RENEWING THE INVESTIGATION INTO SOCIAL PRESENCE: THE IMPACT OF PSYCHOLOGICAL CLOSENESS AND TECHNOLOGY MODALITY ON SATISFACTION, FUTURE PERSISTENCE AND FINAL GRADE

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Dedication

To my mother and father.

Abstract

In 1975, Weinberg (2001) first posed the challenging question that we, as educators, are unfortunately still struggling to answer: Why are we so unable to anticipate the second order effects of the first order victories of science and technology? Forty years later, education is still struggling to identify and address the second order effects of the technological changes that exploded around 1995 with the advent of the worldwide web. Faculty still struggle with rapid technological developments. Students desire greater flexibility with online learning and seek learning that embeds the technological formats they use in their day-to-day lives. Institutions of higher education grapple to meet the demand for more online courses, as well as to resolve the challenges that online learning poses at the institutional level. The field of education is still wondering where online learning fits with more traditional pedagogical designs.

One aspect of online learning that has come into the recent limelight is the topic of social presence. Currently, the term social presence is thrown around as a panacea for a variety of online learning design problems. Unfortunately, the topic of social presence is fraught with ambiguity and controversy. Educational researchers define and measure social presence in a multitude of ways, which makes its application all the more problematic. This debate is happening at the same time as instructors and instructional designers work to implement strategies to increase social presence in online courses, seeking to use it as way to address the challenges that online learning brings to current learning environments.

This study examines the topic of social presence by harkening back to its original conception: a consilience of psychological closeness and technology modality. The study begins with a literature review, including aspects of immediacy and use of technology in online learning, and ends with a call to the field of education in creating online course design in the years ahead.

Keywords

Social presence, online pedagogy, distance education, teaching strategies, instructional design, academic technologies, immediacy, retention, satisfaction, academic persistence, hierarchical linear modeling

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Chapter 1: Introduction

Towards a Consilience of Psychology and Technology

In 1975, Weinberg (2001) first posed the challenging question that we, as educators, are unfortunately still struggling to answer: Why are we so unable to anticipate the second order effects of the first order victories of science and technology? Forty years later, education is still struggling to identify and address the second order effects of the technological changes which exploded around 1995: the advent worldwide web. Between the years 1995 to 2015, education has experienced technological breakthroughs resulting in uncountable possibilities for delivering courses online and connecting learners from nearly every place around the world. The Web has become a connected and generative space where faculty and students have the technological capabilities to co-create content and knowledge together. The social nature of the Web is apparent in its popular websites. In 2014 alone, Google, Facebook and YouTube were the top three most popular websites; and Wikipedia, Twitter and Linked In were among the top fifteen ("List of most popular websites," 2014)

Part of the motivation for this research study was to assess the current usage of technologies in online learning given the drastic change that education has seen in the last 20 years: specifically, the use of text, audio and video in online courses. The smartphone, mobile technologies and the nearly limitless access to information have been speculated as rewiring the human brain (Small & Vorgan, 2009). It is evident that some

faculty are embracing technologies to mindfully engage students in the classroom and online (Miller & Doering, 2014). The 24/7 access to the world via the Internet provides colossal opportunities for collaboration and learning. Reid Hoffman, co-founder of LinkedIn, refers to this potential as I to the power of We (I^{WE}). Through technology we create a culture of collaboration which has never existed before.

Yet, there are downsides to technologies lurking in the background. Paraphrasing Sherry Turkle, a professor of the Social Studies of Science and Technology at the Massachusetts Institute of Technology, it is clear that technology has the capacity to both bring us together and isolate us at the same time (Turkle, 2011). Her research focuses on the interrelationships between psychoanalysis and human-technology relationship.

This research study looked at the psychological human-to-technology relationship through lens of the immediacy and caring behaviors (psychological closeness) and technology modality. The study looked at these variables through the larger lens of social presence theory. Classic social presence theory holds that psychological closeness and technology modality result in the level of 'social presence' perceived. The social nature of human beings begets that learning is a collaborative, social process.

The technological changes seen in the last decade outstrip those seen even the decade before. Technological change is growing exponentially, creating dizzying impacts for the future as the visionary Kurzweil (2005) predicted even a decade ago. Yet education is taking a linear approach to technological change. We must guard against the comfort of the *status quo* and seek a consilience (Wilson, 1999) of technology and psychology in online learning. Unfortunately, attempting to make any system changes

now, given the rapid introduction of new technologies is a little like attempting to redesign an airplane in flight. Still, there is much to be gained.

The researcher seeks to understand what is currently happening in the world of online learning and to imagine a new future through mindful action. Arguably, the success of many popular technologies, such as YouTube, Facebook, and Linked In, is premised on their creators' recognition that human beings are social animals. All of these technologies fulfill a basic human need: social interaction. We are now faced with a situation where online learning essentially alters the reality of time and space because there is no one physical location or time anymore (Ngoyi, Mpanga, & Ngoyi, 2014)

The researcher will argue that an intelligent course design leverages how human beings are wired to connect to others in meaningful ways, as well as achieving formal learning outcomes relating to content and skills. Learning is not just about content; Learning is also emotional (Resnais, 1980). In a constructivist view, learning occurs through the social negotiation of meaning. An intelligent pedagogy is one that incorporates social elements as part of the fundamental learning experience, in addition to content mastery. It is an approach which honors affective elements as fundamental to the learning experience, not ancillary. It is already well accepted that a learner who is emotionally engaged learns more. The larger question is: how does technology affect the experience of learning when all interactions in an online course are mediated by technologies?

Social Presence

Social presence is considered one aspect of quality and a central concept within online learning (Bassani & Barbosa, 2013; Cobb, 2009; Cui, Lockee, & Meng, 2013; Dunlap & Lowenthal, 2014; Lowenthal, 2010). Social presence been positively associated with perceived learning (Caspi & Blau, 2008; Kim, 2011; Richardson & Swan, 2003; Rovai, 2002b), student learning outcomes (Hostetter & Busch, 2013; Richardson & Swan, 2003), final course grade (Liu, 2007; Liu, Gomez, & Yen, 2009), course retention/completion (Liu, 2007; Liu et al., 2009), points earned in the class (Russo & Benson, 2005), satisfaction (Griffiths & Graham, 2009; Gunawardena & Zittle, 1997; Hostetter & Busch, 2006; Kim, 2011; Richardson & Swan, 2003; So & Brush, 2008), interactions with others (Cheung, Chiu, & Lee, 2011; Hall, 2008; Tu & McIsaac, 2002), sense of community (Kim, Kwon, & Cho, 2011; Rovai, 2002a) and the social construction of knowledge in the online classroom (Rovai, 2002a).

Much research in social presence has focused on student satisfaction. However, student satisfaction is a complex factor and a challenging topic in educational research. Hoskins (2012) eloquently described this challenge as follows:

> Student satisfaction is a factor contributing to student success and retention. Student satisfaction is based on a complex set of variables including intrinsic motivation and interest in the course topics, teacher–student transactional engagement, student–student transactional engagement, the sense of social presence in the course, cognitive

> absorption, institutional support, active citizenship, and noninstitutional support. The quality of interaction and degree of engagement continues to be a central theme …. (p. 53)

Very early on in social presence research, Gunawardena and Zittle (1997) found social presence to be connected to learner satisfaction. Richardson and Swan (2003) later reported that perceived social presence affected learner outcomes and learner satisfaction with the course, as well as impacting learner's *perception of satisfaction with the instructor*. Hostetter and Busch (2006) found social presence to be associated with learning satisfaction and Griffiths and Graham (2009) found social presence to be related to course satisfaction.

Student satisfaction has been found to influence retention rates and efforts to improve satisfaction can improve retention/completion (Hoskins, 2012; Leong, 2011). In addition, satisfaction with the learning experience has also been shown to be a positive predictor of intention to enroll in future online courses (Reio & Crim, 2013). Hostetter and Busch (2013) found that students who demonstrated higher levels of social presence behaviors in text-based discussion boards also had significantly higher ratings on the assessment test within the course. A positive connection has been found between social presence and final course grade (Liu, 2007; Liu et al., 2009). In addition, Russo and Benson (2005) found a statistically significant correlation between social presence and points earned in the class.

Still other researchers have found that when information is presented in a way that increases social presence, information is remembered by learners better and the learning

process is considered more *engaging* (Homer, Plass, & Blake, 2008). In general, a sense of social presence has been found to encourage meaningful interactions and promote the social construction of knowledge and sense of community (Rovai, 2002a). It has also been suggested that social presence contributes to the classroom by creating a more convenient climate in which for students to learn (Caspi & Blau, 2008).

However, even with all this, the value of social presence in online learning remains largely unresolved. It requires significantly more research investigating its usefulness and connection to other aspects of quality within online learning (S.-M. Lee, 2014). As such, the concept of social presence in online learning is still highly controversial and much debated (Annand, 2011; Cui et al., 2013), even as it is considered one aspect of quality and a central concept within online learning (Bassani & Barbosa, 2013; Cobb, 2009; Cui et al., 2013; Dunlap & Lowenthal, 2014; Lowenthal, 2010). Much of the controversy centers around what social presence is, how to measure it and evidence of its effectiveness.

In general, social presence improves the sense of connection and community among learners, makes course interactions more engaging, and motivates students to persist in the course. Social presence can reduce the sense of isolation and disconnection that can occur in online learning and it has been posited to positively influence online course retention rates (Cui et al., 2013). Research has demonstrated that social presence is a channel for improving online learning quality and that evaluating student perceptions of social presence is one way to understand how students perceive their online learning experience. This research study will evaluate the role of social presence in online

learning by exploring the fundamental ways which social presence impacts learning in such courses.

