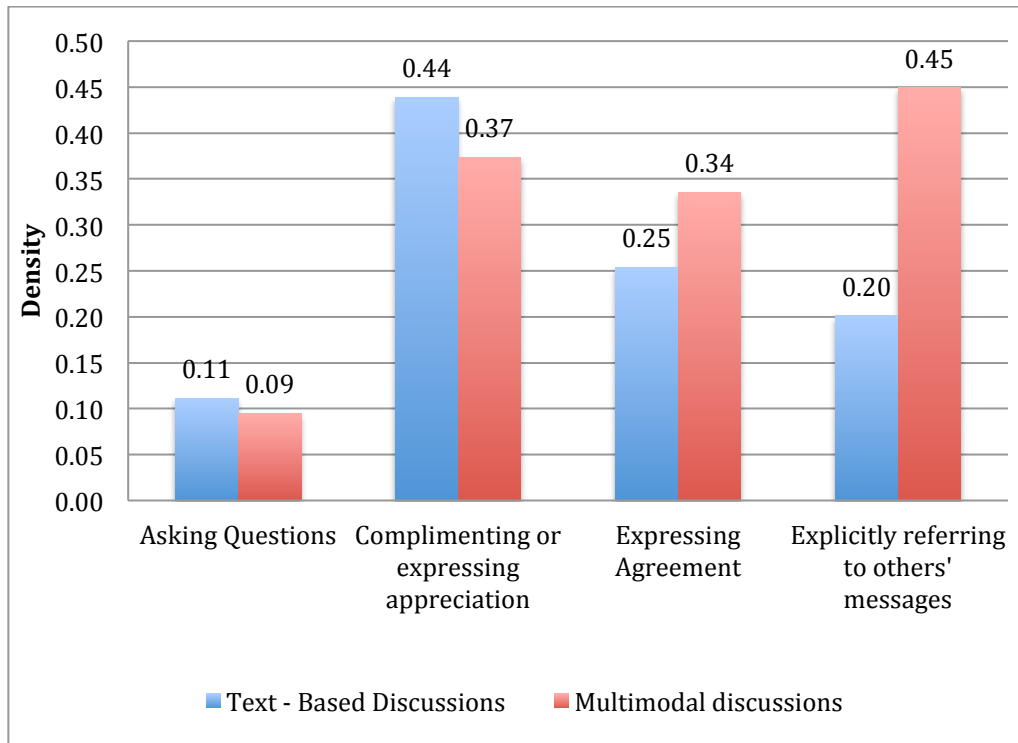


*Figure 10.* Comparison of indicators of Cohesive category between text-based and multimodal discussions.

One plausible explanation for reduced use of the 'greetings/phatics' indicator cited in past research is that as a course moves further along, students became familiar with one another, and hence, they do not feel it is necessary to greet one another whenever they post a comment (Swan, 2002). Moreover, it could also be due to the replacement of general greetings with the names of the participants (Swan, 2002).

Another reason for a lower index of the 'greetings/phatics' indicator in multimodal communication could be related to the etiquettes associated with the medium of conversation (Cui, 2015). Voice-based posts were casual and similar in nature to spoken language. When creating voice-based or Voki posts, students got right to the topic and did not always include greetings. On the other hand, almost all the initial text-based posts began with a greeting such as a "hi" or "hello everyone." Perhaps the students did not choose to include greetings in multimodal posts because of the fact that they were able to establish their politeness and friendliness through the tone of their voice rather than any precursory greetings.

Similarly, the higher manifestation of the interactive category of social presence in multimodal communication was due to the higher amount of posts that indicated references to each other's posts and expressed agreements with each other's viewpoint. Figure 11 below illustrates the comparison of the interactive category indicators between text-based and multimodal discussions. It is evident from the below figure that communicative behavior associated with 'expressing agreement' and 'explicitly referring to other's messages' indicators was higher in multimodal discussions as compared to the text-based discussions.

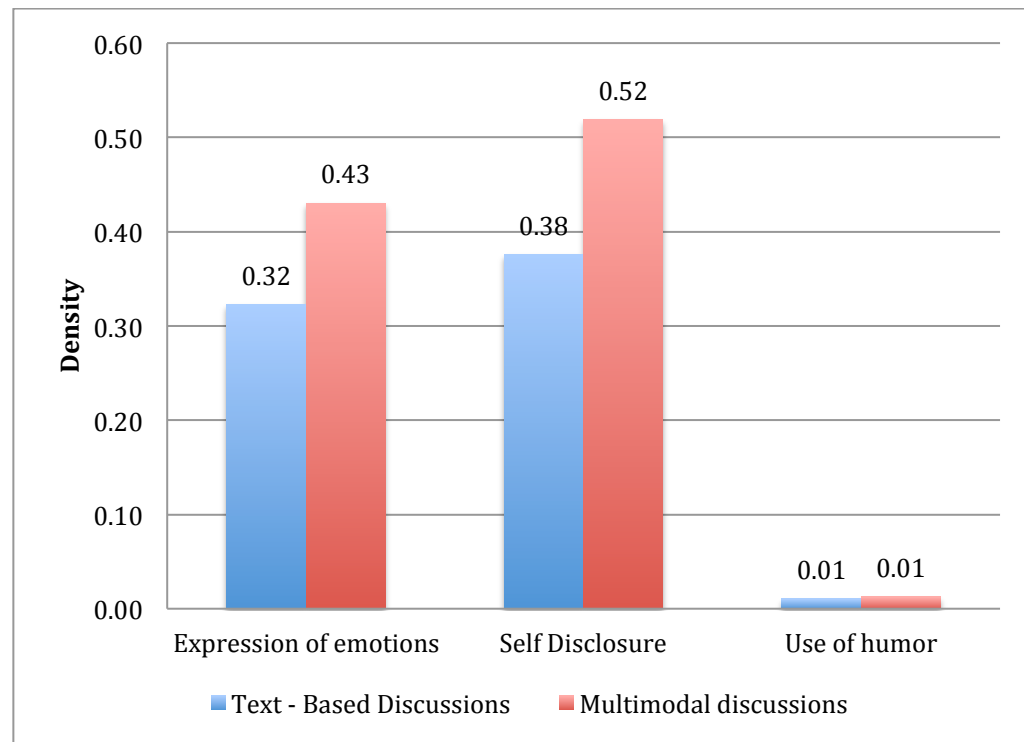


*Figure 11.* Comparison of Interactive category indicators between text-based and multimodal discussions.

This finding contradicts findings from earlier research. Stodel et al. (2006) suggest that it is natural that indicators such as 'expressing agreement' decline over time. They explain how the overuse of words such as "Good point" and "I agree" can give participants a perception of fake conversation. The contradiction of results may be due to the difference in interpretation of indicators. In this study messages such as "good point" were coded under the 'complimenting' indicator rather than 'expressing agreement'.

With the introduction of multimedia in the discussion threads, both affective indicators, the 'self- disclosure' and "expression of emotions" indicators, increased (see Figure 12). This finding is supported by Borup et al.'s (2012) study that assessed the use of asynchronous video and the development of social presence.





*Figure 12.* Comparison of indicators of Affective category between text-based and multimodal discussions.

A human voice is a critical piece of the development of social presence in online courses (King & Ellis, 2009). Through voice intonation, pitch, vocal nods, pauses, and emphasis, students were able to convey their emotions and personalities in these discussion forums. The 'expression of emotions' indicator was coded 37 times in Module 4 discussion, the highest in any discussion in this course. This discussion was unique as it had the highest number of multimodal messages and was hosted using a multimodal application called VoiceThread. It could be argued that affordances of the media enabled users to add more subtle details about their personality and establish their immediacy. Perhaps, the medium enabled the users to experience other participants as being 'real' and 'present' (Kizilelc et al., 2015).

The indicator 'use of humor' was almost non-existent throughout the course. Humor is an important element of affective social presence, and infusing humor in online learning environments contribute to the feeling of immediacy and emotional intimacy (Woods & Baker, 2004). However, research in the past reports a lack of humor in online courses (Garrison & Anderson, 2003; Stodel et al. 2006; Swan, 2003, Lowenthal, 2012). One of the reasons for a limited amount of humor indicators is the problem with its identification. Identifying humor is very subjective, and the risk of being misunderstood when using text to project humor is high (Garrison & Anderson, 2003). Even Rourke et al. (2001) report the lowest inter-rater reliability of 0.25 when identifying humor in transcripts. Use of multimedia is suggested as one way to reduce this risk and to add an element of humor in online courses. However, the findings from this study did not indicate any changes in the 'use of humor' indicator even when students were communicating through multimodal tools.

To summarize, through the measure of social presence density, it was evident that multimodal discussions had a higher social presence as compared to the text-based discussions. All three categories, i.e. interactive, affective, and cohesive, had higher densities in the multimodal discussions as compared to the text-based discussions. At the indicator level, certain communication behaviors such as 'expressing agreement,' 'self disclosure,' and 'expression of emotions' were more prominent in the multimodal discussions as compared to the text-based discussions. The indicator of 'humor' remained unaffected by the choice of medium used for discussions and was the lowest coded indicator.

## **Question 2. How Did Students and Instructor Use Multimedia To Support The**

## Development Of Social Presence?

Students and the instructor made use of a variety of multimodal tools to interact with each other and in the process established their social presence. I discuss how the instructor used multimedia in this course followed by the students' use of multimodal tools to support their social presence.

**The instructor.** Rovai (2002) suggests that, through effective pedagogical practices instructors can establish social presence. This section is organized according to the instructor's multimedia-based pedagogical strategies that contributed to the development of social presence. I discuss how the instructor integrated multimedia into the course design, used multimedia to model the tools, and provide multimodal feedback.

*Integration of multimedia in the course design.* Previous research suggests that through effective instructional designing, social presence can be weaved into an online course (Khurana & Boling, 2012). In this section, I focus on the instructor's integration of multimedia in the course design to develop social presence, which includes the course interface, and the assignments.

The instructor made use of a screencasting program to create an overview video of the eCollege course interface and the syllabus of the course. In the overview video, she explained the course design and the layout of the course. The students confirmed that this screencast was instrumental in understanding the overall organization and the layout of the course.

One of the major challenges to developing social presence for online instructors is to establish their humanness without being there (Lowenthal & Dunlap, 2002). In the beginning of the course, the instructor introduced herself in less than a minute through a video. She used a warm, friendly, and modulated tone while describing her previous job experience, details about her family, and where she lived. Through this video, the instructor was able to share personal information, which is at the core of trust building process in a community (Lowenthal & Dunlap, 2010). The use of videos enabled the instructor to build a personal connection with her students and establish her immediacy.

With her continuous appearance in the course through the videos, the instructor was successful in establishing a personal connection. Research suggests that viewers perceive the person in the video as "more real" and "more present" (Lowenthal, 2010). Tia commented, "Throughout the course – all the Modules -- I mean she was on the screen. We got see her face and how she uses these tools. I think that helped build a connection with the professor." Robin also expressed similar feelings, she commented, "With the fact, with her introducing herself, and, you know, with a number of screencasts where she presented herself, it made a connection. It made the course more personable."

With the use of screencasts and videos, the instructor was successful in establishing her immediacy. Robin mentioned in the interview, "I felt like I have support throughout, say if I was frustrated or confused about anything I felt like [I] could go to the discussion board or you know reach out to the professor and tell her that I am really confused about this activity, could I receive support on it."

Aragon (2003) recommends incorporating multimedia into the design of the course to enhance social presence. The instructor weaved a lot of multimodal tools into various course assignments. She encouraged students to use multimodal tools as a part of their projects, to critique each other's website projects, and to communicate with each other in the discussion threads. For example, she integrated screencasting into the peer feedback assignment. Instead of providing text-based feedback, the students were required to use a screencasting program to provide feedback to each other on their websites. Also, the instructor integrated multimodal tools in the three discussion assignments (Module 4-6). She purposefully chose Voki as she wanted to allow students to project their choices in the online learning environment through their avatars. She mentioned in an interview

That's part of why I chose Voki because you can make an avatar you can record yourself through microphone and then it's like avatar is speaking and you can also type in your text and avatar will read the text for you. So that way it's kind of like they're still doing text but they can change the avatar to look like them so it adds a little personality to it.

The pedagogical strategies that provide an opportunity for students to connect with each other reduce the feeling of isolation and lead to the development of social presence (Kilgore & Lowenthal, 2015). In this course, the instructor used a screencasting program to provide an overview of the interface, introduce herself, and integrate multimedia in students' assignments.

***Use of multimedia to model the tools.*** The instructor used a screencasting program to model the use of three tools (Voki, Vocaroo, and VoiceThread) before asking her students to use them. When introducing a new tool, she created videos that discussed how she had used a particular tool in the past. For example, she created a screencast for

introducing VoiceThread in Module 4's discussion. In this screencast, she showed various ways in which her students could respond to the VoiceThread discussion.

Students appreciated the fact that she made use of multimedia tools to give clear instructions, and they experienced no confusion. One student explained in an interview:

I think the instructions were so clear at a lot of times. The instructor used a lot of modeling. Like, she just did not say that this is what you have to do. Literally, she used multimedia when she was communicating information to us, and explained as what sites to go to and, you know, what the activity would call for us to do.

Research indicates that students mimic the instructors' communication style, and hence, instructors are suggested to model the response posts to set the right expectations (Graham, Cagiltay, Lim, Craner & Duffy, 2001; Tallent Runnels et al., 2006). Students mentioned that they were hesitant and nervous to try out new tools in the discussions, but the instructor's clear instructions and modeling of the tool made them comfortable and motivated to try out the new tools. Tia mentioned, "I think the professor's use of multimedia helped ease the fact that I would explore all of these multimedia tools online." Monica shared similar feelings, and, from her below comment, it is evident that she was cognizant of the affordances of multimedia that contributed positively to her learning experience.

[The videos] It made me want to do more; made me want to focus on my work. She took the time to visually give us directions, which I think explained things better because people interpret texts differently. I took a lot more. I got a lot more out of the directions. I had less questions about the assignment because I could hear her explanations rather [than] just reading a text because I find that confusing sometimes.

Research suggests that non-verbal social cues present in multimedia create a socially comfortable environment, which enhances social presence (Kizilec et al., 2014).

To create a community of online learners, it is important that instructor's pedagogical

strategies focus on reducing student anxieties and frustration (Cui, 2015; Rovai, 2004). The instructor of this course used a screencasting program to model the use of new tools. All the students were able to complete their multimodal assignments and reported little to no anxiety regarding the process.

***Multimodal feedback.*** Recently, multimodal feedback has been the focus of many studies in the field of online education (see Borup, West & Graham, 2012; Borup, West & Thomas, 2015; Thompson & Lee, 2012; West, & Turner, 2015). The instructor provided video feedback to the students on their websites at the end of the semester. Screencasting allowed the instructor to share in-depth feedback with the students. The instructor in this course did not provide video feedback on all the projects. She specifically chose a screencasting program to share feedback on the student's website project. Perhaps, not every project may be suitable for providing video feedback.

Besides communicating the content, the instructor was also able to communicate a variety of social and emotional feelings through her voice, which helped her establish instructor social presence. Most of all, the instructor mentioned that with the voice-based feedback students were able to understand her intentions and did not take the critique of the website personally. Students echoed similar feelings as they felt that the traditional methods of receiving feedback were ambiguous, and often caused much frustration. However, receiving feedback through a screencast helped them make a personal connection with the content and the instructor.

In this course, the instructor used multimedia for a variety of purposes. In essence, the use of multimedia helped the instructor establish her social presence by reducing

student misunderstandings and anxieties. Also, through the use of multimedia she was able to established her immediacy and connect with the students at a deeper level.

**Students.** In this section, I discuss students' uses of multimedia in the course. I then discuss the use of multimedia by the most connected student who also exhibited the highest social presence out of all the students.

**Students' uses of multimedia.** In this course, students' used multimedia in the discussion threads, to provide peer feedback, and to create their websites. Students made use of three different tools in the multimodal discussions forums (Module 4-6). Students were introduced to two new tools (Voki and Vocaroo) in Module 5 and 6 discussions, and were given a choice to use any of these two tools to create a post. It was found that most students preferred to work with the avatar based tool (Voki) over the audio-based tool (Vocaroo). The students created a total of 16 Voki based posts and seven Vocaroo-based posts in these two discussions. Students expressed their preference to work with Voki. One student commented, "Your Voki is engaging to listen to and provides us with an example of a piece of technology that we need some time to be able to use." Students were able to see how Voki could fit into their own classrooms. A student had used a dog as her avatar and seeing this Voki, another student commented, "First of all I loved watching the dog talk! This makes me want to use Voki more with students because I think it would really engage them and keep them on their toes if I were to keep changing the character."

A plausible reason for students' preference to work with Voki could be due to the capability of the tool to project personality through an avatar. For example, Timica used



Voki in Module 5 and 6 discussions to create three posts. All three avatars looked different. She disclosed information about her choices through avatars in these three Vokis. She did a voiceover for one of them and chose an automated computer-based accent for the other two. The students mentioned in the interview and discussion threads that they were hesitant to try new tools. Below is an example of a thread that shows how Timica's Voki-based post received nine follow-up posts, and in some of these posts, students expressed their positive feelings about the tool. In addition, it seemed that Timica's use of Voki influenced Andrew to try the tool and create a follow-up Voki post.

Timica: I tried this for the first time so I hope it works! This would be a great tool for students to use....my middle school kids would have a blast with this. Thank you.

<http://www.voki.com/pickup.php?scid=11205637&height=267&width=200>

Monica: I didn't use Voki, and after seeing yours it is a really cool tool. I completely agree with you about professional development. I feel that we offer the beginning opportunities to teachers to seek knowledge about technology, but we do not follow up with it. We do not dive into the technology aspects and explore how they can better our classroom. We rarely only hit the surface rather than diving into the topic. One day on technology development will not make enough of an impact.

Veronica: Timica you make two excellent points. No matter how willing a teacher is to incorporate new styles, goals, and emphasis there must be well-maintained and functional tools and there must be on-going professional development with an emphasis on the utilization of and training for the modern tools provided by technology. I loved your point that teachers are students too as that is in perfect alignment with our actions within this class.

Christina: I really enjoyed your post because it was very different from the one I just previously commented on. It is very interesting hearing about the difficulties of incorporating technology from a different point of view. I often hear that teachers are not willing to incorporate it, but it makes a lot of sense that it really is just a lack of resources and professional development. I attended a professional development course on google docs and it was really helpful to the more experienced teachers, so I can see how a lack of professional development can impact the use of technology.

Timica: Thank you Christina. At my school, teachers are definitely excited to learn new "stuff" but there is NO TIME. The crazy demands on teachers, with DATA and STUDENT GROWTH make common sense professional development secondary. From my perspective, it is not a lack of interest, it is a lack of freedom to choose what to spend the valuable time on!! :)

Robin: I agree with your statement that "teachers are students too and need support". This reality could or should be used to guide the quality of professional development offered to educators to assist with the increase of the

use of technology in the classroom.

Samantha: Timica my experience teaching in an elementary school were similar to what you described. Most teachers weren't resistant to technology. They just didn't have professional development that allowed them the time to experiment with technology to the point where they could comfortably and effectively use it in the classroom.

Instructor: Your Voki is engaging to listen to and provide us with an example of a piece of technology that we need some time to be able to use.

Andrew: Here is my response. I Used Voki to create a response to your post. I hope the link works  
<http://www.voki.com/pickup.php?scid=11230865&height=267&width=200>

Timica: Andrew....great Voki....this is a fun tool to incorporate into the classroom. I loved your observations and the word that stands out to me is "fluent." You mention that teachers need to become more "fluent" with technology in education and I agree. We will always master what we feel comfortable with and NEW is always challenging. The more fluent, the more successful.

Instructor: Andrew your Voki worked without a problem. From what we've read and people have shared for this Module, the need for professional development seems to be the common thread for barriers to using instructional technology.

Much of the multimodal feedback research focuses on instructors' feedback rather than students' feedback to each other (see Borup et al., 2012). In this course, students were required to provide feedback using a screencasting program on their assigned peer's website. It was evident that the nature of this video-feedback was casual and mimicked face-to-face conversational style. For example, Tia mentioned right at the beginning of her screencast, "I hope I am not too loud or soft in this recording." Using warm and friendly voices, students were able to instill emotions and provide relevant feedback. For example, when Timica reviewed Jamie's website, she complimented Jamie for her website's background, theme, content organization, and overall look and feel of the website. To ensure that Jamie was following her comments, she was pointing to the same places of the website while making her audio narrations. Her feedback to Jamie focused

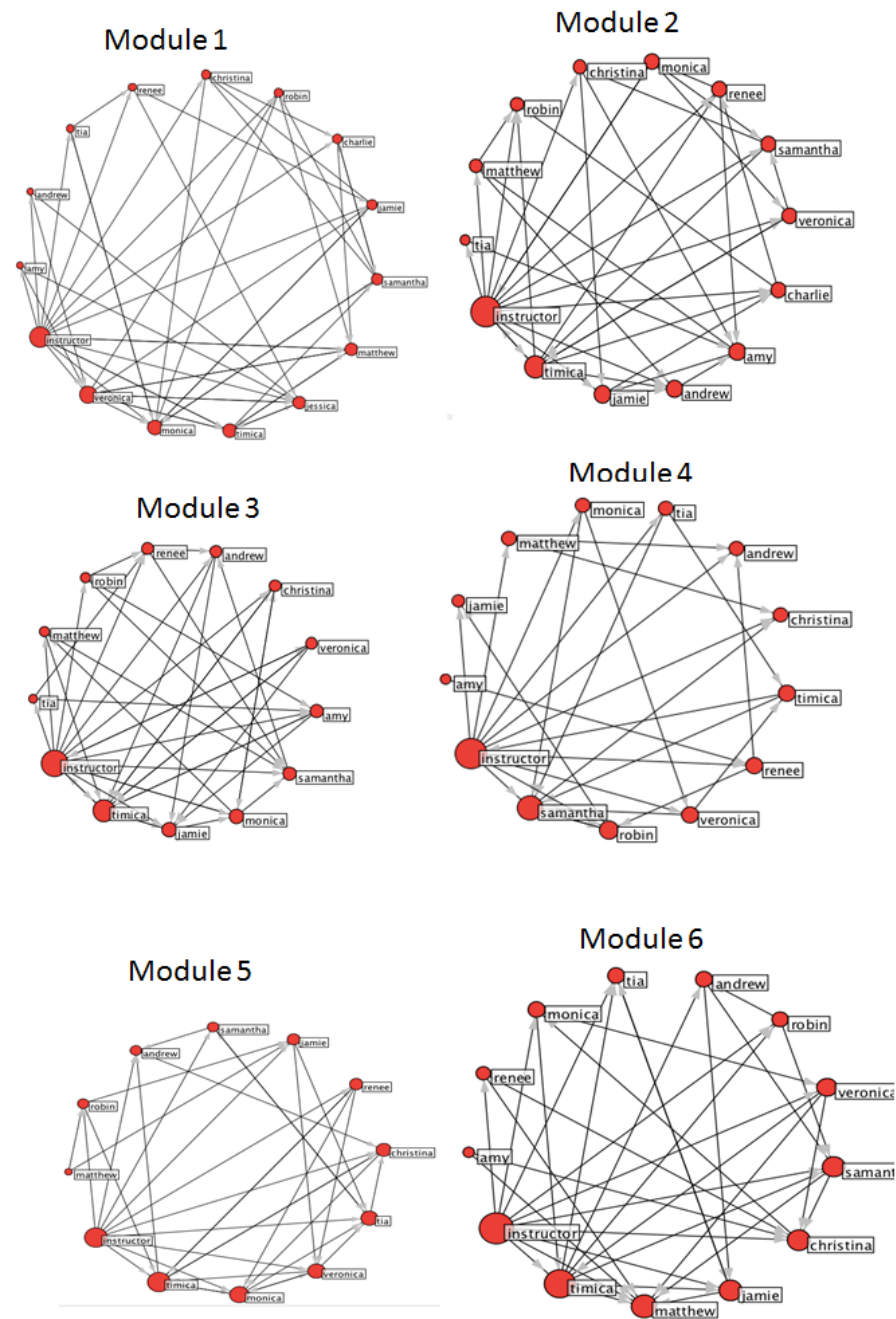
on enhancing the social presence exhibited by her website. For example, one of her suggestion was to include more information about Jamie, and add her pictures on the website. Additionally, she addressed Jamie by her name and often used the word 'us' and 'we' in her screencast. It did not seem like Timica read it off a script or rehearsed it before recording, it felt that she was trying to speak casually. This screencast is an example of the personalized and tailored feedback that students were able to provide to each other through the use of Screencasting tool. Personalization of feedback contributes to the perception of higher a social presence in online teaching learning environments (Keil & Johnson, 2002).

Research suggests that many features of a website have an ability to instill a feeling of social presence to the end user by incorporating features such as personalized greetings, audio or video, avatars, intelligent agents, and personal pictures (Hassanein & Head, 2007). The home page of students' websites included greetings. In addition, some students had included a section about themselves on their website. However, only a couple of students included personal pictures in this section. For example, Tia's website included information about her and pictures of her pets. Timica also included her picture with her colleagues.

Social presence is a determinant of how others' perceive each other in an online course (Richardson, 2003). The review of literature in this study indicated that in most of the online courses, instructors use multimedia to establish their social presence, but not much opportunity is given to students to use these tools to project their personalities. In this online course, students worked with multiple tools that gave them an opportunity to share more about their life, and in this process they established their social presence.

*Use of multimedia by the most connected student who also exhibited highest social presence.* Research indicates that some students exhibit strong social presence while others not so much (Lowenthal, 2012). This means that some students make use of social presence indicators much more than the others in their conversations. In this section, I explain why I chose to focus on Timica, and how her high social presence was manifested in her multimodal conversations.

*Why Timica?* To understand students' use of multimedia to establish their social presence, I identified the most connected student, and the student who had the highest social presence in the online course. To identify the most connected student, I made use of SNA's degree centrality measure. Through degree centrality measure, I was able to identify the student who had received and sent the most number of posts in the course. The below figure illustrates the patterns of conversations that were established throughout the course's six Module discussions.

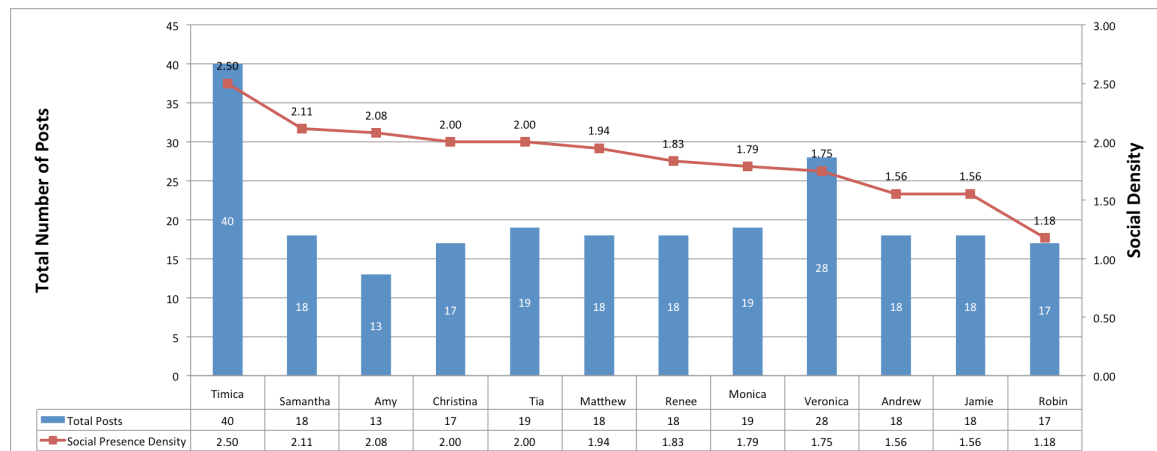


*Figure 13.* Social network graphs for all six Module discussions.

Figure 13 above illustrates network graphs created for all six Module discussions. The above graphs reflect the number of responses made by each member in the discussion thread to each other's original post. Each participant is represented by a 'node'

with lines or 'ties' between the nodes indicating frequency and direction on the interaction (Mazur et al., 2010). The size of the node corresponds to the centrality or the active role played by the member in the discussion. It was also evident that students contributed differently to discussions. Through the above social networks, it was evident that Timica was the most connected student in five out of six discussions (except Module 4).

I also calculated social presence density for each student in the course. The below figure illustrates the number of posts created and social presence density of each student in this course.



*Figure 14.* Total posts and social density of each student.

Based on the above figure, it was evident that Timica had the highest social presence density and the highest amount of posts amongst all students in this online course. Both SNA and social presence density indicated that Timica was the most connected student and exhibited the highest social presence. She made a total of forty comments in the six discussion thread assignments, way more than the required amount. Thirty-nine out of forty posts created by her were coded for at least two categories of

social presence. Besides a high number of posts, she created the most number of multimodal posts. Also, she was the only student in the online course to include a picture of her family in her first discussion thread post and her website. In addition, she was the only student who used multimedia to create a follow-up response post to comment on other people's posts. Therefore, I discuss Timica's case in detail to understand the manifestation of social presence through multimedia.

*Timica's social presence.* Timica had been an English teacher in a middle school for the last nineteen years. At the time of data collection, she was nearing the end of her Masters degree in Library and Information Sciences and was transitioning into the role of school media specialist in her school. The below bar diagram (see Figure 15) illustrates the distribution of different indicators of social presence present in her comments.