The researcher of this study believes a paradigm shift is called for in order to address the opportunities technology affords online learning. One thing is clear: Researchers are struggling to create new pedagogical constructs for online learning. At the same time, institutions are seeing increases in online enrollments and demands for more online learning by students at hurtling rates. There is a creative tension in these synergistic forces and social presence could provide a key to unlocking its potential. This study seeks to disentangle a crucial element of the online course experience.

Relevance and Need for the Study

Higher education is facing a myriad of challenges in the current learning climate: soaring tuition and infrastructure costs, state and federal funding downturns, decreased student loan availability, graduates not finding work, and students struggling with the commitments of lifelong learning and outside responsibilities. Institutions are being challenged to create better, faster and more affordable ways to help students achieve their desired education. Students deserve improved learning experiences, whether online or face-to-face. Faculty, whether teaching face-to-face or online, will benefit from understanding the important roles which psychology and technology play in creating an effective learning environment.

Studying engagement elements at the course level is pivotal in online learning. Researchers, such as Glazer and Wanstreet (2011), report that 40% of online learners do

not identify with their online institution. It is essential for researchers to understand the ways in which social presence affects the climate of online learning courses, especially given the situation where an online student's experience of the institution could very well be with the instructor and other students in individual courses, and not necessarily the institution itself.

In 2013, approximately one-third of students in higher education were taking at least one online course; and about 90% of colleges reported that this number would increase; further, it is estimated that the percentage of students taking at least one online course will exceed 50% within five years (I. E. Allen & Seaman, 2014). For brick and mortar institutions, the evident reality will be that a majority of students, whether living on campus or commuting, will be taking online courses in tandem with face-to-face courses. This requires increased faculty education in best practices for online pedagogy, as well as better institutional services and support for online learners.

Currently, the rate of students enrolling into online learning is growing faster than the rate of enrollment into higher education itself (I. E. Allen & Seaman, 2014; Crawford & Persaud, 2013). Students, meanwhile, are opting to take online courses, not just for convenience, but by preference. Intense inter-institutional competition for online learners is emerging, even as unanswered questions linger regarding the pedagogical doubts of online learning effectiveness, the ill-preparedness of institutions to meet online demand, questions regarding whether the potential online learning promises are realistic, and the current fragmented online learning research in the subject area (D. R. Garrison, Cleveland-Innes, & Fung, 2010).

Yet, barring the possible exception of Gutenberg's printing press, for most of human history there has been nothing which has so dramatically changed how the world learns as the Internet. It is still to be determined as to what it means to cognitively, socially, and affectively, learn and live out part of one's life online. The second order effects of this shift are still to be seen. The current reality in online courses, however, is that communication between people is primarily, if not always, mediated by some form of technology.

In online learning, the concept of social presence is still highly controversial and much debated (Annand, 2011; Cui et al., 2013). There is appreciable controversy as to what social presence is and even how to measure it. The larger question, which will take many years to resolve, is: Over the long term, how will students learning through online courses compare to face-to-face learning when we have evolutionarily adapted for face-to-face interaction over many thousands of years? This study will not attempt to answer this question. But what we do know is that psychological closeness, or the feeling of human connection, impacts learners positively, whereas psychological distance can leave students feeling isolated, alone and disconnected. This study seeks to use the construct of social presence to explore the pivotal juxtaposition between the psychological and technological tensions in online learning.

Purpose of Study

The value of social presence in online learning remains largely unknown and requires significantly more research to identify its usefulness and connections to other

aspects of online learning (S.-M. Lee, 2014). As yet, little research investigates instructor immediacy behaviors in online settings, though they have been widely researched in traditional classroom settings. In addition, how social presence is perceived and influences student perception of course satisfaction, intention to enroll in future online courses, and final course grade has been minimally researched.

This research study seeks to identify social presence factors which help or hinder students becoming and/or remaining engaged to learning. The idea is to help students feel less alone and more authentically connected to each other. Another intent is to provide faculty and researchers with information to pedagogically adjust their course delivery approach. A feeling of connectedness in online learning is especially important given constructivist learning ideals premised on the social negotiation of meaning for knowledge construction.

Specifically, this study is an exploration of social presence theory as currently operationalized within online courses; the researcher wanted to see what is *really happening* in online courses, not just what our aspirations might be for the online learning experience. The guiding questions of the study were to determine how social presence elements affected student satisfaction, future persistence and final course grade. To accomplish this, a literature review was conducted to elucidate existing theoretical assumptions and operational constructs of social presence research in education, with specific emphasis given to online learning. Another purpose of the study was to explore if, or to what extent, psychological closeness (immediacy) and technology modality

(format and form) related to social presence as it evolves within the field of online learning.

Research Questions

This study was primarily exploratory. As such, the research questions were general and devised as a platform for departure for future research in the subject area subsequent to the study results. The following research questions guided the study's purpose:

RQ1: How are the elements of technology modality and immediacy related to satisfaction?

RQ2: How are the elements of technology modality and immediacy related to intended persistence in online learning?

RQ3: How are the elements of technology modality and immediacy related to final course grade?

Overview of Methods

The study used a cross-sectional correlational design with cluster sampling. The sample pool was a random sample of completely online courses at a large Midwestern institution of higher education. An *a priori* power analysis was conducted in order to determine the number of courses/clusters to sample. A *post hoc* perception survey was used for data collection. A factor analysis was implemented to determine factors used in

analysis. The resulting data were analyzed via hierarchical linear modeling to answer the research questions.

Summary

Social presence in online learning presents special challenge to the current field of education as outlined in the preceding paragraphs. Some of the prominent issues with social presence are how it is operationalized in online courses, how researchers define and perceive social presence, and how social presence is measured.

The next section will provide an overview of literature regarding social presence in educational research. It begin with a look at 'classic' social presence and then discuss alternate media theories. A specific selection of social presence articles will be highlighted and then a general history of distance education will be articulated with a special section describing forms of 'distance' in online learning. From there, a discussion of immediacy (a psychological element of social presence) will be highlighted and then technology modality will be explicated, especially the different ways in which modality impacts perception of online learning experiences. The literature review will conclude with sections on the evolution of social presence as a concept, instructional strategies to cultivate social presence in online courses, and various ways which social presence has been measured over time.

Chapter 2: Literature Review

Despite research affirming social presence as crucially important in online learning by some researchers, there is little existing research describing exactly how technology and psychological closeness (two elements fundamental to social presence) are perceived by learners, how social presence affects student perception of course satisfaction, how social presence influences intention to enroll in future online courses, or the extent to which social presence impacts final course grade. The purpose of this literature review is to integrate historic and more recent investigations into social presence as a means to provide a synthesis of social presence methodologies, to describe the evolution of social presence as a concept within the field, to describe the macro forces affecting the climate of online learning at large, to elucidate current trends in social presence research in online education, and to identify gaps in existing literature.

Classic Social Presence

Currently applied social presence theory in educational settings originates from seminal work in the 1970s defining social presence as "the degree of salience of the other person in an interaction and the consequent salience of the interpersonal relationships" (Short, Williams, & Christie, 1976, p. 65). This original conception of social presence was comprised of two elements fused together into a singularity: the communication 'medium' and a corresponding element of psychological intimacy/immediacy. The communication medium ranged from face-to-face, to video, audio or text communication.

The element of immediacy/intimacy was based on Argyle and Dean (1965)'s view of intimacy and Wiener and Mehrabian's (1968) view of immediacy.

In Short et al.'s (1976) original view of social presence there were four levels social presence The optimal or highest level for social presence was in achieved via face-to-face communication. Communicating in a face-to-face way with another party resulted in the highest degree of social presence possible. The next highest level for social presence was video communication. Communicating through video allowed some of the rich communication cues available in face-to-face communication to still be conveyed. The third level of social presence was audio-only communication, such as using the telephone (in the original study). Finally, the nadir of the social presence was text communication. Text communication was considered to have the lowest level of social presence possible. A determining element in the original view of social presence was that the communication medium determined the resulting level of social presence achieved. See for *Figure 1* for reference.

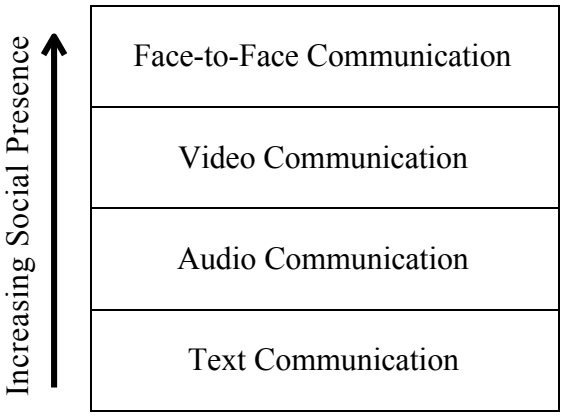

Figure 1. Classic Social Presence
adapted from Short et al. (1976)

The reason face-to-face communication represented the epitome of the social presence scale was that using face-to-face communication provided the greatest capability to convey communication cues between people in the most naturalistic, unmediated way. Communicating face-to-face held the greatest potential to carry interaction signals as to how the communication between people was proceeding. For example, communicators had access to facial cues, body language, and gesturing. In face-to-face settings, people could also collaborate over physical documents and could share physical proximity.

The next level down on the social presence scale was video communication. Video communication had the capability to transmit both video and audio cues. These cues include many non-verbal signals, such as voice inflection, other sounds, facial expressions, gestures and body language. However, as Short et al (1976) noted in their

work, eye contact was never as natural in video settings as it was in face-to-face settings. However, people could still see how people were sitting, how people looked, what people were wearing, if they appeared comfortable or not, and other non-verbal cues, which are important to understanding how the communication was progressing.

The third level down on the social presence scale was audio communication. Audio communication could still convey some non-verbal cues, such as voice inflection, tone of voice, and other cues. The human voice carries a great deal of 'richness' in the sound of a voice, but audio communication cannot convey as many non-verbal signals as video communication can.

The fourth and lowest level of the social presence scale was text communication. Text communication could transmit written words, but had the least capability to convey social presence. In text based communication most non-verbal cues are missing. However, communicators can still try to use other signals to convey things such as humor (e.g. the current use of emoticons), exclamation points and using more informal language to carry greater emotion/meaning/context. But text communication can be misinterpreted. For example, something written can take on a completely different meaning when spoken. The inflection of a word here or there makes all the difference.

Even simple things, such as conveying humor, are difficult in a text-only format. For example, the definition of the word 'smile' is understood syntactically. We could define a smile by what it physically looks like. In Short et al.'s (1976) original view of social presence, seeing a smile carries more social presence than merely reading the word 'smile.' A video of someone smiling feels more immediate and close. This gets back to

Argyle and Dean's (1965) concept of intimacy and Wiener and Mehrabian's (1968) concept of immediacy in social presence.

Thus, the technology used affected how the message was perceived, because each technology had limitations and affordances. As such, Short et al.'s (1976) original social presence concept was based on the idea that the form of technology actually determined the level of social presence in the communication (Kreijns, Kirschner, Jochems, & Buuren, 2011; Reio & Crim, 2013). In this way, Short et al.'s (1976) original conception of social presence was unidimensional, because the technology determined the level of social presence and the components could not be disentangled.

Currently, however, researchers are investigating social presence as a multidimensional concept (Kim, 2011; Liu et al., 2009; Remesal & Colomina, 2013; Shen, Yu, & Khalifa, 2010). Rather than viewing social presence as a quality of the medium itself (Kreijns et al., 2011; Reio & Crim, 2013), there is renewed investigation into refining and redefining what social presence is in online learning and what social presence is comprised of in such settings.

Social presence in online learning includes elements of intimacy/immediacy and technology. Immediacy behaviors are 'conveyed' by technology and 'perceived' by receivers. But, more importantly, the genesis of social presence theory did not emerge in a vacuum.

Alternate Media Theories

Over the years there have been a number of theories which evolved alongside social presence theory. Cuelessness theory, media richness theory, and social information processing theory are similar to social presence theory. These theories were spurred by researchers seeking to address issues of technological media in human discourse. Each of these theories are briefly described in the following paragraphs.

Cuelessness Theory.

Cuelessness theory (Rutter, 1984) was developed around the same time as social presence theory. At a basic level, Rutter challenged Argyle and Dean's (1965) view of intimacy by arguing that the important issue was not the gazing into each other's eyes, but that it was the mutual gazing 'back and forth' which was more crucial in the social interaction. Essentially, Rutter argued that it was the entire social context which was important, including the wide range of social cues in a social communication. In cuelessness theory, it was more important to have full visual access to the whole person. This was so that cues, such as seeing, hearing, and so forth, could be better perceived and absorbed (Rutter, Pennington, Dewey, & Swain, 1984). To be clear, it was not that eye gazing was unimportant, but that eye gazing alone was not sufficient. Eye gazing was just one element, among many, which facilitated social interaction.

Cuelessness theory can be considered a deficit theory (Hrastinski, 2008), similar to social presence theory. Cuelessness theory claims that the fewer the social cues the greater the psychological distance between people (Rutter et al., 1984). A similar

standpoint is true with social presence theory, which is concerned with psychological distance between people and how the communication medium (face-to-face, video, audio or text) affects the perception of messages between communicators.

Both cuelessness theory and social presence theory include a psychological element, which is influenced by technology. In that view, the technology format has varying capabilities or limitations in its ability to transmit communication cues. In cuelessness theory, for example, use of audio has fewer capabilities to emit social cues than video communication does. Whereas if you were sitting face-to-face with someone, you have the most access to the full range of communication cues. Similarly, when listening to someone over the telephone, some cues are not available, as would be if the speakers were conversing face-to-face. The general stance of cuelessness theory is similar to social presence theory in its conception of interactions between people and communication medium.

Media Richness Theory.

Media richness theory (Daft & Lengel, 1986) also emerged around the same time as social presence theory and cuelessness theory. Media richness theory is premised on communication media influencing the information richness of a message. Media richness theory was influenced by social presence theory (Kehrwald, 2008).

Media richness theory posits that richness of information is affected by communication media in the following scale from highest richness potential to lowest richness potential: face-to-face communication, telephone communication, personal

(informal) writing, formal writing, and finally, numeric output, such as would be seen with computers, and which had the least richness (Lengel & Daft, 1984, pp. 7–8). Face-to-face communication was seen as the benchmark for optimal richness and technologies were evaluated according to their capacity to convey communication as more 'real' (non-mediated) (Kehrwald, 2008), similar to social presence theory. In the past, it has been posited that the use of rich media technologies reduces uncertainty in communications between people, but Hrastinski (2008) reported that many studies have found mixed results. With the advances in technologies since the inception of media richness theory (e.g. Facebook, YouTube, Twitter, and greater availability of audio and video capabilities on the Internet), newer research may reconfirm the position that rich media technologies assist in reducing uncertainties in communication.

Both media richness theory and social presence theory suggest that the communication channel (medium) determines the resulting richness/presence of the message. Whereas social presence theory considers social presence to be a function of the communication channel, media richness theory talks more about the capabilities of a technology to convey more realness in the communication channel to varying degrees (Kehrwald, 2008). In this sense, media richness theory is more focused on 'perception' of the message and less focused on the technology medium selected. This means using a different channel/media can increase or decrease richness/presence, but depends on its usage. Media richness theory has been used in evaluating online learning in various studies (Elwood, McCaleb, Fernandez, & Keengwe, 2014; Fernandez, Simo, Sallan, & Enache, 2013; Hrastinski, 2008).

Social Information Processing Theory.

Finally, near the time of the advent of World Wide Web, social information processing theory (Walther, 1992) came into being and provided a new lens in which to view mediated communications in online learning contexts. Social information processing theory was focused on learning situations, whereas cuelessness theory and media richness theory were more generalized. As such, social information processing theory was developed in response to the two deficit theories of cuelessness theory and media richness theory and applied to learning situations. Walther (1992) took an opposing view to the other theories by positing that people interact the same, whether in text-based communication (e.g., CMC) or face-to-face settings.

A key premise of social information processing theory is that communicators filter out unneeded cues and find ways to compensate for any lack of cues resulting from a low context technology (e.g. text communication, email or discussion board postings), in order to communicate in rich and robust ways, just as they naturally would without the technology. Essentially, social information processing theory states that people can overcome or adjust to the limitations of a technology (Sprecher, 2014).

Walther (1996, 2007) has found that CMC (text-based) communications can even be hyper-personal, perhaps even more than face-to-face communication. Walther takes an opposite stance to researchers who would consider text-based communication as a lean medium or having deficits. The key idea of social information processing theory is that people can overcome limitations by strategically presenting themselves online, idealizing the other people in the conversation and could even feel less inhibited in self-disclosure

with others (Walther, 2007). These strategies help overcome the limitations of text communication.

Very early on, Gunawardena (1995) experienced similar findings with social presence, in that CMC had the capacity for few social context cues, but participants still perceived CMC as being interactive and interesting. It seems that people use the technology available to them and ignore or find ways around the limitations of a technology in order to convey their 'presence' and interact with others, despite any limitations of a technology.

In summary, cuelessness theory, media richness theory and social information processing theory have enriched research in educational settings over the years. In many ways, they have been complementary tributaries in social presence research. What is common to all these theories is the interest in mediated communication environments, such as online learning, where technologies influence a psychological element of communication between people. In preparing to understand social presence theory in educational settings, a selection of social presence articles are highlighted in the next section.

A Brief Selection of Social Presence Literature

The summary of specific articles provides an overview of key studies investigating social presence in online learning over the years.

Gunawardena and Zittle (1997).

Gunwardena and Zittle's (1997) conducted a seminal study in social presence and it was one of the first to apply social presence to online learning. In their original study, they examined social presence as a predictor of learner satisfaction in the course. What was key about this study was that their work and a previous paper by Gunawardena (1995) shifted the focus to the perception of media in communication (Cui et al., 2013) rather than considering social presence as a quality of the medium itself, which was the view of Short et al (1976). This was a crucial first step in shifting social presence theory to online learning.

The results of the Gunawardena and Zittle's (1997) study indicated that social presence was strong predictor for learner satisfaction. The survey used in the study became the gold standard used for many years and still continues to be used or adapted.

Tu and McIssac (2002).

Tu and McIsaac (2002) investigated the degree to which social presence and online interaction were related. They posited social presence as being more related to the psychological components of immediacy and intimacy of social presence. This was key because they emphasized social presence from the perspective of social context, online communication and interactivity (i.e., the interrelational effect of social presence between people). They specifically studied public settings. One interesting aspect of this study is that it addressed the asynchronous nature of CMC environments as contributing to a

feeling of decreased immediacy, and thereby, decreasing social presence. The study emphasized the immediacy factor within social presence.