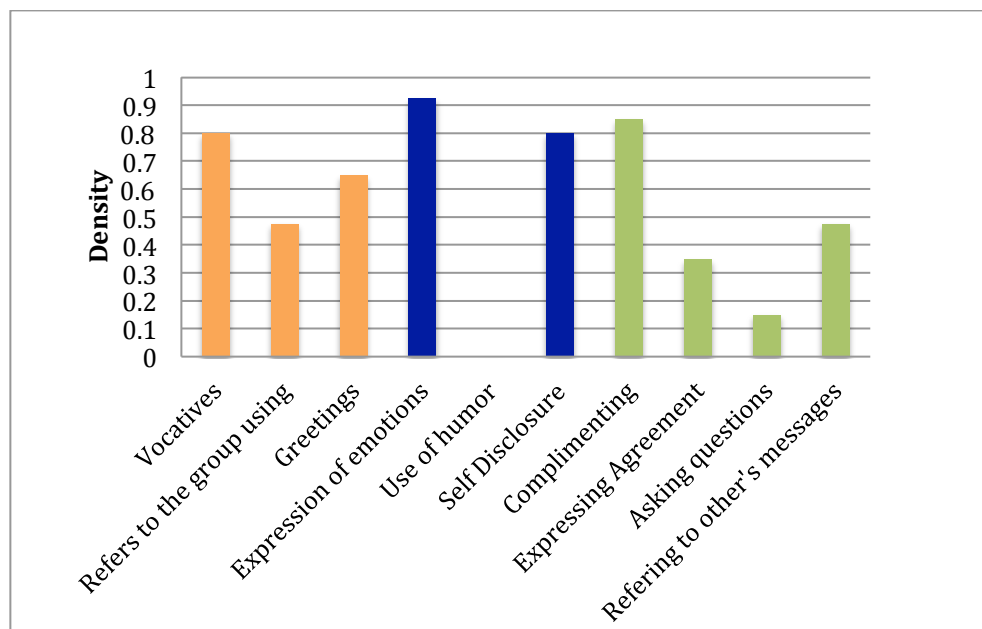


Figure 15. Distribution of social presence indicators in Timica's posts.

The two most occurring indicators of social presence in her posts were 'expression of emotions' and 'self-disclosure.' Timica was proficient in expressing emotions through multimedia. The 'expression of emotions' indicator was coded the most with .93 density. This means that 93% of her messages had an element of emotion. The 'self-disclosure' indicator was coded with 0.8 density, which means that 80% of her messages had an element of self-disclosure. Affordances of multimedia enabled her to reveal more about her life and her choices.

Even though Timica had a high social presence, figure 15 above indicated that she was proficient in using certain indicators of social presence but did not use the other indicators. Timica did not make any multimodal post that included humor. Even though all the indicators are weighted the same under the social presence coding scheme, it may be conjectured, especially based on the distribution of Timica's social presence indicators and her high social presence, that some of them may carry more weight than others, especially in a multimodal learning environment. A conjecture could be that within multimodal discussions, the indicators related to affect might carry more weight than the others. This may be because of the presence of non-verbal and verbal cues that contribute to the sense of social presence as much as the spoken word. More research is needed regarding the weighting of these twelve indicators of social presence, especially in multimodal environments.

To conclude, I discussed how certain affordances of multimedia enabled the instructor and her students to establish their social presence in this online course. The instructor introduced herself and the organization of the course through videos. She made use of a screencasting program to provide clear instructions and relevant feedback. In



addition, she provided video-based feedback to the students. The instructor's use of multimedia led to reduced misunderstandings, which helped in developing a positive perception of the instructor. Student's used a lot of multimodal tools to complete a variety of tasks in this course and in the process established their social presence. In addition, the findings indicated that Timica was the most connected student and had the highest social presence amongst all students in the online course. Timica's social presence indicators helped in building several conjectures related to the use of multimedia and social presence coding scheme.

### **Question 3. What Were Students' Views Of Using Multimedia In An Online Course?**

Using the constant comparative method, I analyzed the student interviews and the discussion data to understand the student views related to the use of multimedia in the "Introduction to Teaching with the Digital Tools" course. Students in this course used multimedia broadly in two ways. Firstly, students used multimedia to communicate with each other within the discussion forums. Secondly, students used screencasting programs to provide feedback to each other on their websites. Student views are discussed below in relation to these two specific uses of multimedia in the course.

**Students' views of using multimedia in the discussion threads.** The students made use of three different tools Voki, Vocaroo, and VoiceThread to create their posts. The three key themes related to students' views from the use of multimedia in the discussion threads are discussed below.

***An engaging and enjoyable experience.*** All students who were interviewed believed that the experience of creating and listening to multimodal posts made the course more enjoyable. In her interview, Tia mentioned that it was an engaging experience. She said, “You know, at first, it was just another class. It was OK, and how to get through this, but it ended up being more than that. It was actually kind of fun when I was logging on to eCollege; it was kind of enjoyable.” Additionally, some students felt excited and motivated to work with these tools because of their novelty instead of completing conventional, text-based assignments. When asked about their initial reaction to work with these tools to create their responses for discussion assignments, Robin mentioned:

I think that is where my excitement came in, like...Oh! Now I can listen to just everyone’s responses instead of trying just pick and choose who I want to respond to. So that was like my initial reaction when we had to screencast and when we had to listen to multimedia presentations of other students.

Tia explained how multimodal posts motivated her to check every post in the forum. She noted, “I liked multimedia a lot more than the text based. Text based, I usually forgot to check that someone’s response might be to me.” Research suggests that this feeling of acknowledgement is important for developing social presence in an online course (Borup et al., 2011). Tia's viewpoint discussed above corroborates the earlier finding that the use of multimedia in threaded discussions motivated students to attend to more posts rather than just meeting the requirements.

***Build deeper social connections.*** All three students who were interviewed had taken one or two online courses before enrolling in the 'Introduction to Teaching with Digital Tools' course. They took the interview as an opportunity to reflect on their previous

online learning experiences and discussed how they felt disconnected in their previous online courses. Robin expressed how she felt way more connected in this course as compared to her previous online courses. She credited this to the use of tools such as screencasting and Voki to create an environment where students could really connect with each other. As the course progressed, students got an opportunity to use more multimodal tools. Tia commented, “In the beginning [I] felt more disconnected but as we went through the course and we tried more tools, it got better.” Students also pointed out that listening to others in the discussion forums expressing their viewpoint helped them to connect better with each other. In her interview, Monica detailed:

I actually really liked hearing, you know, the forums where I would hear someone’s voice. Actually, you can hear them judging your work, and you can hear the tone in their voice. So, I took that much more personally than when someone just wrote about it because I know when I am writing back a response I don’t feel the connection to what I am writing back to that person.

The students mentioned that the multimodal tool Voki had been particularly instrumental in creating a sense of someone's real personality. Voki enabled a user to create an avatar, and a few students pointed out that they were able to imagine other students' personality by looking at their avatar. After looking at other students' multimodal posts, Veronica commented, “This is just a guess, however, is your favorite color purple?”

***An easier and faster process.*** Research in the past discusses the tedious and time-consuming process of keeping track of all the discussion activity in online courses (Rabbany, Elatia, Takaffoli & Zaïane, 2014). Teachers and students find this huge amount of data generated through discussion forums laborious to comprehend. Most of the students enrolled in this course were graduating the same year. They mentioned being

extremely busy and inundated with assignments. Students found responding to the multimodal discussions easier and a welcome change from the rest of their assignments. Robin in her interview explained how multimedia made it easier for her to respond to the discussions:

There was a requirement that you had to respond to at least two other people. If you had 16 people in literally like . . . My background is math so what I would do is on times when I would have to read them, I would pick two from the top portion of the discussion or two from the bottom because I did not have time to read all the student discussions right? But, when we used multimedia apps, I was able to listen to all the class responses because instead of me having to read. I can listen to those responses and compare, you know, or and decide which ones I want to respond to.

Students expressed how the use of multimedia in the threaded discussions helped them connect and respond faster, making participation in the discussion activity an engaging and enjoyable experience. This finding regarding students' views on the use of multimedia is in accord with previous research (see Borup et al., 2011).

**Students' views on providing multimodal feedback.** Students used the screencasting program called Screencastomatic.com to share feedback with their peers. The three students unanimously favored the multimodal feedback over the text-based feedback. They felt that the multimodal feedback was much easier to follow and understand. This kind of feedback eliminated chances of confusion thereby contributing to a positive social learning experience. Robin explained:

I felt like the screencast assignment was more helpful, and it was my first time I was giving feedback via screencast. I think you are able to communicate your specific ideas without being misunderstood because I am literally on your site, and I am moving my mouse around to highlight exactly what it is that I am complimenting or stating concerns about. So, there is no confusion right?"

Additionally, two of the three students also mentioned that hearing other students' voices in the screencasts helped them visualize their peer's personality in a better way. Monica discussed how a screencast completely changed her conception of someone's personality. She explained, "When people shared their screencasts with me, I definitely had a much different idea of what they sounded like, but you just had a picture based on what you read, and when they speak they sound completely different."

In an attempt to corroborate students' viewpoints, I looked into their actual use of multimedia. I specifically looked into the students' screencasts to see how multimedia helped them make the course more personal. With the extensive exposure to the use of multimedia in this course, it felt like the students were cognizant of the power of these tools to communicate feelings, emotions, and personality. While reviewing a peer's website, a student specifically suggested that this student include a video on her website to include more about her personality:

I wonder if, perhaps, some artwork would just liven up the site. Perhaps, a little bit of your sense of humor, your style, and personality. If, perhaps, an actual video of you welcoming them [students] to your class or maybe sharing some of the things about yourself or why you got into Math, might again, just make you even more accessible to your students.

Tia's suggestion to Andrew on the draft of his website had a similar theme. She said:

I was just wondering if you can add a little sense of more of your personality. Like your goals and may be your mission for your class as a whole for your language arts class as a whole. I think that could help instead of like just getting to business build more of a connection with the families parents and students. I think it would be great to add to the home page to just set the tone.

These personalized suggestions shared by the students validated their positive views on the use of multimedia in this course. It can be argued that students were able to make connections between the use of the tools and development of their social presence.

To conclude, this chapter investigated the manifestation of social presence in relation to the medium of communication. The manifestation of overall social presence was higher in multimodal discussions as compared to the text-based discussions. The results hinted that certain communication behaviors related to the development of social presence may flourish well in multimodal learning environments as compared to the text-based environments. In addition, the instructor's and students' uses of multimodal tools offered insight on the process of development of social presence in an online course. Multimodal tools used in this course occurred to reduce the feeling of isolation and development of a sense of community. Students' views supported the use of multimedia to make the course more personal and engaging.

## Chapter 5

### DISCUSSION

Most of the research on Community of Inquiry focuses on studying the communication behavior in a text-based community, and further research is needed to understand the manifestation of social presence in a multimodal community (Lambert & Fisher, 2013). Additionally, much of the existing research centers on students' and instructors' perceptions of using the new tools in online teaching and learning environments and not on the actual communication behaviors. The primary purpose of this study was to understand the manifestation of social presence in different multimodal online discussions. The following research questions outlined the scope of this study.

1. How is social presence manifested in different modality online discussions?
2. How did students and instructor use multimedia to support the development of social presence?
3. What were students' views of using multimedia in an online course?

I designed an exploratory mixed-method case study that used both qualitative and quantitative methods. 'Introduction to Teaching with Digital Tools' served as a single bounded case for this study. I collected data throughout the Spring 2015 semester, and the data sources for this study comprised of discussion threads, digital artifacts created as a part of the course, and instructor and student interviews. The three theoretical frameworks Social constructivism, Community of Inquiry (CoI), and Social Network Analysis (SNA) shaped the development of this study. I employed three different analyses aligned with the theoretical frameworks to analyze the data. These analyses

were a) content analysis, b) social network analysis, and c) constant comparative analysis.

This last chapter discusses the key findings and situates them within an existing body of literature. To conclude this study, I discuss its limitations and implications, and make recommendations for further research and practice.

### **Significant Findings**

Several key findings emerged from this research study. In the following paragraphs, I address the key findings related to social presence, the social presence coding scheme, and the multimedia tools used to communicate in this study.

**Social presence.** The overall social presence density indicated a higher social presence in the multimodal discussions as compared to the text-based discussions. At the category level, all three categories had a higher manifestation in multimodal discussions as compared to the text-based discussions. There is a huge gap in the previous research as there are very limited studies that discuss the manifestation of social presence in reference to the media used for communication.

I developed several conjectures related to properties of multimedia as a plausible reason for a higher manifestation of social presence in multimodal discussions.

First, a high index of 'expression of emotions' in multimodal discussions could be related to the presence of vocal and nonvocal cues in multimodal posts. Previous research suggests that voice-based discussions help in the development of a community by allowing students to express deep feelings (Xie, 2006). The affective category of social



presence relates to the expression of feelings related to self, others, or things. The manifestation of this category of social presence was highest in Module 1 and 4 discussions. The fact that affective category was coded highest in Module 1 discussion is not surprising at all. Research in the past has reported high manifestation and importance of affective communication at the beginning of the course (Ubon & Kimble, 2004). However, in this study, Module 4 discussion had the highest amount of audio posts. Perhaps, both these discussions (Module 1 and 4) enabled students to perceive other students as "real" and "there" as a result of the communication media and the nature of the discussion prompt (Lowenthal, 2010).

Second, the higher manifestation of 'self disclosure' in multimodal discussions as compared to text-based discussions could be due to factors related to trust. It was observed that the nature of the content of the multimodal posts was more private as it included details about students' lives beyond the classroom. Research suggests that the permanent nature of students' participation in the form of text-based threaded discussions is a huge deterrent for students to disclose confidential and private information (Siemens et al., 2013). The other reason could be related to the building of trust in a community. Trust and self-disclosure share an intimate relationship where one builds on another (Rourke et al., 2001). In an online text-based environment, it is difficult to establish trust when students do not know much about each other (Siemens et al., 2013). In this course students had several opportunities to hear each other and learn more about each other's likes and dislikes through their voice-based posts and Avatars. In addition, the Instructor also played a huge role in establishing trust within the community by modeling the use of the videos and screencast to disclose her background and professional information.

Third, the higher manifestation of cohesion category in multimodal discussions could be related to the etiquettes associated with the medium of conversation. Every medium has its associated etiquettes, and written communications tend to be more formal as compared to verbal communications (Brennan & Ohaeri, 1999). Brennan and Ohaeri (1999) suggest that text-based conversations are perceived less polite because of the lack of social cues. Whereas, through voice-based posts, users can establish their politeness through the social cues manifested in their tone and intonation. The higher manifestation of 'Greetings/phatics' indicator in the text-based discussions could be there to compensate the lack of social cues in a text-based environment that establish the tone and politeness in a conversation.

Fourth, the higher manifestation of the interactive category in multimodal discussions could be related to the attraction associated with the high self-disclosure index of multimodal posts (Sheldon, 2009). The interactive category of social presence is related to messages that build upon other's posts, like someone raising a question, making a compliment, and expressing an agreement. The findings indicated that multimodal posts received more follow-up posts as compared to the text-based posts. Research suggests a symbiotic relationship between self-disclosure and attraction in mediated environments (Sheldon, 2009). The content of the multimodal messages, the social cues in students' voices, and visual cues in students' avatars all contributed to high self-disclosure. Perhaps, this high self-disclosure in multimodal posts provoked others to respond to these posts over the text-based posts.

In the next section, I discuss the key findings related to the social presence coding scheme used to assess the level of social presence in this study.