Their study assessed the use of email, bulletin board and real-time chat. A survey was constructed to measure social presence and privacy elements using a 5-point Likert type scale. The researchers conducted an exploratory factor analysis, which resulted in factors of social context, online communication, interactivity, and system privacy.

The results of the study found that social presence "positively influences online interaction; however, frequency of participation does not represent high social presence" (Tu & McIsaac, 2002, p. 140). The results indicated that perceptions of social presence and privacy remained unchanged across email, bulletin board and real-time chat. The concept of privacy was non-significant. Of note was that other social relationships emerged from the study; such as: exchanging information, providing services, maintaining existing status and demonstrating caring. The authors recommended instructor strategies to increase perceived social presence in online courses.

Richardson and Swan (2003).

Richardson and Swan (2003) investigated social presence in an online learning context, giving specific emphasis to teacher immediacy behaviors and the presence of others in a course. They concluded that teacher immediacy behaviors accounted for the same phenomena as seen in social presence, where technology was not an intermediating variable (p. 70). They noted that that instructor immediacy behaviors have been related

to ratings of instruction. They posited that social presence could be 'cultured' into a course.

Richardson and Swan used a correlational design and a modified version of Gunawardena and Zittle's (1997) social presence survey but used a 6-point Likert type scale. The results of the study showed statistically significant correlations between perceived social presence and overall perceived learning and perceived social presence and satisfaction with the instructor. In their analysis of course tools (e.g., written assignments, class discussions, group projects, lectures, and self-tests), they found that students perceiving strong social presence in group projects also felt a higher degree of I).↑ 끓ing from such tasks.

Richardson and Swan found that social presence and students' perceived learning in the course were strongly correlated. Of particular note, the perception of social presence also included the perceived social presence of other students. The study found that students who had high perceptions of social presence also had high levels of perceived learning and perceived satisfaction with the instructor.

The results of their study also provided indirect support that social presence can be 'cultured' into a course which suggested that *differences in social presence could indicate something more than media effects*. The authors proposed that immediacy seemed to account for the perception of social presence but without the mediating variable of technology (Richardson & Swan, 2003, p. 70).

Mayne and Wu (2011).

Mayne and Wu (2011) conducted a comparison study to examine the effect of instructor-led strategies to improve social presence perceptions of students. They defined social presence as the "connectedness to a group" (p. 110) or how "participants in computer-mediated communication feel affectively connected to one another" (p. 111). They created an adapted survey instrument based on Richardson and Swan (2003) called the self-report classroom community scale (Rovai, Wighting, & Lucking, 2004) and a questionnaire from their institution. One of the questions asked of the participants was: whether the experience of taking the online course made the student feel like continuing to take online courses. The survey used a 5-point Likert type scale. The results of the study found the social presence group scores indicated significantly greater perception that student expectations about online learning were met and that students were likely to continue with online courses. This study focused on the interactions between people and highlighted the aspect of immediacy within the construct of social presence.

Leong (2011).

Leong (2011) investigated the influence of social presence, student interest and cognitive absorption on student satisfaction as a way to redress attrition problems in online learning. Leong examined how social presence, interest and cognitive absorption were related to student satisfaction of the course experience. It was noted that many social presence researchers had found social presence to be a predictor for student satisfaction, but Leong felt the relationship was more complex than originally conceived.

Leong tested the relationship between cognitive absorption, social presence and satisfaction. The hypothesis was that these constructs were positively related based on a literature review presented in the article.

Leong used a modified version of Tu's (2002) social presence survey but left out the parts regarding privacy which Tu had found to be non-significant. The student satisfaction questions was derived from Tallman's (1994) student satisfaction questionnaire. Student interest was based on course evaluation questions used at the institution of study. The resulting survey used a 7-point Likert type scale of agreement/disagreement.

Leong used confirmatory factor analysis (CFA) to determine the constructs and employed structural equation modeling to test a model of relationships among the theorized constructs. The CFA of social presence confirmed the three factors as set forth by Tu (2000). The results of the study indicated that, contrary to other researchers finding a direct relationship or impact of social presence on student satisfaction, Leong (2011) found social presence moderately influenced student satisfaction, yet its impact was not direct and was non-significant; Instead, social presence was mediated by cognitive absorption in the model. Thus, social presence had a non-significant relationship to satisfaction, but social presence appeared to strongly influence cognitive absorption, which in turn, directly influenced satisfaction. The study also found that student interest had a significant relationship with social presence and satisfaction. Leong's was one of a few studies using factor analysis in assessing social presence and gave specific focus into how social presence affected other elements of the course setting.

Reio and Crim (2013).

Reio and Crim (2013) examined the relationship between social presence, student satisfaction with learning and future intended enrollment into online courses. They found that students taking a course due to convenience were more likely to enroll in a future course, whereas students taking a course because it was required for their major were less likely say they would enroll in a future online course. The study results indicated both social presence and satisfaction were moderately and positively correlated with future enrollment intent. In addition, social presence was strongly and positively correlated with learning satisfaction.

Students who perceived greater social presence were more likely to be satisfied with their learning experiences. Furthermore, students who perceived greater social presence and were satisfied, were more likely to indicate enrollment into future online courses. In their study, social presence uniquely predicted around 15% of the variance in future intention to enroll in online courses. They concluded that the "amount and quality of social presence can exert a strong influence on the level of satisfaction students derive from a course and their likelihood of enrolling in a future online course" (Reio & Crim, 2013, p. 131).

Hostetter and Busch (2013).

Hostetter and Busch (2013) examined the relationship between social presence and learning outcomes. They used a mixed method study to investigate the amount of perceived social presence by students, the amount of demonstrated social presence

behaviors by students and the relationship between those factors and student performance on an assessment. Text-based social presence was examined by assessing students' perceived social presence in a warm-up exercise, a discussion forum and a PowerPoint presentation.

The authors used the social presence survey designed by Richardson and Swan (2003), which implemented a 6-point Likert type scale of agreement/disagreement. Next, Hostetter and Busch performed content analysis on students' postings in discussion boards. Third, they assessed the relationship between social presence and students' performance on an assessment, such as an exam.

The results indicated that students who demonstrated more social presence skills in discussion forums also resulted in higher levels of perceived social presence, as well as had statistically significant higher ratings on their assessment exam: social presence influenced student outcomes (Hostetter & Busch, 2013). They also found a connection with social presence and the number of online courses a student had previously taken. They proposed further research into whether students having more social presence skills are more likely to take online courses or whether social presence is a skill that can be learned over time.

But before moving much further ahead, it is important to place social presence within the larger context of online learning. Toward this aim the next section provides an overview of distance education and online learning as the backdrop to the canvas that social presence is a part of.

A Brief History of Distance Education and Online Learning

Even though it may not seem like it to many students studying at institutions of higher education today, the paradigm of online learning is still nascent compared to the history of distance education which began in the latter part of the 19th century. Given how Internet technologies have transformed learning possibilities to an extent never experienced before, it is plausible to consider online learning as a completely separate paradigm from distance education altogether. Where does online end when online technologies can be included in face-to-face courses?

There are numerous possibilities for combining both online and face-to-face learning, which has led to the blooming sector of flipped classroom approaches and blended/hybrid classes. The researcher of this study does not consider online learning to be a form of distance education. Instead, the researcher considers online learning as separate way of 'knowing' (i.e. knowledge in action). Online learning does not fit within the realm of what was considered distance education, but neither is it is quite like what we used to know in 'traditional' classroom settings. Thus, just like there has been nothing quite like the Internet to shake up learning than ever before, online learning is a new paradigm and a new approach is needed when designing online learning experiences. However, the majority of educational literature places online learning under the umbrella of distance education. Thus, a brief history of distance education and online learning is included in order to place this study in context.

Distance education has been defined as a system of distance teaching and learning which includes processes such as learning, teaching, communication, design and

management (M. G. Moore & Kearsley, 2005). A more recent definition defines distance education as an education using technologies to deliver instruction to physically remote students and which technologies aid in the support of regular and substantive interactions between students and the instructor both synchronously or asynchronously (Ginder, 2014).

The inception of distance education began in the mid- to late 1800s. It initially commenced as correspondence study, where course materials were delivered by the postal service and students returned assignments to instructors in the same way. This practice continued for many years with little attention given to the practice, theory or pedagogy of distance education itself.

Then, in the 1970s, the concept of learner autonomy (M. G. Moore, 1972, 1973) emerged. It was later refined into what Moore would eventually coin the "theory of transactional distance," (M. G. Moore, 2007). Moore's theory of transactional distance focused on the psychological distance between people in learning situations, especially distance learning. He posited that when people were separated by geographical distance, (such as that seen in distance education), psychological distance would be a crucial element in communication. The theory of transactional distance is one of the most cited theories for distance teaching and has had wide ranging of influence on the field of distance education.

During this same time period, the Open University of United Kingdom became the first publicly-funded, degree-granting distance education university. The idea to start a university focused on distance learning was, at the time, revolutionary. The English

government challenged and funded higher education to create new ways of reaching distance remote citizens and learners.

Continuing into the 1980s, Keegan's (1980) work provided a widely accepted definition of distance education where distance education was composed of six elements: separation of teacher and student, influence of an educational organization, use of technical media, two-way communication, possibility of occasional seminars, and participation in the most industrialized form of education. Keegan's definition was flexible and is widely referred to in educational literature. Moore's theory of transactional distance and Keegan's views for distance education became increasing accepted during the 1990s. It was during this period that online learning began to come of age and the term e-learning emerged.[1]

During the 1990s, technologies challenged (and arguably, continue to challenge) what it means to teach and learn. In the later 1990's, the World Wide Web became more available to a growing audience of remote learners. Today it is impossible to know how a pre-Internet education system could have conceived of a world where Massive Open Online Courses (MOOCs) are challenging institutional infrastructures. MOOCs challenge enrollment capacities of institutions, as they, literally, can have thousands of registered course participants, and are typically free, though sentiment towards a more fee-based approach is emerging (Lowendahl, 2013). Even so, it remains unclear what MOOCs may mean for degree completion (I. E. Allen & Seaman, 2014).

[1] Exactly who first coined the term e-learning is still largely debated, but various sources indicate it was somewhere around 1998.

But prior to MOOCs coming of age, there were massive technological changes which materialized during the 1990s and 2000s as various technologies surfaced. Twenty years ago, technologies such as email, internet discussion forums, chat rooms and even websites were *avant-garde*, even though it is difficult to consider such technologies revolutionary today. As educators, we must recognize that the majority of incoming students view technologies such as email, discussion forums, chat rooms and web pages as merely the *status quo* in online learning environments; such technologies are, at a minimum, unoriginal.

Moore's law[2] was especially prophetic during the tumultuous early 2000s. The relative power of the computer was doubling rapidly as relative cost was decreasing substantially. The reduced cost was one factor allowing computers and associated Internet capabilities to become widely available to the general population of learners. At the same time, Internet Service Providers (ISP) were making the possibility of a home Internet connection to the World Wide Web possible and affordable.

As online learning ramped up, electronic course management systems emerged and matured. Online course management systems facilitated the administration of online classrooms. Examples of course management systems are Blackboard, Angel, and Desire2Learn. Examples of some open-source or community-developed course

[2] Moore's Law (G. B. Moore, 1965) roughly stated that the number of transistors in a computer chip would approximately double every 24 months. This resulted in increased computing power, functionality and performance while reducing cost. Moore's Law has remained in force though there is recent discussion as to whether the end of Moore's Law draws near (Chien & Karamcheti, 2013). Incidentally, year 2015 marks the 50th anniversary of Moore's prediction.

management systems are PingPong, Moodle, and Sakai. Examples of MOOC platforms are Coursera, Udacity, Khan Academy, edX, and Udemy (Lowendahl, 2013).

Typical components of course management systems are discussion boards/forums, assignment drop boxes, an electronic grade book, communication tools such as messaging and email, and the ability to use hypertext (HTML) and/or integrated audio/video elements. Many of these systems also have customized online learning activities, such as making choices, signing up into groups and/or extending to external resources like websites, data bases, libraries or other resources.

The plethora of technologies and devices makes online learning platforms widely diverse. In addition to a range of choices in administrating courses, hardware and software devices continue to provide more options for accessing online learning. Institutions of higher education are increasingly establishing a BYOD (Bring Your Own Device) openness to their institution's learning environment; thereby allowing students to access learning content from their computer, smartphone, tablets and other handheld devices even as it struggles to meet the expectations that a BYOD approach requires (Lowendahl, 2013).

As technologies emerge and devices adapt, learning materials can be accessed from nearly anywhere from any device. This climate allows learning itself to become more open. Consider Khan Academy, which is making access to learning more available, more systematized, highly adaptive, and free. Khan Academy has nearly reinvented education (Noer, 2012). Highly systematized approaches provide greater efficiencies of scale. However, ever changing devices in the marketplace, online course management

systems and university infrastructures create a continual sea of change and challenge for administrators, faculty and students alike.

The last two decades have experienced numerous emerging technologies, as well as the retirement of outdated legacy technologies. Technologies would spring up, morph and fade away at gut-wrenching speed, only to germinate in new forms or variants a short while later. Some technologies survived the hype and matured to become standard, adopted software solutions at the institutional level in online learning. Other technologies, such as virtual worlds, have not realized their aspired-to potential. Other forms of technologies, such as Adaptive Learning (e.g., SAT and GRE-like assessments) are on the upswing and being integrated into many learning management systems (Lowendahl, 2013). This creates tension for faculty and institutions in integrating emerging technologies into the curriculum.

A legitimate concern with technologies is that the use of new technologies can be autotelic, where the more valuable benefit is to focus on learner interactions. Technology is not a big wrench.[3] It is utilized best when mindfully integrated towards achieving an outcome, not just because it is cool or interesting to use. Goleman (2012) mindfully warns of a disconnection existing between changes in the environment caused by technology and the slow evolutionary change of the human brain.

To a large degree, the Internet and online learning is still so new that educational researchers, faculty, students and administrators are still trying to figure out what it

[3] The Great Media Debate erupted around 1995. Some researchers argued that technologies mattered (Kozma, 1994) while others argued they did not (R. E. Clark, 1994).

means to integrate emerging technologies into the curriculum. Human beings have developed for thousands of years without the Internet. The Internet brings new ways to learn but it does not change the fundamental human need embedded in learning situations: to construct knowledge and connect with others in ways we are natively adapted for.

Some institutions have readily adopted online learning into their curriculum. Still other institutions debate whether to incorporate online elements into the curriculum at all. Approximately 75% of academic leaders consider the online learning outcomes to be the same as, or superior to, face-to-face courses (I. E. Allen & Seaman, 2014). Even so, many institutions remain at a loss as to what it takes to deliver high quality online learning experiences, even as the demand for online learning is so strong that over 7.1 million students at degree-granting higher education institutions participated in at least one online course during Fall 2012 (I. E. Allen & Seaman, 2014).

The researcher of this study argues that a major issue in the online learning climate is the current difference between younger learners (learners between the ages of 18 to 22 years) and more mature learners. Enormous technological changes have happened in the last 20 years and more mature learners encountered the Internet as adults, whereas younger learners *grew up with the Internet* and children are beginning to use iPads as toddlers. Technology is rewiring our brains (Small & Vorgan, 2009). The imprints and understandings of the Internet and technologies which younger learners possess is vastly different from that of older learners.

But the flexibility which online learning can offer and the variety of new technological tools which can facilitate learning at a distance more easily, appear to be at odds with the lurking problems in online learning. Some of the problems are institutional. Some of the problems are pedagogical. Some of the problems are student-related. Some of the problems result from technology itself.

In systems thinking, everything is related to everything else. Thus, the problems in online learning are intertwined and return back to a central tension in online learning, that is, the tension between the social nature of people and the technologies used to bridge the 'distance' inherent to online learning. The next section explores three forms of 'distance' in online learning.

Distance in Online Learning

In online learning, learners and instructors are separated from each other by some form of distance: geographical distance, temporal distance, and psychological distance. All three forms of distance influence elements of online learning and contribute to the interaction, or lack thereof, between learners and other learners, between learners and content, and between learners and instructors.

Spatial Distance.

The most obvious form of distance in online learning is spatial distance. At a fundamental level, geographical distance describes a physical separation between people. For thousands of years people learned *in situ*. Thus, learning at institutions of higher

education literally required people to be in the same place and time as their guru. Learning happened when people were together in physical space.

Technological advances helped to overcome the requirement to be at the same time and place in order to learn. Human beings are tool makers and we develop technology to 'extend' the reach of the human mind as a way to assist in solving basic human struggles (A. Clark, 1998). As it happens, advances in technologies preceded each change within traditional distance education, as well as online learning. Each advancement in technologies extended the physical distance possible between learners, instructors and content.

The first major technology to assist in overcoming physical distance was the postal system. It facilitated the advent of 'distance learning' and correspondence study. The postal system provided a means for students and teachers to overcome the challenges of physical distance by using the postal service to communicate. Students and teachers did not need to physically travel to each other for learning and exchange of ideas to occur. Technology provided the means to overcome the requirement to physically 'travel' to where the learning would occur by sending messages using technology instead.

Geographical distance literally permeates the entire idea of online learning. Physical distance, then, becomes a way to both structurally identify online learning, as well as a way to define the type of education itself (learning while being physically separated). The physical separation of instructors and learners is still a dominant issue in the literature surrounding e-learning environments (Kiliç Çakmak, Çebi, & Kan, 2014), mostly because online instructors and learners do not share one physical location

anymore (Ngoyi et al., 2014). Physical distance is the both bane of, as well as the key attraction for, many online learners (i.e. not needing to travel to an institution to learn). Many university students do not consider it a 'feature' to have to travel to a university once a week to follow an evening class. Yet, it is known that when students are physically separated from their institution, its services and other peers, students more likely to experience feelings of isolation or alienation (Rovai & Downey, 2010), which decreases motivation to persist in learning. There is a tension between these elements.

Furthermore, what happens when there is no physical institution of learning anymore? With online learning, a physical institution may not even exist. This is a quandary because, for hundreds of years, universities have always been physical places; Institutions of higher learning were a place one could go *to*. A university was a place. A class was a *place*. A physical institution is a powerful cognitive imprint in the human mind with respect to a formal education.

But even if a physical institution for an online academy exists, online learners who are enrolled in a fully online program/institution frequently have no tangible or physical connection to the institution (Glazer & Wanstreet, 2011). As such, for courses conducted exclusively online, the online course space may be the only shared place that instructors and learners experience together (Ngoyi et al., 2014). Physicality, as a condition itself, may be becoming entirely *removed from* online learning. At its best, it is liberating. At its worst, it can be a form of disembodiment or displacement.

Temporal Distance.