**The social presence coding scheme.** Recent research is beginning to stress the need for the expansion of the existing social presence framework to multimodal learning environments (Cui, 2015; Wu, 2015). In the past decade, researchers have studied the development of social presence using text-based discussions, "when today more advanced technologies are available for creating these communities" (Lambert & Fisher, 2013, p. 14). Research is full of evidence that multimodal communication includes a large number of social cues. Indicators such as "humor, emotions, self-disclosure, support or agreement for an idea, addressing people by name, greetings, compliment another's idea" proposed by Rourke et al. (2001) as a part of the social presence coding scheme can be easily observed in an audio form (Portolese & Trumpy, 2014, para. 9). However, many of the indicators of social presence outlined by Rourke et al. (2001) can only be identified within a text-based community.

This study is the first to discuss the steps to fill the existing gap in the literature by expanding the application of the existing framework to multimodal learning environments. I propose a revised definition of the 'expression of emotions' indicator to identify the manifestation of this indicator in multimodal learning environments. In addition, the current study proposed a method to code the posts created by tools such as Voki. In this study these Voki based avatars were implied as manifestations of the students' choices, likes and dislikes. Therefore, these avatars were coded as an indicator of self-disclosure.

In addition, I discuss the process of coding voice data directly using the social presence-coding scheme. The limited research that discusses the development of social presence in multimodal environment transcribes the multimodal data to prepare the data

for content analysis (King & Ellis, 2009; Wu, 2015). However, I used the raw multimodal files to capture all the social cues (nonvocal and vocal) present in the conversation, which is otherwise missed in multimodal communications. Teasing out emotions from audio files is a complex and time-consuming process. The reliability coding process revealed subjectivity in identifying and interpreting the emotions. However, it was easier to come to an agreement since the unit of analysis for this study was a single message. The inter-rater reliability process adopted in this study supported the choice of unit of analysis as a single message especially when working with multimodal data and emotions. This study lays down the foundation for future research that focuses on the adaptation of the CoI framework to multimodal learning environments.

To conclude, I identify gaps in the existing social presence coding scheme and propose measures to address them by suggesting various ways to expand the application of the existing framework to multimodal learning environments. In the next section, I discuss the significant findings related to the use of multimedia tools.

**The multimedia tools.** In the interviews the students expressed their preference to work with Voki over other tools. Many researchers have stressed the importance of using audio and video tools within the threaded discussions to provide more cues that lead to the development of social presence (Borup et al., 2012; Ice et al., 2007). In Module 5 and 6 discussions, the students created a total of 11 and 10 multimodal messages either through Voki or Vocaroo. Previous research indicates that when working with audio or video tools, many students feel anxiety about recording their voice and facing the camera (Ching & Hsu, 2013). Students also report that much time is wasted in

editing, rehearsing, and handling technical issues (Colorado & D'souza, 2012). Tu and McIssac (2002) explain that students' perception of the complexity of a task influences the degree of social presence. In addition, they suggest training that focuses on the use of the tool to communicate alleviates tension and develops social presence. A plausible reason for students' preference to work with Voki may stem from the fact that this tool did not require them to face a camera or record their voice. In addition, the students did not experience additional anxiety working with the new tool since the instructor modeled the use for them.

Unlike face-to-face instruction, it is extremely difficult to judge students' confusions in online environments. Research suggests that students' perplexities lead to the development of a feeling of isolation and therefore influence social presence (Hara & Kling, 2001). Screencasts proved to be an instrumental tool in reducing misunderstandings and confusions in an online environment. In this course the instructor used this tool to provide instructions and feedback.

Research is consistent about instructors and instructional designers experiencing difficulties when trying to establish the social presence in a text-based community (Borup et al., 2011; Lowenthal & Dunlap, 2010). Using multimedia is suggested as one of the strategies to enhance social presence in an online course (Horvath & Lombard, 2010). However, limited research-based strategies are available that focus on matching the tool with the learning activity to develop the sense of community. "No matter what tools are employed, we are reminded that successful development of community will depend largely on how an instructor designs the course" and integrates social presence using proven research-based pedagogical strategies (Lambert & Fisher, 2013, p.14). This study

demonstrated some of the authentic ways to weave social presence in the design and facilitation of the course through the use of multimedia.

### **Limitations of the Study**

Like most research, this study also had its limitations. These were a restricted sample size, a limited number of multimodal tools used, and a message used as a unit of analysis.

The sample size was limited to a small group of adult learners enrolled in 'Introduction to Teaching with Digital Tools,' an online asynchronous graduate level course. The course focused on educational technology, and the adult learners enrolled in this course were either pre-service teachers or practicing teachers. Therefore, it is hard to generalize the findings based on such a small sample. Similar studies with differing sets of sample population are suggested to increase the generalizability of this research's findings.

Additionally, the use of the multimodal tools in this study was limited to the asynchronous tools such as VoiceThread, Voki, Screencastomatic.com, and Vocaroo. Similar studies with an array of other multimodal tools may uncover different findings. The experience of communicating afforded by synchronous tools is different as feedback is instant, and there is not much time for reflection (Wu, 2015). Regarding the timeline, the multimodal tools were introduced in this course from the fourth Module onwards. This course was a fifteen-week long course, and Module 4 was presented during the sixth week of the semester. Perhaps, a similar study could be designed where students have exposure to a wider choice of multimodal tools and for a longer duration of time.

Additionally, this study also suffered from a methodological limitation. As mentioned earlier in Chapter three, the unit of analysis for this study was a complete post or a message. Hence, minute details regarding the frequency of occurrence of an indicator within a single post may have been missed in this study. Lowenthal (2012) also noted this limitation in his study. For instance, if an indicator under the cohesive category of social presence ‘refers to the group using inclusive pronouns’ occurs more than once in a message, the researcher in this study still coded this indicator once because the unit of analysis for this study was a message. For example, in the below message, even though ‘we’ or ‘us’ appeared three times (highlighted in yellow), this message was coded only once under the ‘refers to the group using inclusive pronouns’ indicator and once under the ‘cohesion’ category. If the unit of analysis for this study were a sentence instead of a message, then the indicator ‘refers to the group using inclusive pronouns’ must have been coded thrice for this post.

Congratulations on your upcoming graduation Charlie! I love your comment that "skill in troubleshooting is much different than having hands on experience with specific programs for educators" because it is a key concept **we** will examine in this course. (**We**'ll learn more about that in Module 4.) I look forward to you sharing with **us** your perspective of the technical challenges that may arise when trying to implement some of the digital tools.

Perhaps, the same study with a different unit of analysis would reveal different results.

## **Implications**

This study has strong implications for both research and practice. The research on the CoI framework in multimodal environments is at a very nascent stage. Inconclusive

results have been reported when the CoI framework was applied within multimodal learning environments (Wu, 2015). Fifteen years ago, Rourke et al. (2001) stated that “current applications of computer conferencing are mainly text-based and largely asynchronous; therefore, to extend these concepts to educational uses of CMC, these behaviors will need to be reconsidered in their textual and asynchronous forms” (p.5). However, a lot has changed in online learning environments with the growth of multimedia tools. Online courses are now using a variety of tools with different synchronicity to meet course objectives. In this study I have suggested a few measures to adapt the existing social presence coding protocol to a multimodal learning environment. Further research is required to understand, identify, measure, and operationalize the behaviors that contribute to the growth of social presence in multimodal learning environments.

The study also has implications for practice. Research recommends to "look beyond the use of discussion forums and begin exploring the impact of other tools that can be just as effective, if not more so, in developing communities of inquiry in online learning" (Lambert & Fisher, 2013, p.14). In this study I have discussed some of the ways in which multimedia can be integrated into course elements such as course design, instruction, and feedback that support the development of social presence. The use of the tools produced higher peer awareness and clearer understanding of the course goals and expectations. The findings of this study inform the choice of multimedia tools and aligned pedagogical strategies. Instructional designers and instructors can use the results to inform the design of an online learning environments where learners feel supported and truly a part of a community.



## **Suggestions for Further Research**

The findings of this study raise some additional questions for further research. Using SNA and social presence coding scheme, Timica was identified as the most connected student with the highest social presence. The two most frequently occurring indicators in Timica's posts were 'self-disclosure' and 'expression of emotions' both related to the affective category. The results of this study suggested that there could be certain communication behaviors that thrive well in the multimodal environments over the text-based learning environments, perhaps, communication behaviors related to affect. Based on the manifestation of Timica's social presence indicators and her position in the network, it could be conjectured that all the ten indicators under social presence might carry different weights depending on the medium of the communication and its synchronicity.

In addition, till date social presence research has focused on the interactive behavior but does not take into account the patterns of interaction. Unlike face-to-face interaction, it is known that affordances of different mediums create different patterns of interaction (Gunawardena, 1995). Patterns of interaction reveal much about the development of inter-personal relationships, which is at the heart of social presence research (Fahy, Crawford, & Ally, 2001). An example might be a situation where a student interacts with only one other student in the online course. Based on social presence coding scheme, this particular student may still have a high social presence because of his/her communicative behavior, but he/she might not connect to any other student in the course and may not feel a part of the community. Social presence research can benefit from the research in the field of social networking to answer questions

like,"How does self-disclosure through multimedia invoke a response from others?"

Further research should focus on understanding the development of social presence from the interaction patterns perspective.

Newer forms of technologies support creative, engaging, and exciting learning environments that provide students with a very similar experience to face-to-face learning (Lambert & Fisher, 2013). Further studies with a focus on courses that utilizes a wider array of both synchronous and asynchronous multimodal tools should be undertaken. There is little discussion regarding the suitability of the growing and complex multimedia tools for hosting a threaded online asynchronous discussion. Many of the new tools (e.g., Skype, YouTube, and Facebook) used in online courses were not originally designed for the purpose of education (see Borup et al., 2012; DeSchryver, Mishra, Koehleer & Francis, 2009; Strang, 2012). The information about the social presence of a particular tool may be especially helpful to facilitate appropriate selection of tools for suitable learning activities (Dennis & Kinney, 1998). The suitability, affordances, and the correct use of these tools should be researched for various tasks and documented.

Past research is consistent in suggesting the use of humor as a strategy to enhance social presence (Aragon, 2003; Polhemus et al., 2001; Rourke et al., 2001; Sung & Mayer, 2012). However, researchers have consistently reported little to no evidence of humor in online courses (Lowenthal, 2012; Stodel et al., 2006). Use of multimedia is suggested as one of the strategies to include more humor in online courses (Lowenthal & Dunlap, 2010). However, this research proved no change in the 'use of humor' indicator even with the use of multimedia. For instance, it was surprising to see that even with Voki posts where a student used a dog or a chipmunk as their avatar, none of the follow-

up posts had an element of humor. Further research should be undertaken to understand the identification and impact of this indicator on social presence. This finding also raised an important question whether humor could be intentionally woven into the course using multimedia or not. If yes, these multimedia based strategies to include humor in the course design and facilitation strategies should be researched and documented.

## **Conclusion**

To summarize, this mixed-method research used three different but inter-related theoretical frameworks to situate the current study and answer the three research questions. The methods of data analyses were consistent with the theoretical lens adopted for this study. The findings of this study demonstrated various ways in which multimedia could be used to enhance social presence in an online learning community. The pilot coding process revealed the inability of the social presence-coding scheme developed by Rourke et al. (2001) to capture certain social presence indicators in multimodal forums. The study addressed this gap by suggesting a few revisions to adapt the existing coding scheme to dynamic learning environments.

The findings of this study revealed higher manifestations of all the three categories of social presence in the multimedia-based discussions. Based on the findings, several conjectures related to the affordances of multimedia were proposed as reasons behind the higher manifestation of social presence in multimodal discussions. The study suffered from three major limitations. These were restricted sample size, a limited number of multimodal tools used, and message as a unit of analysis. Overall, the results of the study have strong implications for both research and practice.

The strength of the study was primarily in its methodology to study social presence. Multiple methods informed by different conceptual frameworks were used to understand the manifestation of social presence and how multimedia tools contribute to its development. To capture the true essence of multimodal communication, the posts created using multimedia were coded in their original form instead of transcribing. In addition, interviews with the students and instructor were conducted to help supplement the data captured through the course.

## References

- Abawajy, J. (2012). Analysis of asynchronous online discussion forums for collaborative learning. *International journal of education and learning*, 1(2), 11-21.
- Akyol, Z., Garrison, D. R., & Ozden, M. Y. (2009). Development of a community of inquiry in online and blended learning contexts. *Procedia-Social and Behavioral Sciences*, 1(1), 1834-1838.
- Z. Akyol, D.R. Garrison, (2008). The development of a community of inquiry over time: Understanding the progression and integration of social, cognitive and teaching presence. Unpublished manuscript
- Albert, T. C., Goes, P. B., & Gupta, A. (2004). GIST: a model for design and management of content and interactivity of customer-centric web sites. *MIS Quarterly*, 161-182.
- Allen, I. E., & Seaman, J. (2013). *Changing Course: Ten Years of Tracking Online Education in the United States*. Sloan Consortium, Newburyport, MA.
- Allen, E. I., & Seaman, J. (2011). Going the distance. Babson Survey Research Group. Retrieved from <http://sloanconsortium.org/publications/survey/index.asp>
- An, H., Shin, S., & Lim, K. (2009). The effects of different instructor facilitation approaches on students' interactions during asynchronous online discussions. *Computers & Education*, 53(3), 749-760.
- Anderson, T. (2005). Distance learning – social software's killer ap? Paper presented at the *ODLAA Breaking Down Barriers* Adelaide, South Australia.
- Anderson, T. (2004). Teaching in an online learning context. *Theory and practice of online learning*, 273-294.
- Anderson, T. (2003). Getting the mix right again: An updated and theoretical rationale for interaction. *The International Review of Research in Open and Distance Learning*, 4(2).
- Anderson, T., & Dron, J. (2011). Three generations of distance education pedagogy. *The International Review of Research in Open and Distance Learning*, 12(3), 81-97. Retrieved from: <http://www.irrodl.org/index.php/irrodl/article/view/890/1663>
- Anderson, T., Rourke, L., Garrison, R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2), 1-17.
- Annand, D. (2011). Social presence within the community of inquiry framework. *The International review of research in Open and Distance Learning*, 12(5), 40-56.
- Aragon, S. R. (2003). Creating social presence in online environments. *New Directions for Adult and Continuing Education*, (100), 57-68.
- Arbaugh, J. B. (2008). Does the community of inquiry framework predict outcomes in online MBA Courses?. *International Review Of Research In Open And Distance Learning*, 9(2), 1-21.
- Arbaugh, J. B., Cleveland-Innes, Diaz, S., Garrison, D. R., Ice, P., Richardson, J., & Swan, K. (2008). Developing a community of inquiry instrument: Testing a measure of the Community of Inquiry framework using a multi-institutional sample. *Internet and Higher Education*, 11, 133-136.
- Arbaugh, J., Bangert, A., & Cleveland-Innes, M. (2010). Subject matter effects and the community of inquiry (CoI) framework: An exploratory study. *The Internet and*