Another form of distance in online learning is temporal distance: distance in time. In practical terms, this can be thought of as the time between the initiation of a communication/interaction and of its receipt by a receiver. When two people are standing next to each other, the time distance of communication is functionally zero. When communicating face-to-face, learners and instructors easily pick up verbal and non-verbal cues about how the communication is going, and can send/receive messages without any time lag. However, when two people are physically separated, the time between message initiation and message receipt increases.

Again, advances in technology have helped overcome issues of temporal distance. While sending communications via the postal service communicators had to wait at the speed of postal delivery. It created flexibility and convenience, at the cost of time and communication cues. Then, with the advent of the Internet, people could send written messages nearly instantaneously via email, whereas a physical letter took much longer. Email started to make written communication *seem* more synchronous. Telephone communication allowed physically distant communicators to converse in real time (synchronously), even though they were physically distant from one another. When technologies matured enough to provide audio and video conferencing to the average Internet user, it was almost like 'being there.'

In learning situations, technological developments, such as email, electronic discussion boards, and chat rooms, allowed the quicker exchange of messages and decreased the lag time between instructor and student interactions. It also opened up the

possibility to interact with other learners that would have been nearly impossible previously. In the past, a significant lag time had always existed, due to the geographical dispersion of instructors and students and the limitations of technology to transmit communication. Even small things, such as when people had to arrange to be in a designated location to engage in a telephone call or video conference disappeared for many learners who could now be at home with their own web camera. Currently, many students and instructors can phone each other without being locked to a landline (and some students may even ask: What is a landline?!). Instructors and students now video conference using free software from their own computers with web cameras, for relatively little cost, compared to commercial video conferencing tools. The reduction in time lag of messages and/or feedback using these tools is valuable for learners but there is a challenge in selecting the technology that works best in the specific situation (Dunlap & Lowenthal, 2009).

Even as developments in Internet technologies decreased the time and space constraints that physical distance created between instructor and student, the shortened time frame brought its own challenges and cultural expectations. Assignments and feedback could be delivered in a matter of seconds. The boon of reducing lag time in communications uncovered expectations on both sides regarding communication turn-around. Students started to expect an immediate reply (Tu, 2000) as their email would arrive immediately at the instructor's virtual desk.

The expectation on instructors to provide feedback on assignments immediately is a strain and technological expectations are a major factor influencing online instructor

burnout (Hogan & McKnight, 2007). On the upside, once an assignment is evaluated, receiving feedback is relatively immediate for students.

The advances in technology also allowed for changes in the *virtual, geographic mobility* of students and instructors. Students and instructors could now easily interact and communicate from nearly any place in the world, as long as they had the tools and access to the Internet. Technologies have theoretically annihilated temporal distance and functionally evaporated geographical distance. Yet, with all these technologies supposedly having the capacity to bring people together there is an aspect of 'being alone' when using technologies (Turkle, 2011). Feeling alone or disconnected from others in online learning is a recurring theme. Rather than the physical distance or the temporal distance being the issue, it is the social or 'emotional' distance that is crucial element in online learning experiences.

Psychological Distance.

Psychological distance can be thought of as the psychological closeness or remoteness people feel when communicating. In social presence, psychological distance is addressed by the element of 'immediacy' between communicators. In the case of online learning, temporal and geographic (or spatial) distance are widely accepted elements of the online learning climate. What is important is that both spatial and temporal distance affect how socially close people feel to one another (Stephan, Liberman, & Trope, 2010). In other words, physical distance and time-lag between messages can affect how psychologically close people feel with each other.

The feeling of being socially close or remote to other people is, then, a psychological element. Turkle (2011) aptly addresses how technology can solve some of the problems of geographical distance, and yet, also be a source of social isolation. Case in point is the popularity of video and social technologies online. In 2014, Google, Facebook and YouTube were the 3 most popular websites in the world; Wikipedia, Twitter and Linked In were among the top fifteen ("List of most popular websites," 2014). All of these websites speak to the collaborative and social nature of the Web.

One thing that video and audio technologies facilitate is social interaction in online learning, which can support creating a greater sense of immediacy and closeness between course participants. In traditional classroom settings, people met in a face-to-face environment where physical proximity allowed a wide range of real-time cues to enhance the discussion and exchange of ideas, such as body language, seeing a smile, the spatial setting of furniture in the physical space, and how voices sound in that space. In an online learning settings, however, this is not the case; yet, the maturation of Internet technologies has provided greater capability for remote participants to participate in online learning using technologies. However, interactions in online settings are always mediated by some form of technology. Mediated interactions have been reported to create psychological distance between online learning participants (Kehrwald, 2008). However, there have been many advances in technologies in the last few years. Do mediated interactions still create greater psychological distance?

Even early on, online learning researchers found that people could still feel psychologically 'close' even when separated by physical distance, such as Walther's

(1996) article which stated that communications online were personal and even hyperpersonal. This happened at a time when the vast majority of available technologies were text-based, and the Internet was relatively young. More recently, Sprecher (2014) found that communicators in text-based situations will use techniques, such as greater personal disclosure, to enhance or create closeness when physically distant. Thus, there are ways to feel connected to others, even when using communication forms where non-verbal cues are absent, such as the use of a lean communication medium like text. Maybe it is not technology but how people interact which makes the difference?

It is also important to note that people can 'ignore' each other and place their intentions elsewhere, even while co-located in same physical space. For example, observe people texting or posting messages to remote 'others' while ignoring their proximate friends seated across from them at the same table. Thus, people can be geographically proximate and remain psychologically distant. Turkle's (2011) premise is that technology can deteriorate elements of human communication.

Thus, even being in physical proximity to others does not necessarily guarantee meaningful connection. Students living on-campus taking online courses can still feel isolated (Reio & Crim, 2013). Online learning essentially alters the reality of time and space in educational contexts: there is no one physical location or time anymore (Ngoyi et al., 2014). Conversely, people can feel psychologically close while physically distant, even with text-based technologies, such as seen with Walther's (1996, 2007) work. It is not just physical distance nor the presence or absence of technologies in the communication channel which create a sense of isolation or closeness.

In summary, spatial distance is mitigated by technologies allowing participants to communicate more easily at a distance. Temporal distance is mitigated by technologies allowing faster feedback and turnaround times of communication between people. Psychological distance is the more challenging barrier and could, as least theoretically, be impacted by technologies providing certain affordances over other technologies. Psychological distance/closeness is a key element of social presence theory. Social presence has been proposed to reduce psychological distance and increase connection in online learning contexts. But how does the aspect of immediacy in social presence correspond to psychological closeness? The next section describes immediacy and its relationship within the model of social presence.

Social Presence Immediacy

Short et al.'s (1976) original ideation of the immediacy element within social presence was based on Argyle and Dean (1965)'s view of intimacy and Wiener and Mehrabian's (1968) view of immediacy. These two views informed how psychological closeness integrated with social presence theory and also related to how technology affected immediacy cues.

Argyle & Dean's (1965) study examined how eye gazing, physical proximity, intimacy of the topic discussed and amount of smiling, affected the feeling of intimacy between communicators. The core of the investigation revolved around how these elements provided information to communication participants regarding the ongoing social interaction. For example, eye contact provided information about how the

conversation was progressing (e.g., either well or not so well), in addition to providing a channel for signaling about when the communication channel was open (e.g., when it is okay to interrupt someone or when it is time to yield the floor to another speaker). They also found that eye gazing could also be too intense, such as when extended eye gazing is too long, it creates tension between communicators. Argyle and Dean's concept of intimacy proposed that when intimacy between communicators changed there was a corresponding change in the communication environment in order to bring equilibrium to the communication.

In general, much of the original basis for social interactions surrounding immediacy/intimacy was based on an approach-avoidance perspective. This stance is one where communication between participants alternates between the two poles until a natural equilibrium in communication is achieved, for example, where eye gazing, physical distance and the conversation topic come into balance. Achieving equilibrium is amenable for all parties involved. When signals are misinterpreted, however, or if communication seems unnatural or awkward, equilibrium is delayed or not achieved. The resulting feeling of psychological closeness or distance is perceived either verbally (e.g., by what is spoken or written) or non-verbally (e.g., through actions, sound, sight or touch).

Mehrabian's (1967) view of immediacy was based on the perceived physical and/or psychological closeness between people. This work became the springboard into research on instructor immediacy in the classroom. Mehrabian's basic stance was that people tend to move towards what they like and move away from what they dislike:

approach or avoidance behavior. In course settings, immediacy means that participants are drawn towards people and things they like, prefer, or evaluate highly (Melrose, 2009). In instructional settings this can sometimes be described as 'likability.'

The original view of social presence argued that the communication medium was the carrier of immediacy and intimacy through verbal and non-verbal behaviors. Short et al.'s (1976) original definition of social presence described the salience of interpersonal relationships through the communication channel selected (e.g. text, audio, video or face-to-face). Salience in interpersonal relationships implies feelings of engagement, affection, inclusion and involvement in those relationships (Melrose, 2009). In teaching settings, instructor immediacy behaviors are frequently investigated with the goal of finding ways to reduce psychological distance between instructors and learners; and, thereby creating better engagement in the course and reducing psychological withdrawal.

Immediacy behaviors in learning situations are exhibited via instructor immediacy behaviors. Such behaviors can even be an instructional strategy, which facilitates a sense of community and a rich social presence perceived by learners (Melrose, 2009). Instructor immediacy behaviors can influence the climate of the online course. Instructor immediacy is perceived through behaviors which enhance feelings of closeness (Pelowski, Frissell, Cabral, & Yu, 2005) between instructors and students in online courses.

Instructor immediacy behaviors are typically delineated into two categories: verbal and non-verbal. Wiener and Mehrabian's (1968) original work described verbal immediacy behaviors as actions. In learning settings verbal immediacy behaviors would

be things such as addressing others by name, acknowledging people, self-disclosure, and using emotional expressions. Verbal immediacy behaviors were those actions, intentions or thoughts which were communicated through words or language. Naturally, it is easy to see how text-based communication in online courses can make researching this topic more accessible when verbal immediacy behaviors are frequently recorded via text-based activities between course participants (e.g. discussion boards, email, or chat sessions).

Verbal immediacy behaviors are observable through words. Verbal immediacy is the degree of psychological closeness or distance between communicators as created and evidenced by what communicators say or write. Language is a powerful motivator and statements of 'we' or 'our' in instructor communications demonstrate verbal immediacy, while a statement of 'you' or 'your' does not (Melrose, 2009). However, language can be subtle. There can be miscommunication or misunderstandings when using low context or 'lean' channels, such as text-based communication.

In contrast to verbal immediacy behaviors, non-verbal instructor immediacy behaviors are those behaviors which are observed, rather than communicated through words. According to a classic work, nonverbal instructor immediacy was demonstrated through behaviors such as maintaining eye contact, leaning closer to people, appropriate touching, smiling at others, voice inflection, and having a relaxed body stance. (J. F. Anderson, 1979). Gorham (1988) extended the work of J. F. Anderson (1979) and incorporated the non-verbal behaviors Anderson had described, together with verbal immediacy behaviors. Gorham's (1988) classic work is frequently cited in educational research. Recent authors, such as Creasy, Jarvis and Gadke (2009), continue to use or

cite this seminal work as a platform for departure into the exploration of immediacy topic in online settings.

Gorham cited examples of non-verbal instructor immediacy behaviors in the traditional classroom, such as an instructor gesturing, not sitting behind a desk while teaching, having a relaxed body position, or not using a monotone voice when speaking. Gorham described examples of traditional verbal instructor immediacy behaviors as addressing students by name, providing individualized feedback on student work, encouraging students to talk in class, and incorporating personal examples about the instructor's own experiences outside of class.

In the traditional face-to-face classroom, the classroom setting resulted in a dynamic, rich, synchronous communication channel where educational discourse flowed naturally. In social presence theory, cuelessness theory and media richness theory, face-to-face settings are the optimal level for perception of nonverbal communication cues. In Short et al.'s (1976) original view, face-to-face settings had the highest potential for social presence.

Thus, in traditional face-to-face settings, instructors convey non-verbal immediacy (probably) without even thinking about it: sometimes unconsciously. Instructors gesture, smile, move and emote through various behaviors, which convey the instructor's state of mind and other communication signals to course participants. In face-to-face contexts, non-verbal immediacy is likely not given much thought because it just happens. Even so, instructors teaching in online learning contexts may be required to convey immediacy exclusively through written communication (Melrose, 2009), as many

online courses rely heavily on text-based communication. This can be difficult because text is considered a 'lean' communication medium and creates a sense of distance between people. This can create a significant challenge in online learning; especially when instructional immediacy in online learning is the extent to which instructors project warmth and likability in their online interactions (Melrose, 2009). This means that online instructors may be needing to convey their personal warmth and other traits using a communication modality that makes it inherently more difficult from the start.

Instructor immediacy behaviors have mostly been researched in traditional classroom settings (Pelowski et al., 2005; Wise, Chang, Duffy, & Valle, 2004). However, with the advent of online learning, some research began to investigate immediacy behaviors in online learning settings. In the classroom, Biocca and Nowak (2002) described instructor immediacy behaviors as verbal or non-verbal actions which instructors produce or exhibit, and which students receive or observe.

Historically, research has associated high instructor immediacy behaviors with better student motivation, increased student satisfaction and more affective and cognitive learning (Christophel, 1990; Christophel & Gorham, 1995; Gorham, 1988). More recently, instructor immediacy behaviors have been linked to better student learning outcomes (Arbaugh, 2001; Baker, 2004), overall course satisfaction (Arbaugh, 2001), and student learning motivation and cognitive mastery of learning materials (M. Allen, Witt, & Wheeless, 2006). Baker (2004) also found that students who rated their instructors as more verbally immediate generally had a more positive outlook toward the course content. Immediacy behaviors in online settings has been researched only rarely.

Instructor immediacy behaviors can help model social presence expectations, which influences student learning outcomes (Hostetter & Busch, 2013). Other researchers have investigated the concept of the 'We-intention' of online social network use by students which is influenced by the level of social presence (Cheung et al., 2011). This appears to be in alignment with Wiener and Mehrabian's (1968) concept of using inclusive language. Using we/our is also one of Gorham's (1988) classic indicators of verbal immediacy.

There are very few studies investigating immediacy behaviors of students. Pelowski et al (2005) analyzed student text chat discussions for immediacy behaviors. They found that overall student immediacy behaviors were not significantly associated with exam performance. They did find, however, that the specific student immediacy behavior of 'support' was positively correlated with changes in pre- and post-test scores.

As yet, only little educational research exists studying the effects of immediacy behaviors in online environments. In online learning situations, non-verbal behaviors can be observed when audio and video formats are used. For example, video may show an instructor's body posture or facial gestures. Audio can convey the sound, depth and inflection of an instructor's voice. But the big question appears to be how immediacy behaviors (both verbal and non-verbal) do, or do not, interact with, mediate or moderate communication signals in online learning. Put another way, immediacy behaviors are presumably present in online learning contexts, but with respect to social presence:

> Teacher immediacy behaviors seem to take into account the same phenomena as social presence without the intermediating variable of

> media. Thus it may be that instructors and students involved in asynchronous communication develop a set of immediacy behaviors that 'cultures' social presence in online courses … (Richardson & Swan, 2003, p. 70).

The idea that immediacy behaviors accounts for social presence, but without technology as a mediator in the channel, leads into a discussion about how exactly technology contributes to the concept of social presence. Does technology matter? Is immediacy the real heart of the issue? From the preceding paragraphs, it is apparent that technology can deliver messages, and to a certain extent can transmit immediacy behaviors to learners to a greater or lesser degree depending on the technology used and its modality. Yet, it appears that students and instructors can adapt and learn behaviors and ways to convey their presence (person) online, in spite of limitations in 'lean' technology, such as that experienced around the turn of the century, was seen even by early social presence researchers, such as Gunawardena and Zittle (1997) and Walther (1996).

Thus, instructors and course participants can adapt to the limitations of a technology in order to convey their presence in a robust way, even using 'lean' technologies. This is exactly what is apparent when participants found ways to convey their social presence, even in low context CMC environments. Participants can be personal, even hyperpersonal (Walther, 1996, 2007). Sprecher (2014) confirmed similar results in that participants communicating via text still found ways of conveying their presence in that lean medium through greater personal disclosure, for example.

A number of studies have found that participants work around the limitations of technology in order to cast their personal presence into the learning environment. Garrison et al (2010) proposed that social presence is a mediating variable between cognitive presence and teaching presence in the community of inquiry framework? To what extent does immediacy or technology matter?

Text-based (written) communication is considered a low context form of computer mediated communication (Walther, 1996). Online courses are predominantly conducted asynchronously, which is considered a low structure format (Crawford & Persaud, 2013). Online courses typically rely largely asynchronous text-based communication (Borup, West, & Graham, 2013; Parsad & Lewis, 2009). Asynchronous communications are time-lagged and considered less engaging and less motivating for learners (Dunlap & Lowenthal, 2009).

With largely text-based, asynchronous technologies being used in online courses, instructors may need to convey their immediacy solely through written communication (Melrose, 2009), which is sub-optimal given the premise of social presence theory. Thus, it would appear that the majority of online learning uses text-based communication, uses text-based technologies, is structured in an asynchronous way, is less engaging, less motivating, and has low instructor presence due to the instructor needing to convey immediacy via text. This appears rather grim. Yet audio and video technologies are widely available. Is this picture still true today? Are text-heavy online courses still the *status quo*?

This situation presents an enormous challenge in creating vivid social presence. It is only recently that more research is beginning to be conducted on audio and video elements, both synchronous and asynchronous, in online learning settings (Borup, West, & Graham, 2012; Borup et al., 2013; Hrastinski, 2008; Hrastinski, Keller, & Carlsson, 2010) and how it affects immediacy. More studies are needed to evaluate multiple levels of technology, as well as synchronous and asynchronous types of communication, and the perception of immediacy behaviors within these elements, and how all this affects online learning outcomes.

Unfortunately, immediacy, and its behaviors and consequent feelings or perceptions of closeness or distance, as well as the choices of technology utilized in the course, are intricately intertwined. Teacher immediacy behaviors are especially important in online learning where instructors need to be aware of the impact their behaviors have on the course and how the perception of social presence can impact student motivation, satisfaction and learning. Feeling a lack of community or belonging contributes to higher attrition rates in online learning (Crawford & Persaud, 2013). Given the current pressures felt by institutions, academic persistence is hot topic in online learning and social presence elements may present a unique way in addressing this challenge.

If immediacy were the only element of social presence the discussion could stop there. However, the other element of social presence is technology. In online learning, technology can be presented in many ways. Technology could mean the type of technology used, for example, text, audio or video. However, it can also mean the

synchronous or asynchronous nature of the technology, such as the difference between recorded messages or live messages. The next section describes the various ways in which technology modality are experienced in online courses and how it fits into social presence.