- Higher Education*, 13, 37–44.
- Arbaugh, J. B., & Huang, A. (2006). Does "teaching presence" exist in online MBA courses? *The Internet and Higher Education* 9, 9-21.
- Argyle, M., & Dean, J. (1965). Eye-contact, distance and affiliation. *Sociometry*, 289-304.
- Beauvois, M. H. (1992), Computer-Assisted Classroom Discussion in the Foreign Language Classroom: Conversation in Slow Motion. *Foreign Language Annals*, 25: 455–464. doi: 10.1111/j.1944-9720.1992.tb01128.x
- Beauvois, M. (1998) Conversations in slow motion: Computer-mediated communication in the foreign language classroom. *The Canadian Modern Language Review*, 54(2), 198-217
- Braun, T. (2008). Making a choice: The perceptions and attitudes of online graduate students. *Journal of Technology and Teacher Education*, 16(1), 63-92.
- Biocca, F., & Harms, C. (2002). What is social presence? In F. Gouveia & F. Biocca (Eds.), *Presence 2002 Proceedings*. Porto, Portugal: University of Fernando Pessoa Press.
- Biocca, F., Harms, C., & Burgoon, J. (2003). Toward a more robust theory and measure of social presence: Review and suggested criteria. *Presence*, 12(5), 456-480.
- Biocca, F., Burgoon, J., Harm, C., & Stoner, M. (2001). Criteria and scope conditions for a theory and measure of social presence. E. Lansing, MI: Media Interface and Network Design (M.I.N.D.) Lab.
- Biordi & Nicholson. (2008). Social Isolation. In Larsen P., *Chronic Illness Impact and Interventions* (85-115). MA: Jones & Bartlett Publishing.
- Boling, E. C., Hough, M., Krinsky, H., Saleem, H., & Stevens, M. (2012). Cutting the distance in distance education: Perspectives on what promotes positive, online learning experiences. *The Internet and Higher Education*, 15(2), 118-126.
- Bolliger, D. U., & Inan, F. A. (2012). Development and validation of the online student connectedness survey (OSCS). *The International Review of Research in Open and Distributed Learning*, 13(3), 41-65.
- Borup, J., West, R. E., & Graham, C. R. (2012). Improving online social presence through asynchronous video. *The Internet and Higher Education*, 15(3), 195-203.
- Borup, J., Graham, C. R., & Velasquez, A. (2011). The use of asynchronous video communication to improve instructor immediacy and social presence in a blended learning environment. *Blended learning across disciplines: Models for implementation*, 38-57.
- Borup, J., West, R. E., Thomas, R., & Graham, C. R. (2014). Examining the impact of video feedback on instructor social presence in blended courses. *The International Review of Research in Open and Distributed Learning*, 15(3).
- Borup, J., West, R. E., & Thomas, R. (2015). The impact of text versus video communication on instructor feedback in blended courses. *Educational Technology Research and Development*, 63(2), 161-184.
- Boulos, M., Taylor, A., & Breton, A. (2005). A synchronous communication experiment within an online distance learning program: A case study. *Telemedicine Journal and E-health*, 11(5), 583-593.
- Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Sage

- Brass, D. J. (1984). Being in the right place: A structural analysis of individual influence in an organization. *Administrative science quarterly*, 518-539.
- Brennan, S. E., & Ohaeri, J. O. (1999, March). Why do electronic conversations seem less polite? The costs and benefits of hedging. In *ACM SIGSOFT Software Engineering Notes* (Vol. 24, No. 2, pp. 227-235). ACM.
- Buraphadeja, V., & Dawson, K. (2008). Content analysis in computer-mediated communication: Analyzing models for assessing critical thinking through the lens of social constructivism. *The American Journal of Distance Education*, 22(3), 130-145.
- Bunn, J. (2004). Student persistence in a LIS distance education program. *Australian Academic Research Libraries*, 35(3), 253-270
- Cairncross, S., & Mannion, M. (2001). Interactive multimedia and learning: Realizing the benefits. *Innovations in education and teaching international*, 38(2), 156-164.
- Carr, S. (2000). As distance education comes of age, the challenge is keeping the students. *The Chronicle of Higher Education*, 46(23), A39 –A41.
- Cereijo, M. V. P., Young, J., & Wilhelm, R. W. (2001). Factors Facilitating Student Participation in Asynchronous Web-Based Courses. *The Journal of Computing in Teacher Education*, 18 (1), 32-39.
- Charalambos, V., Michalinos, Z., & Chamberlain, R. (2004). The design of online learning communities: Critical issues. *Educational Media International*, 41(2), 135-143.
- Ching, Y. H., & Hsu, Y. C. (2013). Collaborative learning using VoiceThread in an online graduate course. *Knowledge Management & E-Learning: An International Journal (KM&EL)*, 5(3), 298-314.
- Choi, J. H., & Strobel, J. (2012, April). Validation of a modified instrument: Using social network analysis to measure social presence. *Proceedings of the American Education Research Association*, Vancouver, BC, Canada
- Cho, H., & Gay, G. (2009). The Effect of Communication Styles on Computer-Supported Collaborative Learning. *Cognitive and Emotional Processes in Web-Based Education: Integrating Human Factors and Personalization: Integrating Human Factors and Personalization*, 357.
- Churcher, K. M., Downs, E., & Tewksbury, D. (2014). “Friending” Vygotsky: A Social Constructivist Pedagogy of Knowledge Building Through Classroom Social Media Use. *The Journal of Effective Teaching*, 33.
- Cobb, S. (2009). Social presence and online learning: a current view from a research perspective. *Journal of Interactive Online Learning*, 8(3), 241-254.
- Colorado, J.T. & D’Souza, J. (2012). Using VoiceThread to Enhance Online Discussions. *National Social Sciences Technology Journal*, 2(4).
- Collins, A. (1991). Cognitive apprenticeship and instructional technology. *Educational values and cognitive instruction: Implications for reform*, 121-138.
- Creswell, J. W. & Miller, D. L. (2000). *Determining validity in qualitative inquiry. Theory into Practice*, 39(3), 124-131.
- Cui, G. (2013). Evaluating online social presence: an overview of social presence assessment. *Journal of Educational Technology Development and Exchange*, 6(1), 13-30.

- Curry, D. B. (2000). Collaborative, connected and experiential learning: Reflections of an online learner.
- Cunningham, J. M. (2015). Mechanizing People and Pedagogy: Establishing Social Presence in the Online Classroom. *Online Learning*, 19(3), 34-47.
- Dallinger, J. M., & Hample, D. (1995). Personalizing and managing conflict. *International Journal of Conflict Management*, 6(3), 273-289.
- Daugherty, M. and Funke, B. L. (1998). University faculty and student perceptions of Web-based instruction. *Journal of Distance Education* 13 (1)
- Dawson, S. (2008). A study of the relationship between student social networks and sense of community. *Journal of Educational Technology & Society*, 11(3), 224-238.
- Dawson, S., Bakharia, A., & Heathcote, E. (2010, May). SNAPP: Realising the affordances of real-time SNA within networked learning environments. In *Proceedings of the 7th International Conference on Networked Learning* (pp. 125-133). Denmark, Aalborg.
- De Laat, M., Lally, V., Lipponen, L., & Simons, R. J. (2007). Investigating patterns of interaction in networked learning and computer-supported collaborative learning: A role for Social Network Analysis. *International Journal of Computer-Supported Collaborative Learning*, 2(1), 87-103.
- De Wever, B., Schellens, T., Valcke, M., & Van Keer, H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers & Education*, 46(1), 6-28.
- Denzin, N. K., & Lincoln, Y. S. (2005). Qualitative research. Denzin, NK y Lincoln YS.
- Desai, M., Hart, J., & Richards, T. (2009). E-Learning: Paradigm shift in education. *Education*, 129/2, 327-334.
- DeSchryver, M., Mishra, P., Koehler, M., & Francis, A. (2009, March). Moodle vs. Facebook: Does using Facebook for discussions in an online course enhance perceived social presence and student interaction?. In *Society for Information Technology & Teacher Education International Conference* (Vol. 2009, No. 1, pp. 329-336).
- De Laat, M., Lally, V., Lipponen, L., & Simons, R. J. (2007). Investigating patterns of interaction in networked learning and computer-supported collaborative learning: A role for Social Network Analysis. *International Journal of Computer-Supported Collaborative Learning*, 2(1), 87-103.
- Dickey, M. D. (2008). Integrating cognitive apprenticeship methods in a Web-based educational technology course for P-12 teacher education. *Computers & Education*, 51, 506-518.
- Dillon, C., Keogh, E., & Freeman, J. (2002). It's been emotional: Affect, physiology and presence. Paper presented at the 5th International Workshop on Presence, Porto, Portugal, October 9–11, 2002.
- Dimitrova, N., Zhang, H. J., Shahraray, B., Sezan, I., Huang, T., & Zakhori, A. (2002). Applications of video-content analysis and retrieval. *IEEE multimedia*, 9(3), 42-55
- Dringus, L., Snyder, M., & Terrell, S. (2010). Facilitating discourse and enhancing teaching presence: Using mini audio presentations in online forums. *Internet and Higher Education*, 13, 75-77.



- Dunlap, J. C., & Lowenthal, P. R. (2009). Tweeting the night away: Using Twitter to enhance social presence. *Journal of Information Systems Education*, 20(2).
- Dunlap, J. C., & Lowenthal, P. R. (2010). Hot for teacher: Using digital music to enhance students' experience in online courses. *TechTrends*, 54(4), 58-73.
- DuVall, J. B., Powell, M. R., Hodge, E., & Ellis, M. (2007). Text messaging to improve social presence in online learning. *Educause Quarterly*, 30(3), 24.
- Faigley, L. (1999). Beyond imagination: The Internet and global digital literacy. *Passions, pedagogies, and 21st century technologies*, 129-139.
- Falloon, G. (2011). Making the connection: Moore's theory of transactional distance and its relevance to the use of a virtual classroom in postgraduate online teacher education. *Journal of Research on Technology in Education*, 43(3), 187-209.
- Fidalgo, P., & Freitas, J. C. de. (2011). Does teacher's experience matters? Social network analysis applied to learning forums. Challenges11 - VII Conferência internacional de TIC na Educação, Braga, Universidade de Aveiro
- Frisby, B. N., Limperos, A. M., Record, R. A., Downs, E., & Kercsmar, S. E. (2013). Students' Perceptions of Social Presence: Rhetorical and Relational Goals Across Three Mediated Instructional Designs. *Journal of Online Learning and Teaching*, 9(4), 468-480.
- Garramone, G. M., Harris, A. C., & Anderson, R. (1986). Uses of political computer bulletin boards. *Journal of Broadcasting & Electronic Media*, 30(3), 325-339.
- Garrison, D. R. (2007). Online community of inquiry review: Social, cognitive, and teaching presence issues. *Journal of Asynchronous Learning Networks*, 11(1), 61-72.
- Garrison, D. R. (2009). Implications of online learning for the conceptual development and practice of distance education. *Journal of Distance Education*, 23(2), 93-104.
- Garrison, D. R. (2011). *E-Learning in the 21st century: A framework for research and practice* (2nd Ed.). London: Routledge/Taylor and Francis.
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2-3), 87-105.
- Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The Internet and Higher Education*, 13(1), 5-9.
- Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education*, 10(3), 157-172.
- Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework. *Internet & Higher Education*, 13(1), 31-36.
- Garrison, D. R., Cleveland-Innes, M., Koole, M., & Kappelman, J. (2006). Revisiting methodological issues in transcript analysis: Negotiated coding and reliability. *The Internet and Higher Education*, 9(1), 1-8.
- Geertz, C. (1973). *The interpretation of cultures: Selected essays* (Vol. 5019). Basic books.

- Gefen, D., & Straub, D. W. (1997). Gender differences in the perception and use of e-mail: An extension to the technology acceptance model. *MIS quarterly*, 389-400.
- Gellevij, M., Van Der Meij, H., De Jong, T., & Pieters, J. (2002). Multimodal versus unimodal instruction in a complex learning context. *The Journal of Experimental Education*, 70(3), 215-239.
- Glaser, B. G., & Strauss, A. L. (1965). Discovery of substantive theory: A basic strategy underlying qualitative research. *American Behavioral Scientist*, 8(6), 5-12.
- Glaser, B., & Strauss, A. (1967). The discovery of grounded theory. London: Weidenfeld and Nicholson.
- Graham, C., Cagiltay, K., Lim, B. R., Craner, J., & Duffy, T. M. (2001). Seven principles of effective teaching: A practical lens for evaluating online courses. *The Technology Source*, 30(5), 50.
- Griffiths, M. E., & Graham, C. R. (2009). Using asynchronous video in online classes: Results from a pilot study. *International Journal of Instructional Technology and Distance Learning*, 6(3), 65-76.
- Goda, Y., & Yamada, M. (2012). Application of CoI to design CSCL for EFL online asynchronous discussion. Z. Akyol. & DR Garrison (Eds.) *Educational Community of Inquiry: Theoretical Framework, Research and Practice*, 295-316.
- Gunawardena, C., Carabajal, K., & Lowe, C. A. (2001). Critical Analysis of Models and Methods Used To Evaluate Online Learning Networks.
- Gunawardena, C. N. (1995). Social presence theory and implications for interaction and collaborative learning in computer conferences. *International journal of educational telecommunications*, 1(2), 147-166.
- Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *American journal of distance education*, 11(3), 8-26.
- Gunawardena, C. N., Hermans, M. B., Sanchez, D., Richmond, C., Bohley, M., & Tuttle, R. (2009). A theoretical framework for building online communities of practice with social networking tools. *Educational Media International*, 46(1), 3-16.
- Hara, N., & Kling, R. (2001). Student distress in Web-based distance education. *EDUCAUSE Quarterly*, 3
- Hrastinski, S. (2008). What is online learner participation? A literature review. *Computers & Education*, 51(4), 1755-1765.
- Havice, P.A., Davis, T.T., Foxx, K.W. & Havice, W.L. (2010). The Impact of Rich Media Presentations on a Distributed Learning Environment: Engagement and Satisfaction of Undergraduate Students. *Quarterly Review of Distance Education*, 11(1), 53-58
- Heilbronn, M., & Libby, W. L. (1973). Comparative effects of technological and social immediacy upon performance and perceptions during a two-person game. Paper presented at the Paper read at the annual convention of the American Psychological Association, Montreal.
- Henninger, M., & Viswanathan, V. (2004). Socialpresence in online tutoring. In *Proceedings from the Knowledge Media and Research Centre Conference in Tübingen*. Vol. 4, p. 2006.
- Henri, F. (1992). Computer conferencing and content analysis. In *Collaborative learning through computer conferencing* (p. 117-136). Springer Berlin Heidelberg.

- Herrington, J., Reeves, T. C., & Oliver, R. (2006). Authentic tasks online: A synergy among learner, task, and technology. *Distance Education*, 27(2), 233-247.
- Hillman, D. C., Willis, D. J., & Gunawardena, C. N. (1994). Learner-interface interaction in distance education: An extension of contemporary models and strategies for practitioners. *The American Journal of Distance Education*, 8(2), 30-42.
- Homer, B.D, Plass, J.L & Blake, L.(2008). The effects of video on cognitive load and social presence in multimedia-learning. *Computers in Human Behavior*, 24(3), 786-797.
- Horvath, K., & Lombard, M. (2010). Social and Spatial Presence: An Application to Optimize Human-Computer Interaction. *PsychNology Journal*, 8(1), 85-114.
- Holsti, O. R. (1969). Content analysis for the social sciences and humanities. Reading, MA: AddisonWesley.
- Huang, H. M. (2002). Toward constructivism for adult learners in online learning environments. *British Journal of Educational Technology*, 33(1), 27-37.
- Huang, W., Hong, S. H., & Eades, P. (2007). Effects of Sociogram Drawing Conventions and Edge Crossings in Social Network Visualization. *Journal of Graph Algorithms Appl.*, 11(2), 397-429.
- Ice, P., Curtis, R., Wells, J., & Phillips, P. (2007). Using asynchronous audio feedback to enhance teaching presence and student sense of community. *Journal of Asynchronous Learning Networks*, 11(2), 3-25.
- Ice, P., Gibson, A. M., Boston, W., & Becher, D. (2011). An Exploration of Differences between Community of Inquiry Indicators in Low and High Disenrollment Online Courses. *Journal of Asynchronous Learning Networks*, 15(2), 44-69.
- IJsselsteijn, W.A., De Ridder, H., Freeman, J. and Avons, S.E. (2000). Presence: Concept, determinants and measurement. Proceedings of the SPIE 3959.
- Jensen, S. A. (2011). In-Class Versus Online Video Lectures Similar Learning Outcomes, but a Preference for In-Class. *Teaching of Psychology*, 38(4), 298-302.
- Johnson, K. E. (2009). Second language teacher education: A sociocultural perspective. Routledge.
- Jourard, S. M., & Lasakow, P. (1958). Some factors in self-disclosure. *The Journal of Abnormal and Social Psychology*, 56(1), 91.
- Jusoff, K., & Khodabandelou, R. (2009). Preliminary study on the role of social presence in blended learning environment in higher education. *International Education Studies*, 2(4).
- Kaplan (1964). *The Conduct of Inquiry*. Crowell, New York.
- Kanuka, H., & Anderson, T. (1999). Using constructivism in technology-mediated learning: Constructing order out of the chaos in the literature. *Radical Pedagogy*, 1(2).
- Ke, F. (2010). Examining online teaching, cognitive, and social presence for adult students. *Computers & Education*, 55(2), 808-820.
- Kear, K., Chetwynd, F., & Jefferis, H. (2014). Social presence in online learning communities: the role of personal profiles. *Research In Learning Technology*, 22. doi:<http://dx.doi.org/10.3402/rlt.v22.19710>
- Keil, M., and Johnson, R. D. (2002). Feedback channels: Using social presence theory to compare voice mail to e-mail. *Journal of Information System Education*, 13(4), 295-303

- Kern, R. G. (1995). Students' and teachers' beliefs about language learning. *Foreign Language Annals*, 28(1), 71-92.
- Khurana, C., & Boling, E. (2012, June). 'Setting the Climate': The Role of Instructional Design and Multimedia to Enhance Social Presence. In *World Conference on Educational Multimedia, Hypermedia and Telecommunications* (Vol. 2012, No. 1, pp. 1813-1818).
- Karen D. King. 2008. Comparison of Social Presence in Voice-based and Text-based Asynchronous computer Conferencing. Doctoral dissertation. *Nova Southeastern University*. Retrieved from NSUWorks, Graduate School of Computer and Information Sciences. (637)
- Kim, L. (2004). Online technologies for teaching writing: Students react to teacher response in voice and written modalities. *Research in the Teaching of English*, 38(3), 304-337.
- King, K. P. (2008, May). Introducing new media into teacher preparation: Transparently integrating podcasting into college classes ISTE SIG Handheld Computing (ISTE SIGHC) 3(4), 4-7.
- King, K., & Ellis, T. J. (2009, January). Comparison of social presence in voice-based and text-based asynchronous computer conferences. In *System Sciences, 2009. HICSS'09. 42nd Hawaii International Conference on* (pp. 1-10). IEEE.
- King, J. E., Walpole, C. E., & Lamon, K. (2007). Surf and turf wars online—growing implications of internet gang violence. *Journal of Adolescent Health*, 41(6), 66-68.
- Kilgore, W., & Lowenthal, P. R. (2015). The Human Element MOOC: An experiment in social presence. In R. D. Wright (Ed.), *Establishing an equitable and fair admissions system for an online* (pp. 389-407). Hershey, PA: IGI Global.
- Kivran-Swaine, F., Govindan, P., & Naaman, M. (2011, May). The impact of network structure on breaking ties in online social networks: unfollowing on twitter. In *Proceedings of the SIGCHI conference on human factors in computing systems* (1101-1104).
- Kizilcec, R. F., Bailenson, J. N., & Gomez, C. J. (2015). The Instructor's Face in Video Instruction: Evidence From Two Large-Scale Field Studies.
- Kreijns, K., Kirschner, P. A., Jochems, W., & Van Buuren, H. (2011). Measuring perceived social presence in distributed learning groups. *Education and Information Technologies*, 16(4), 365-381.
- Kok, A. (2006). An online social constructivist tool: A secondary school experience in the developing world. In *Proceedings of the 3rd International Conference on e-Learning* (p. 241). Academic Conferences Limited.
- Kovanović, V., Joksimović, S., Gašević, D., Hatala, M. (2014), "What is the source of social capital? The association between social network position and social presence in communities of inquiry," In *Proceedings of 7<sup>th</sup> International Conference on Educational Data Mining – Workshops*, London, UK.
- Kupczynski, L., Ice, P., Weisenmayer, R., & McCluskey, F. (2010). Student perceptions of the relationship between indicators of teaching presence and success in online courses. *Journal of Interactive Online Learning*, 9(1), 23-43

- Lambert, J., & Fisher, J. (2013). Community of Inquiry Framework: Establishing Community in an Online Course. *Journal of Interactive Online Learning*, 12(1), 1-16.
- Lane, D. R., & Shelton, M. W. (2001). The centrality of communication education in classroom computer-mediated-communication: Toward a practical and evaluative pedagogy. *Communication Education*, 50(3), 241-255.
- Lee, S., Srinivasan, S., Trail, T., Lewis, D., & Lopez, S. (2011). Examining the relationship among student perception of support, course satisfaction, and learning outcomes in online learning. *Internet and Higher Education*, 14, 158-63.
- Leech, N. L., & Onwuegbuzie, A. J. (2007). An array of qualitative data analysis tools: A call for data analysis triangulation. *School psychology quarterly*, 22(4), 557.
- Leech, N. L., & Onwuegbuzie, A. J. (2011). Beyond constant comparison qualitative data analysis: Using NVivo. *School Psychology Quarterly*, 26(1), 70.
- Lin, G. Y. (2004). Social presence questionnaire of online collaborative learning: Development and validity. 2004 Annual Proceedings-Chicago: Volume 588.
- Liu, S., Gomez, J., Khan, B., & Yen, C. (2007). Toward a learner-oriented community college online course dropout framework. *International Journal on ELearning*, 6(4), 519-542.
- Liu, S. H., Liao, H. L., & Pratt, J. A. (2009). Impact of media richness and flow on e-learning technology acceptance. *Computers & Education*, 52(3), 599-607.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications, Inc.
- Lomicka, L., & Lord, G. (2007). Social presence in virtual communities of foreign language (FL) teachers. *System*, 35(2), 208-228.
- Lowenthal, P. R. (2012). *Social presence: What is it? How do we measure it?* (Doctoral dissertation). University of Colorado Denver, Denver, Colorado.
- Lowenthal, P. R., & Dunlap, J. (2010). From pixel on a screen to real person in your students' lives: Establishing social presence using digital storytelling. *The Internet and Higher Education*.
- Lowenthal, A., & Lowenthal, P. R. (2009, April). Revisiting teaching presence: An analysis of teaching presence across discourse communities. Paper presented at the annual meeting of the American Education Research Association, San Diego, CA
- Lowenthal, P. R., & Parscal, T. (2008). Teaching presence. *The Learning Curve*, 3(4), 1-2, 4.
- Lowenthal, P. R., Wilson, B., & Parrish, P. (2009, October). Context matters: A description and typology of the online learning landscape. Paper presented at the AECT International Convention, Louisville, KY.
- Lowell, N. O. (2004). *An Investigation of Factors Contributing to Perceived Transactional Distance in an Online Setting*. Unpublished Dissertation, University of Northern Colorado, Greeley.
- Looi, C. K., & Ang, D. (2000). A multimedia-enhanced collaborative learning environment. *Journal of Computer Assisted Learning*, 16(1), 2-14.
- Ludwig-Hardman, S., & Dunlap, J. C. (2003). Learner support services for online students: scaffolding for success. *The International Review of Research in Open and Distance Learning*, 4(1)

- Lowenthal, P. R., & Dunlap, J. C. (2014). Problems Measuring Social Presence in a Community of Inquiry. *E-Learning and Digital Media*, 11(1), 19-30.
- Lowenthal, P. R., & Dunlap, J. C. (2010). From pixel on a screen to real person in your students' lives: Establishing social presence using digital storytelling. *The Internet and Higher Education*, 13(1), 70-72.
- Lowenthal, P. R., & Leech, N. (2009). Mixed research and online learning: Strategies for improvement. In T. T. Kidd (Ed.), *Online education and adult learning: New frontiers for teaching practices* (pp. 202-211). Hershey, PA: IGI Global.
- Lowenthal, P. R., Wilson, B., & Parrish, P. (2009, October). Context matters: A description and typology of the online learning landscape. Paper presented at the 2009 AECT International Convention, Louisville, KY.
- MacKnight, C. B. (2000). Teaching critical thinking through online discussions. *Educause Quarterly*, 23(4), 38-41.
- Maddrell, J. A., Morrison, G. R., Watson, G. S., & Design, I. (2011). Community of Inquiry Framework and Learner Achievement.
- Maddux, C. D., Johnson, D. L., & Willis, J. W. (2001). *Educational Computing: Learning With Tomorrow's Technologies*. Boston: Allyn and Bacon.
- Marin, A., & Wellman, B. (2011). Social network analysis: An introduction. Scott J, Carrington PJ, editors. *The SAGE Handbook of Social Network Analysis*, 11-25.
- Mark, J. W., & Anthony, C. H. A. N. (2007). Reducing the effects of isolation and promoting inclusivity for distance learners through podcasting. *Turkish Online Journal of Distance Education*, 8(1).
- Marks, R. B., Sibley, S. D., & Arbaugh, J. B. (2005). A structural equation model of predictors for effective online learning. *Journal of Management Education*, 29(4), 531-563.
- Mayer, R. E. (2001). *Multimedia Learning*. New York: Cambridge University Press.
- Mayer, R. E., Griffith, E., Jurkowitz, I. T., & Rothman, D. (2008). Increased interestingness of extraneous details in a multimedia science presentation leads to decreased learning. *Journal of Experimental Psychology: Applied*, 14(4), 329.
- Marks, R. B., Sibley, S. D., & Arbaugh, J. B. (2005). A structural equation model of predictors for effective online learning. *Journal of Management Education*, 29(4), 531-563.
- Mazur, A., Doran, C., & Doran, P. (2010, April). The use of social network analysis software to analyze communication patterns and interaction in online collaborative environments. In *International Conference on Education, Training and Informatics*, (ICETI 2010).
- McInnerney, J. M., & Roberts, T. S. (2004). Online Learning: Social Interaction and the Creation of a Sense of Community. *Educational Technology & Society*, 7 (3), 73-81.
- McBrien, J. L., Cheng, R., & Jones, P. (2009). Virtual spaces: Employing a synchronous online classroom to facilitate student engagement in online learning. *The International Review of Research in Open and Distance Learning*, 10(3).
- Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass
- Moreno, J. L. (1934). Who shall survive? :A new approach to the problem of human interrelations.

- Moller, L., Foshay, W. R., & Huett, J. (2008). Implications for Instructional Design on the Potential of the Web. *TechTrends*, 52(4), 67.
- Monahan, T., McArdle, G., & Bertolotto, M. (2008). Virtual reality for collaborative e-learning. *Computers & Education*, 50(4), 1339-1353.
- Moore, M. G. (1980). Independent study. In R. Boyd & J. Apps (Eds.), *Redefining the Discipline of Adult Education*(16-31). San Francisco: Jossey-Bass.
- Moore, M. G. (1989). Three types of interaction. *American Journal of Distance Education*, 3(2), 1-7.
- Moore, M. G. (1992). Distance education theory. *The American Journal of Distance Education*, 5(3), 1-6.
- Moore, M G (1993) Three types of interaction. In Harry, K, John, M and Keegan, D (eds) *Distance education: new perspectives*, Routledge, London
- Moore, M. G. (1993). 2 Theory of transactional distance. *Theoretical principles of distance education*, 22.
- Morse, J. M. (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing Research*, 40, 120-123
- Morse, J. M. (2000). Determining sample size. *Qualitative health research*, 10(1), 3-5.
- Muilenburg, L. and Berge, Z. (2005). Student barriers to online learning: A factor analytic study *Distance Education*, 26 (1), 29-48.
- Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2008). Verification strategies for establishing reliability and validity in qualitative research. *International journal of qualitative methods*, 1(2), 13-22.
- Nowak, K. (2001). Defining and differentiating copresence, social presence and presence as transportation. In *Presence 2001 Conference*, Philadelphia, PA.
- Nowak, K. L., & Biocca, F. (2003). The effect of the agency and anthropomorphism on users' sense of telepresence, copresence, and social presence in virtual environments. *Presence: Teleoperators and Virtual Environments*, 12(5), 481-494.
- Olesova L., Yang D. , & Richardson, J.C. (2011). Cross-Cultural Differences in Undergraduate Students' Perceptions of Online Barriers. *Journal of Asynchronous Learning Networks* 15(3),68-80.
- Orlando, J., & Orlando, L. (2010). Using VoiceThread to improve educational outcomes. In *Proceedings of the 27th Annual Conference on Distance Teaching and Learning*. Madison, WI. Retrieved from [http://www.uwex.edu/disted/conference/Resource\\_library/proceedings/28642\\_10.pdf](http://www.uwex.edu/disted/conference/Resource_library/proceedings/28642_10.pdf)
- Ortega, L. (1997). Processes and outcomes in networked classroom interaction: Defining the research agenda for L2 computer-assisted classroom discussion. *Language learning & technology*, 1(1), 82-93.
- Oztok, M. & Brett, C. (2011). Social presence and online learning: A review of the research. *The Journal of Distance Education*, 25(3), 1-10.
- Otte, E., & Rousseau, R. (2002). Social network analysis: a powerful strategy, also for the information sciences. *Journal of information Science*, 28(6), 441-453.
- Pawan, F., Paulus, T. M., Yalcin, S., & Chang, C. (2003). Online learning: Patterns of engagement and interaction among in-service teachers. *Language Learning & Technology*, 7(3), 119-140.

- Patton, M. Q. (1980). Qualitative evaluation methods.
- Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous learning networks*, 6(1), 21-40.
- Portolese, D. L., & Trumpy, R. (2014). Online Instructor's Use of Audio Feedback to Increase Social Presence and Student Satisfaction. *Journal of Educators Online*, 11(2): Retrieved from the ERIC database. (EJ1033260)
- Rabbany, R., Takaffoli, M., & Zaïane, O. R. (2011). Analyzing participation of students in online courses using social network analysis techniques. In *Proceedings of educational data mining*.
- Rabbany, R., Elatia, S., Takaffoli, M., & Zaïane, O. R. (2014). Collaborative learning of students in online discussion forums: A social network analysis perspective. In *Educational Data Mining* (pp. 441-466). Springer International Publishing.
- Ramli, N. F. M., Darus, S., & Bakar, N. A. (2011). Metacognitive Online Reading Strategies of Adult ESL Learners Using a Learning Management System. *Theory and Practice in Language Studies*, 1(3), 195-204.
- Rettie, R. (2003). Connectedness, awareness and social presence.
- Rice, R. E. (1993). Media appropriateness. *Human communication research*, 19(4), 451-484.
- Richardson, J. C., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction.
- Rourke, L., & Anderson, T. (2002). Exploring social interaction in computer conferencing. *Journal of Interactive Learning Research*, 13(3), 257-273
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (1999). Assessing social presence in asynchronous text-based computer conferencing. *Journal of Distance Education*, 14(2), 50-71.
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Assessing social presence in screen text-based computer conferencing. *Journal of Distance Education*, 14 from [http://cade.athabasca.ca/vol14.2/rourke\\_et\\_al.html](http://cade.athabasca.ca/vol14.2/rourke_et_al.html)
- Rovai, A. P., & Wighting, M. J. (2005). Feelings of alienation and community among higher education students in a virtual classroom. *The Internet and higher education*, 8(2), 97-110.
- Saba, F., & Shearer, R. L. (1994). Verifying key theoretical concepts in a dynamic model of distance education. *The American Journal of Distance Education*, 8 (1), 36-59.
- Salmons, J. (2009). *Designing and Conducting Research With Online Interviews*. Sage Publication.
- Schermerhorn, P., Scheutz, M., & Crowell, C. R. (2008, March). Robot social presence and gender: Do females view robots differently than males?. In *Proceedings of the 3rd ACM/IEEE international conference on Human robot interaction* (pp. 263-270). ACM
- Schrire, S. (2004). Interaction and cognition in asynchronous computer conferencing. *Instructional Science*, 32(6), 475-502.
- Schreurs, B. (2014). Analysing Learning Ties to Stimulate Continuous Professional Development in the Workplace. In *The Design, Experience and Practice of Networked Learning* (pp. 207-224). Springer International Publishing.
- Scott, J. (2013) *Social Network Analysis: A Handbook*. Sage Publications, 2nd edition.



- Séror, J. (2012). Show Me! Enhanced Feedback through Screencasting Technology. *TESL Canada Journal*, 30(1), 104-116.
- Shea P. J. , (2006). A study of students' sense of learning community in online learning environments. *Journal of Asynchronous Learning Networks*, 10(1).
- Shea, P., & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of inquiry in online and blended learning environments. *Computers & Education*, 55(4), 1721-1731.
- Shea, P., J., Pickett, A., M., & Pelz, W., E. (2003). A follow-up investigation of "teaching presence" in the SUNY learning network. *Journal of Asynchronous Learning Networks*, 7(2), 61-80.
- Shea, P., Hayes, S., Vickers, J., Gozza-Cohen, M., Uzuner, S., Mehta, R., . . . Rangan, P. (2010). A re-examination of the community of inquiry framework: Social network and content analysis. *Internet & Higher Education*, 13(1), 10-21.
- Shea, P., Sau Li, C., & Pickett, A. (2006). A study of teaching presence and student sense of learning community in fully online and web-enhanced college courses. *Internet & Higher Education*, 9(3), 175-190.
- Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for information*, 22(2), 63-75.
- Sherblom, J. C. (2010). The computer-mediated communication (CMC) classroom: A challenge of medium, presence, interaction, identity, and relationship. *Communication Education*, 59(4), 497-523.
- Shea, P., Hayes, S., Smith, S. U., Vickers, J., Bidjerano, T., Gozza-Cohen, M., ... & Tseng, C. H. (2013). Online learner self-regulation: Learning presence viewed through quantitative content-and social network analysis. *The International Review of Research in Open and Distributed Learning*, 14(3), 427-461.
- Sherer, P. D., & Shea, T. P. (2002). Designing Courses Outside the Classroom: New Opportunities With the Electronic Delivery Toolkit. *College Teaching*, 50(1), 15-20
- Sheldon, P. (2009). I'll poke you. You'll poke me! Self-disclosure, social attraction, predictability and trust as important predictors of Facebook relationships. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 3(2), 67-75.
- Short, J., Williams, E., & Christie, B. (1976). The social psychology of telecommunications.
- Sikora, A., & Carroll, C. D. (2002). A profile of participation in distance education: 1999-2000. Postsecondary education descriptive analysis report. National Center for Education Statistics , U.S. Department of Education.
- Song, L., Singleton, E.S., Hill, J.R. & Koh, M.H. (2004). Improving Online Learning: Student Perceptions of Useful and Challenging Characteristics. *Internet and Higher Education*, 7(1), 59-70
- Stacey, E. (2002). Social presence online: Networking learners at a distance. In *Networking the Learner* (pp. 39-48). Springer US.
- Stein, D. S., & Wanstreet, C. E. (2004). Presence and interaction in an inquiry-based learning environment. Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education.

- Stein, D. S., Wanstreet, C. E., Glazer, H. R., Engle, C. L., Harris, R. A., Johnston, S. M., et al. (2007). Creating shared understanding through chats in a community of inquiry. *The Internet and Higher Education*, 10(2), 103-115.
- Steiner, V., & Mahn, H. (1996). Sociocultural approaches to learning and development: A Vygotskian framework. *Educational Psychologist* 31, 191-206.
- Stodel, E. J., Thompson, T. L., & MacDonald, C. J. (2006). Learners' perspectives on what is missing from online learning: Interpretations through the community of inquiry framework. *The International Review of Research in Open and Distributed Learning*, 7(3).
- Strang, D. K. (2012). Skype synchronous interaction effectiveness in a quantitative management science course. *Decision Sciences Journal of Innovative Education*, 10(1), 3-23.
- Sun, P. C., Tsai, R. J., Finger, G., Chen, Y. Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education*, 50(4), 1183-1202
- Swan, K. (2002). Immediacy, social presence, and asynchronous discussion. *Elements of quality online education*, 3, 157-72.
- Swan, K. (2006). Threaded Discussion. Paper presented at Ohio Digital Commons for Education (ODCE) 2006 Conference, Ohio.
- Swan, K., Garrison, D. R., & Richardson, J. C. (2009). A constructivist approach to online learning: the Community of Inquiry framework. Information technology and constructivism in higher education: Progressive learning frameworks. Hershey, PA: IGI Global, 43-57.
- Swan, K., & Shih, L-F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous Learning Networks*, 9 (3), 115-136.
- Swan, K., Shea, P., Richardson, J., Ice, P., Garrison, D. R., Cleveland-Innes, M., & Arbaugh, J. B. (2008). Validating a measurement tool of presence in online communities of inquiry. *E-mentor*, 2(24), 1-12.
- Tallent-Runnels, M. K., Thomas, J. A., Lan, W. Y., Cooper, S., Ahern, T. C., Shaw, S. M., & Liu, X. (2006). Teaching courses online: A review of the research. *Review of educational research*, 76(1), 93-135.
- Takaffoli, M., & Zaïane, O. R. (2012). Social network analysis and mining to support the assessment of on-line student participation. *ACM SIGKDD Explorations Newsletter*, 13(2), 20-29.
- Thompson, R., & Lee, M. J. (2012). Talking with students through screencasting: Experimentations with video feedback to improve student learning. *The Journal of Interactive Technology and Pedagogy*, 1(1).
- Tirado, R., Hernando, Á., & Aguaded, J. I. (2015). The effect of centralization and cohesion on the social construction of knowledge in discussion forums. *Interactive Learning Environments*, 23(3), 293-316.
- Tsai, I.-C., Kim, B., Liu, P.-J., Goggins, S. P., Kumalasari, C., & Laffey, J. M. (2008). Building a Model Explaining the Social Nature of Online Learning. *Educational Technology & Society*, 11(3), 198-215.
- Tu, C. H. (2002). The measurement of social presence in an online learning environment. *International Journal on E-learning*, 1(2), 34-45.

- Tu, C. H., & McIsaac, M. (2002). The relationship of social presence and interaction in online classes. *The American Journal of Distance Education*, 16(3), 131-150.
- Ubon, N. A., & Kimble, C. (2004). Exploring social presence in asynchronous text-based online learning communities (OLCS). In *Proceedings of the 5th International Conference on Information Communication Technologies in Education* ( 292-297).
- Velasquez, A., Graham, C. R., & West, R. E. (2013). An investigation of practices and tools that enabled technology-mediated caring in an online high school. *The International Review of Research in Open and Distance Learning*, 14(5).
- Vrasidas, C., & McIsaac, M. S. (1999). Factors influencing interaction in an online course. *American Journal of Distance Education*, 13(3), 22-36.
- Vygotsky, L. (1978). Interaction between learning and development. *Readings on the development of children*, 23(3), 34-41.
- Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction a relational perspective. *Communication research*, 19(1), 52-90.
- Walther, J. B. (1996). Computer-mediated communication impersonal, interpersonal, and hyperpersonal interaction. *Communication research*, 23(1), 3-43.
- Walther, J. B., & Parks, M. R. (2002). Cues filtered out, cues filtered in: Computer-mediated communication and relationships. *Handbook of interpersonal communication*, 3, 529-563.
- Wang, Y., & Fesenmaier, D. R. (2003). Assessing motivation of contribution in online communities: An empirical investigation of an online travel community. *Electronic markets*, 13(1), 33-45.
- Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications* (Vol. 8). Cambridge university press.
- Wegerif, R. (1998). The Social Dimension of Asynchronous Learning Networks. *Journal of Asynchronous Learning Networks*, 2 (1),
- Wenger, E. (1999). *Communities of practice: Learning, meaning, and identity*. Cambridge university press.
- West, J., & Turner, W. (2015). Enhancing the assessment experience: improving student perceptions, engagement and understanding using online video feedback. *Innovations in Education and Teaching International*, (ahead-of-print), 1-11.
- Wiener, M., & Mehrabian, A. (1968). Language within language: Immediacy, a channel in verbal communication. Ardent Media.
- Woods, R. H., & Baker, J. D. (2004). Interaction and immediacy in online learning. *The International Review of Research in Open and Distributed Learning*, 5(2).
- Wu, H., Gao, J., & Zhang, W. (2014). Chinese EFL Teachers' Social Interaction and Socio-cognitive presence in synchronous computer mediated communication. *Language, Learning & Technology*, 18(3), 228.
- Wu, L. (2015) Investigating social presence in the voice-based chat room and the text-based forum in the Chinese online learning context. PhD, *University of the West of England*. Available from: <http://eprints.uwe.ac.uk/27173>
- Xie, B. (2008). Multimodal Computer-Mediated Communication and Social Support among Older Chinese Internet Users. *Journal of Computer-Mediated Communication*, 13(3), 728-750.

- Yamada, M., & Goda, Y. (2012). Application of Social Presence Principles to CSCL Design for Quality Interactions. *Educational stages and interactive learning: From kindergarden to workplace training*, 31-48.
- Yoo, J., & Kim, J. (2012). Predicting learner's project performance with dialogue features in online q&a discussions. In S. Cerri, W. Clancey, G. Papadourakis, & K. Panourgia (Eds.), *Intelligent Tutoring Systems*. 570–575. Springer Berlin / Heidelberg volume 7315
- Zhan, H., & de Montes, L. S. (2007). Is it a tale of woe?—An investigation of relationships of online teaching presence and learning. *International Journal of Technology in Teaching and Learning*, 3(2), 107-122.
- Zhu, C., Rodríguez-Hidalgo, R. C. R. H., Questier, F., & Torres-Alfonso, A. M. (2015). Using social network analysis for analysing online threaded discussions. *International Journal of Learning, Teaching and Educational Research*, 10(3).
- Zydney, J. M., & Chen, B. (2014). Strategies for creating a community of inquiry through online asynchronous discussions. *Journal of Online Learning and Teaching*, 10(1), 153.

**Appendices**

Appendix A List of reviewed studies under social presence and multimedia

Appendix B Discussion Prompts

Appendix C Relevant publications and presentations

Appendix D Interview protocols

Appendix E Consent Form

## Appendix A

### List of reviewed studies under social presence and multimedia

Study	Multimedia
Dringus, L. P., Snyder, M. M., & Terrell, S. R. (2010). Facilitating discourse and enhancing teaching presence: Using mini audio presentations in online forums. <i>Internet &amp; Higher Education</i> , 13(1), 75-77. doi: 10.1016/j.iheduc.2009.11.001	Mini Audio Presentation
Dunlap, J. C., & Lowenthal, P. R. (2010). Horton hears a tweet. <i>EDUCAUSE Quarterly</i> , 32(4).	Twitter
Dunlap, J. C., & Lowenthal, P. R. (2010). Hot for teacher: Using digital music to enhance students' experience in online courses. <i>TechTrends: Linking Research and Practice to Improve Learning</i> , 54(4), 58-73.	Music
Griffiths, M. E., & Graham, C. R. (2009). Using asynchronous video in online classes: Results from a pilot study. <i>International Journal of Instructional Technology &amp; Distance Learning</i> , 6 (3), 65-76.	Video
Kizilcec, R. F., Bailenson, J. N., & Gomez, C. J. (2015). <a href="#">The Instructor's Face in Video Instruction: Evidence from Two Large-Scale Field Studies</a> . <i>Journal of Educational Psychology</i> . Advance online publication.	Video
Borup, J., Graham, C. R., & Velasquez, A. (2011). The use of asynchronous video communication to improve instructor immediacy and social presence in a blended learning environment. In A. Kitchenham (Ed.), <i>Blended learning across disciplines: Models for implementation</i> (pp. 38-57). Hershey, PA: IGI Global.	Video
Ice, P., Curtis, R., Phillips, P., & Wells, J. (2007). Using asynchronous audio feedback to enhance teaching presence and students' sense of community. <i>Journal of Asynchronous Learning Networks</i> , 11(2), 3-25.	Audio
Keil, M., and Johnson, R. D. (2002). Feedback channels: Using social presence theory to compare voice mail to e-mail. <i>Journal of Information System Education</i> , 13(4), 295-303	Voicemail
Lowenthal, P. R., & Dunlap, J. C. (2010). From pixel on a screen to real person in your students' lives: Establishing social presence using digital storytelling. <i>The Internet and Higher Education</i> , 13(1), 70-72.	Digital Storytelling
DuVall, J. B., Powell, M. R., Hodge, E., & Ellis, M. (2007). Text	Texting

messaging to improve social presence in online learning. <i>Educause Quarterly</i> , 30(3), 24–28	
DeSchryver, M., Mishra, P., Koehler, M. & Francis, A. (2009). Moodle vs. Facebook: Does using Facebook for Discussions in an online course enhance perceived social presence and student interaction?. In I. Gibson et al. (Eds.), <i>Proceedings of Society for Information Technology &amp; Teacher Education International Conference 2009</i> (pp. 329-336). Chesapeake, VA: AACE.)	Facebook
Olesova, L., Yang, D., and Richardson, J.C. (2011). Cross-Cultural Differences in Undergraduate Students' Perceptions of Online Barriers. <i>Journal of Asynchronous Learning Networks</i> 15(3),68-80.	Audio
Cunningham, J. M. (2015). Mechanizing People and Pedagogy: Establishing Social Presence in the Online Classroom. <i>Online Learning</i> , 19(3), 34-47.	Voki
Wu, L. (2015) Investigating social presence in the voice-based chat room and the text-based forum in the Chinese online learning context. PhD, <i>University of the West of England</i> . Available from: <a href="http://eprints.uwe.ac.uk/27173">http://eprints.uwe.ac.uk/27173</a>	Comparison of modalities
King, K., & Ellis, T. J. (2009, January). Comparison of social presence in voice-based and text-based asynchronous computer conferences. In <i>System Sciences, 2009. HICSS'09. 42nd Hawaii International Conference on</i> (pp. 1-10). IEEE.	

## Appendix B

### Discussion Prompts

**Module 1:** Use this discussion thread to introduce yourself. Feel free to introduce yourself through video, podcast, or pictures. eCollege allows you to embed video and audio files within the discussion thread. Please be sure to mention your current professional engagement and your goals for taking this course. Feel free to talk about your hobbies, family, interests, etc.

Review the introductions of everyone in our course and find TWO people with whom you have something in common and comment on their post.

**Module 2:** In the course thus far, we have learned about our 21st-Century learners and began to explore the tools available for educators to use. It's now time to begin thinking about how to use these tools in your educational environment.

Browse lesson plans online and find one that connects to your expertise, grade level, or subject area. In your post include a link to this lesson. Critique the lesson using the Lesson Plan Rubric found on page 114-115 in the Schrum & Levin textbook. Describe your thoughts about the lesson and its strengths and weaknesses. Be sure to reference the lesson's use of technology and you must comment on each of the seven components of the Schrum & Levin rubric. Use the vocabulary you encountered in this Module and cite appropriate readings and resources.

**Module 3:** Create a social bookmarking site. Add at least two websites to your social bookmarking site that relate to your teaching. The websites could be one of those described in one of our textbooks.

Provide a link to your social bookmarking site in the discussion board. Identify one of the websites you have listed in your social bookmarking site and describe how it could be used for teaching. Finally, describe the [LoTi Framework](#) level for this application. Comment on the posts of at least two of your classmates.

**Module 4:** Discuss the use of social networking sites in education. Focus on an age range such as K-12, college, or adult learner as the context for your discussion.

Include in your response answers to the questions below.

- 1) What social networking sites do you and your students have access to in your setting?
- 2) If you taught in a setting where social networking sites were not blocked, what might you do to ensure student safety and the protection of their privacy?
- 3) Do you think the benefits of using social networks outweigh the risk? Why or why not?



- 4) What types of professional safeguards, if any, do you put in place that limit your own use of social network sites?

**Module 5:** This week we are going to do more experimenting with audio. As we have for all our discussion boards, you will need to provide one original response and then comment on two of your peer's posts for a total of three posts. This week, at least one of those three posts needs to be an audio clip. Feel free to have two or all three of your posts be audio clips. You can respond to one or both of the questions for this week.

1. Based on your academic and professional experience, what are some of the problems (and barriers) of educational technology and how do they compare to the resources provided in Module 5?
2. Do you believe that the problems and barriers that we face are unique to the United States or do you believe that these issues exist internationally?

**Module 6:** We will again use audio and/or video to participate in this week's Class Discussion. For this discussion you will need one original post and two responses to your peers. One of those three posts needs to be either a [Voki](#) or a video or audio recording of yourself.

Consider the two questions below and select ONE question to answer for this discussion board. You will then need to respond to two of your peers.

1. What type of technology leadership skills will you bring to your future educational environments that will help you carry out the work that you have learned in this course? Which models will you follow? Include ideas from Moersch, Dede, Jobs, McLeod and other relevant leaders in the field of educational technology. This video may help your writing: <http://youtu.be/-yA6oTU1emM>
2. What type of professional development plan will you embark upon that will keep you abreast of changes in technologies? Please cite examples of the best and worst examples that you have experienced and how you will learn from those experiences.

## Appendix C

### Research Journal Publications

- Lajoie, S. P. , Hmelo-Silver, C. E. , Wiseman, J. G. , Chan, L. , Lu, J. , **Khurana, C.** , Cruz-Panesso, I. , Poitras, E. , & Kazemitabar, M. (2014). Using Online Digital Tools and Video to Support International Problem-Based Learning. *Interdisciplinary Journal of Problem-based Learning*, 8(2).

### Refereed Conference Proceedings

- **Khurana, C.**, & Boling, E. (2014, October). Understanding Online Pedagogy: A Review of Strategies to Enhance Teaching Presence. In *World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (Vol. 2014, No. 1, pp. 1001-1010).
- **Khurana, C.** (2014, October). Redesigning Discussion Forums: Using Multimedia to Foster Cognitive Presence. In *World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (Vol. 2014, No. 1, pp. 995-1000).
- Hmelo-Silver C.E., Lajoie, S.P., Chan, L.K., **Khurana, C.**, Lu, J., Panesso, I.C., Wiseman, J. (2013) Using Online Digital Tools and Video to Support International Problem-Based Learning, *Proceedings of 46th Hawaii International Conference on System Sciences 2013* (pp.68-76). Hawaii, U.S
- **Khurana, C.** & Boling, E. (2012). ‘Setting the Climate’: The Role of Instructional Design and Multimedia to Enhance Social Presence. In T. Amiel & B. Wilson (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2012* (pp. 1813-1818). Chesapeake, VA: AACE.
- **Khurana, C.** & Boling, E. (2012). Beyond Threaded Discussions: A Study of Teaching Presence in an Online Educational Technology Course. In *Proceedings of Society for Information Technology & Teacher Education International Conference 2012* (pp. 4254-4259). Chesapeake, VA: AACE.
- **Khurana, C.** & Boling, E. (2011). Multidisciplinary Review of Communities in Online Professional Development Programs. In *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2011* (pp. 1990-1996). Chesapeake, VA: AACE.

### Refereed Research Papers and Presentations

- Silver, C.H., Lajoie, S., **Khurana, C.**, Lu, J., Wiseman, J., Chan, L.K.( 2013) Supporting International Problem-based Learning Using CSCL Tools. Paper presented at 15<sup>th</sup> biennial EARLI conference. Munch, Germany.
- **Khurana C.** & Boling E.C (2013, April). Get Engaged: Role of Multimedia in Supporting Social

Presence. Paper presented at American Educational Research Association Annual Meeting. San Diego, CA.

- Boling, E.C., Khurana C., Hough, M., & Holan, E. (2012, November) [Multimedia, Engagement and Collaboration: How to Humanize the Online Learning Experience](#). Presented at NJEdge conference. Plainsboro, NJ
- Boling E.C, **Khurana C.**, & Hough M. (2011, November) [Understanding Effective Online Educational Technology Courses: A Look at Research and Practice](#). Presented at NJ Edge conference 2.0. Plainsboro, NJ

## Appendix D

### Interview protocols

#### Students

##### General Questions:

- How was the course? Did you like it?
- What did you like the most and what part do you think was irrelevant or needs improvement?
- Why were you interested in signing up for this course?
- Was this your first online course?
- How would you rate yourself when it comes to use of technology in personal life. 1 being I don't know what you're talking about. 10 being I am a know it all, any new thing that hits the market, I have to get my hands on it.

##### **Focus Question: What were students' views on using multimedia in an online course? And how did students use multimedia to support the development of social presence?**

1 In this course, the first three discussions forums were text based and from the fourth Module onwards, you were required to use multimedia to respond to discussion assignment. What was your first reaction when you came to know about it?

- Was it your first time using these tools?
- What tools did you use?
- How was the experience of using these tools for a discussion response post?

2. What other tools did you end up using this course? (**If no answer, prompt them :Voki, Voicethread, screencasting etc.**). Can you talk a little bit about how you used them in the course and were you comfortable using them? Can you share some examples?

3. So, you used these tools to comment on discussion posts and you made screencasts to provide feedback etc. What did you think about these assignments? Were they any different from the text-based assignments? If yes, how?

4. Your instructor communicated a lot with you through videos, audios, screencast. What did you think about that? ( prompt them: was it more personal, connection..maybe prompt something about student learning if they don't mention it)

5. In what ways did your instructor provide you feedback in this course? Did she use multimedia to provide you feedback?

- What did you think about that?
- Was it helpful?

Any different than text based feedback?

**Focus Question: In what ways does multimedia enhance social presence in an online course?**

6. How comfortable were you in asking questions, expressing disagreements or sharing personal information in this course?

7. Can you talk a little bit about the interaction in the course? **Prompt: Feel free to talk about it from the Course design, Instruction, Feedback, Discussion- facilitation, or the community perspective.**

8. This course required you to share your work with others and provide peer feedback on a lot of assignments. What did you think about this requirement of the course? ( **Prompt: Did Knowing that other members were aware of your work and will provide feedback did it influence the quality of your work**)

9. What kind of social connections were you able to establish in this course? Did you feel you were a part of learning community?

10. Which multimodal tools (if any) helped you connect with students or the instructor more directly? Can you give some examples? The term “multimedia” might be better for them. They might not be that familiar with the term “multimodal” unless if it was explicitly taught in class.

11. Did you like any particular tool in this course? Can you talk a little bit about why you liked it?

12. Do you think if it weren’t for these tools, social connections fostered in this course will be at different? How? **(prompt for level of connections/engagement if needed)**

**Instructor**

### General Questions:

- How long you've been teaching this course?
- Have you taught online before? How long you've been teaching?
- Why were you interested in teaching this course?
- How would you rate yourself when it comes to use of technology in personal life. 1 being I don't know what you're talking about. 10 being I am a know it all, any new thing that hits the market, I have to get my hands on it.
- What do you like the most about this course and what part you think needs improvement?

### Focus Question: how does the instructor use multimedia to support the development of social presence?

- 1 How did you use multimedia in this course? Can you share some examples?
2. In this course, the first three discussions forum were text based and from the fourth Module you had asked students to use multimodal tools to respond to discussion forum assignment? What were your reasons for using multimedia within the discussion assignment?
3. You modeled these tools to students. How was your experience using these tools in an academic online course?
4. Comparing the responses received on the text based forums vs. Multimedia based forums. Were they any different from the text-based discussion forums?

### Focus Question: In what ways does multimedia enhance social presence in an online course?

13. How comfortable were the students in asking questions, expressing disagreements or sharing personal information in this course?
14. What did you do to ensure there is trust in the community so that students can express freely without any inhibition?
15. Can you talk a little bit about the interaction in the course? (**Prompt: feel free to talk about student-student, student-instructor, student content/interface interactions).**
16. Do you think students were able to establish social connections? Did they feel a part

of learning community?

17. Which multimodal tools (if any) helped you connect with students more directly? Can you give some examples?
18. Do you think your students' preferred/appreciated a particular tool that you had introduced in this course and what were there reasons? Can you share some examples
19. Do you think if it weren't for these tools social connections fostered in this course will be at different level? Can you share some examples

## Appendix E

### Interview Consent Form with Audio/Visual Recording

I am a Ph.D. student at Graduate School of Education, Rutgers University. I am studying: *the role of Multimedia in developing social presence in an online asynchronous course*. During this study, you will be asked to answer some questions related to your coursework and your experience in this online course. This interview is designed to be approximately a half hour in length. However, please feel free to expand on the topic or talk about related ideas. Also, if there are any questions you would rather not answer or that you do not feel comfortable answering, please say so and we will stop the interview or move on to the next question, whichever you prefer.

This research is confidential. Confidential means that the research records will include some information about you and this information will be stored in such a manner that some linkage between your identity and the response in the research exists. Some of the information collected about you will include your assignments, your responses in the discussion threads. Please note that I will keep this information confidential by limiting individual's access to the research data and keeping it secure on my laptop which is password protected. The data gathered in this study are confidential with respect to your personal identity unless you specify otherwise.

I, my advisor Dr. Erica Boling, and the Institutional Review Board at Rutgers University are the only parties that will be allowed to see the data, except as may be required by law. If a report of this study is published, or the results are presented at a professional conference, only group results will be stated. All study data will be kept for three years and will later be deleted from my computer.

You are aware that your participation in this interview is voluntary. You understand the intent and purpose of this research. If, for any reason, at any time, you wish to stop the interview, you may do so without having to give an explanation. ***There are no foreseeable risks to participation in this study.***

You may receive no direct benefit from taking part in this study. However, it is possible that you may benefit from reflections that interviews in the study might generate. You will receive 20\$ amazon gift card for your participation as a general participant and 50 \$ amazon gift card for your participation as a focus participant at the end of the course. Should you decide to withdraw your participation earlier than required. The gift card amount will be pro-rated based on the number of Modules covered. There are six Modules in the course.

Your interview will be audio recorded and the recording(s) will be first transcribed and will be used during the analysis step of this study. If you say anything that you believe at a later point may be hurtful and/or damage your reputation, then you can ask the interviewer to rewind the recording and record over such information OR you can ask that certain text be removed from the dataset/transcripts.



The recording(s) will be saved on my computer. My computer is password protected and only I will have access to the password. The recordings will be kept for ***three years and will be deleted after that***. If you have any questions about the study or study procedures, you may contact myself at [chestakhurana@gmail.com](mailto:chestakhurana@gmail.com) or call me 6468969130 or mail me 2402 Vroom Dr. Bridgewater NJ, 08807.

You may also contact my faculty advisor Dr. Erica Boling at [erica.boling@gse.rutgers.edu](mailto:erica.boling@gse.rutgers.edu) or call 908-227-2963.

If you have any questions about your rights as a research participant, you can contact the Institutional Review Board at Rutgers (which is a committee that reviews research studies in order to protect research participants).

Institutional Review Board  
Rutgers University, the State University of New Jersey

Liberty Plaza / Suite 3200

335 George Street, 3<sup>rd</sup> Floor

New Brunswick, NJ 08901

Phone: 732-235-9806

Email: [humansubjects@orsp.rutgers.edu](mailto:humansubjects@orsp.rutgers.edu)

You will be offered a copy of this consent form that you may keep for your own reference.

Once you have read the above form and, with the understanding that you can withdraw at any time and for whatever reason, you need to let me know your decision to participate in today's interview.

Your signature on this form grants the investigator named above permission to record you as described above during participation in the above-referenced study. The investigator will not use the recording(s) for any other reason than that/those stated in the consent form without your written permission.

- I agree to participate as a GENERAL PARTICIPANT. I will only share course information and will not participate in any interviews.

----- Yes      -----No

- I agree to participate as a FOCUS PARTICIPANT. I will share course information and will participate in 2 audio-recorded interviews.

-----Yes      -----No

Name (Print ) \_\_\_\_\_

Your Signature \_\_\_\_\_ Date \_\_\_\_\_  
\_\_\_\_\_

Principal Investigator Signature \_\_\_\_\_ Date \_\_\_\_\_