Technology Modality

The field of education has long been interested in how specific technologies may enhance the learning environment. Social presence researchers, in particular, are especially interested in answering the question of what technologies work well and what forms or processes assist the technology in achieving desired course outcomes. In general, social presence is both a quality of the medium as well as users' perceptions of media (Cui et al., 2013).

The rapid changes in technologies have resulted in many researchers investigating the effects of emerging technologies and the resulting social presence achieved (Cui et al., 2013). Toward this aim, in social presence research the goal may be "a means to explore some aspect of technology or the effects of technology" (Biocca, Harms, & Burgoon, 2003, p. 457) without the corresponding aspect of psychological immediacy. This is not surprising given that a large portion of social presence theory is about how technology impacts the communication channel and communication cues between senders and receivers. The evolution of online technologies has resulted in researchers seeking to apply and examine the effectiveness of technologies in relation to social presence (Cui et al., 2013).

When investigating technologies, it is useful to classify the technology by type or product. For example, is the communication conducted face-to-face, through the use of video web cameras, over audio channels (e.g. telephone), or in written formats (e.g. text-based computer mediated communication (CMC) or email)? Much of CMC research has focused on text-based forms of CMC, but it is becoming more common to investigate audio and video formats of CMC (Sprecher, 2014), likely due to these technologies becoming more widely and freely available.

Another way to classify technologies is by the primary modality or operationalization of the technology, that is, whether the technology is synchronous or asynchronous. The format of a technology can be text-based, audio-based or video-based. Some forms of asynchronous text are letter writing or email, while synchronous text forms are instant messaging and texting (Sprecher, 2014). Some forms of asynchronous audio are voice messages and recorded podcasts. Some forms of synchronous audio are telephone conversations, VOIP (i.e. internet 'phone') and live streamed podcasts. Some forms of asynchronous video technologies are video voicemail, recorded YouTube videos, recorded vodcasts (i.e. video podcasts) and video lectures.

When studying online learning technologies, it may seem reasonable to anticipate that Web 2.0 technologies (e.g. blogs, wikis, Facebook, Twitter) will result in more social presence because course participants can communicate with each other in an immediate and flexible way (Cui et al., 2013). However, this is not always the case. For example, blogs are relatively new, but in at least one study, blogs were rated as having lower social

presence than electronic discussion boards, with the finding being that the interaction between people that is more important than the technology itself (Hall, 2008).

The positive effect seen with discussion boards in Hall (2008) may have been related to that modalities capability for interactivity and discourse by 'replying' to each other. A blog is typically more one-sided. It is possible that blogs (primarily asynchronous) were perceived as being less *interactive* than discussion boards (also primarily asynchronous). Discussion forums provide greater opportunity for more dialogue between participants during posts and rejoinders.

Asynchronous technology forms result in communications which are time-lagged to a certain degree. Time-lagged messages can be demotivating for students, whereas more synchronous communication is more engaging (Dunlap & Lowenthal, 2009). Text is considered a 'lean' medium, where non-verbal cues such as tone of voices, facial expressions and body language are absent; thus, text based communication is considerably lacking in social presence (Mayne & Wu, 2011), especially when conducted asynchronously.

It is widely accepted that synchronous 'rich' media are available for faculty use in designing and implementing online and mobile learning (Miller & Doering, 2014). So why is it that online courses reportedly rely on asynchronous text-based communication (Borup et al., 2012; Crawford & Persaud, 2013), despite students expressing dissatisfaction with the asynchronous modes (Crawford & Persaud, 2013)? Is the predominant use of asynchronous, text-based communication still persist in current online learning?

Another facet of the synchronous-to-asynchronous debate is that people can use technologies in both synchronous or asynchronous ways, even though certain mediums may more naturally support synchronous usage or social presence due to inherent characteristics (Hrastinski, 2008). For example, email and discussion boards are considered asynchronous because there is always a degree of lag time between messages. However, even email could be utilized in a nearly synchronous way; it just depends on how the technology is actively used (Hrastinski et al., 2010). For example, if the recipient of an email replies nearly instantaneously and the originator rejoinders the reply nearly instantaneously, then this asynchronous technology begins to take on more synchronous attributes.

Synchronicity has been proposed as providing a richer environment for interaction between course participants. For example, Twitter is a more synchronous text-based technology; and Twitter has been found to enhance the perception of social presence (Dunlap & Lowenthal, 2009). Kear (2010) also suggests that strategically implementing more synchronous communication forms of a specific technology because it can assist in amplifying the perceived social presence in a course. Sprecher (2014) investigated synchronous communications across face-to-face, video and audio and text-based formats and found that more 'rich' synchronous channel formats resulted in better outcomes. However, using synchronous technologies do not always lead to better course outcomes. In one study, web conferencing did not increase learner satisfaction (Giesbers, Rienties, Gijselaers, Segers, & Tempelaar, 2009).

Thus, mixed results are found regarding synchronous or asynchronous technology modalities. It has been suggested that depending on as learner's personal preference of how to receive learning materials, the use of video, for example, may either decrease or increase a learner's cognitive load (Homer et al., 2008). One study showed mixed results with asynchronous video, which impacted social presence of both students and instructors, but impacted an instructor's perceived social presence to a greater degree than students' social presence (Borup et al., 2012). Thus, the perception of social presence varied depending on the audience and who the sender was. It may also depend on the course context, pedagogical design and nature of the course environment.

In keeping with Short et al.'s (1976) original depiction of social presence, current communicators (e.g., learners and instructors) probably choose a technology form and implementation-format which is best suited to the learning task at hand. Therefore, it is people who choose (determine) the medium to use and whether a technology's synchronous or asynchronous 'nature' is operationalized (Hrastinski, 2008).

To extend this example further, learners may opt for synchronous technology forms (e.g., web camera meetings) when participating in a task in order to support more complicated discussions requiring participants to reach a shared understanding and elect more asynchronous forms (e.g., email) when only needing to exchange task-focused information between group members (Hrastinski et al., 2010). This is in alignment with social presence theory (Short et al., 1976) and cuelessness theory (Rutter et al., 1984) where people were seen to choose different media or formats depending on the type of task.

As Dunlap and Lowenthal (2009) point out, the design of a software system (e.g. a course management system) can determine the extent to which communications seem time-lagged and make a technology 'seem' more asynchronous than it might otherwise be. For example, a person could receive an email, but decide to reply days from now. A person could telephone someone but they do not pick up and the person does not reply for a long while. Dunlap and Lowenthal described the problem of most learning management systems requiring participants to login/access the system in order to reply to communication messages. This is considered inconvenient and interrupts communication flow. It tends to make messages time-lagged and out of context. Also, it is possible that the 'effort' of having to login to an LMS is a disincentive towards participating; whereas, if a participant can receive and update on her/his mobile device, there are fewer steps to read/reply, and the message 'feels' closer. Because the messages are short and read/reply times are quick, the message channel *seems* more synchronous.

The motivation of the person to reply may be influenced by a myriad of reasons, such as the urgency of the message, convenience of replying, due dates, whether a reply is expected, and technology factors. In some cases, an instructor may send an email to the class, but students may not be expected to reply to the message because it is more of a posting, rather than a communication requiring a response. Expectations are powerful realities. If an immediate response is expected but not received, social presence is diminished (Tu, 2000), such as when a student sends a message and it is not replied to in a reasonably immediate period of time. This, consequently, makes studying social presence and technology modality more complex.

Toward the aim of determining how modality affects the communication environment, Sprecher (2014) investigated its effects on certain outcomes based on initial interactions. Unacquainted participants were placed into dyads and then randomly assigned to a 'getting to know you' type of activity based on a randomly assigned communication modality: text, audio, video, and face-to-face. Measurements of liking and closeness were measured after that initial interaction. Then all the dyads met for a second time using synchronous video (Skype). The results were that the pairs who initially interacted via text-based synchronous communication had the lowest initial affiliative scores but made up for things once they met in the video-based synchronous interaction. More interestingly, the results suggested that audio and video modalities had similar results and it was speculated that video communication may not provide more advantage over audio modes (e.g. telephone) (Sprecher, 2014). This potentially indicates that participants may perceive audio and video as being functionally equivalent, but more research is needed.

Still other researchers have found positive social presence results using asynchronous technologies (Hall, 2008; Walther, 1996, 2007). But there are concerns that asynchronous communication may not provide enough immediacy for learners to interact freely with other students; and consequently, using asynchronous modalities are hypothesized to create feelings of isolation and a sub-optimal online learning climate (Reio & Crim, 2013). It has been posited that more synchronous technologies provide an avenue for informal banter which supports social connections in the learning environment (Dunlap & Lowenthal, 2009, 2014). Twitter, specifically, has been proposed as a way to

enhance social presence in courses (Dunlap & Lowenthal, 2009). Twitter is a text-based technology, and according to the social presence model, text has the lowest level potential for social presence. It uses a 'lean' medium, but has fast and frequent messages.

There is literature suggesting that social presence is influenced by the behavior of and interactions with other participants. Learners in an online community can influence social presence by communicating in ways which are perceived as more 'warm' or 'sociable' and can compensate for the lack of richness of the medium channel such as seen with early social presence researchers like Gunawardena (1995) and Walther (1996). In this way, even heavily text-based courses could experience high degrees of social presence, but it may largely be due to the circumstantial interaction climate fostered within the course setting.

With regard to social presence, various technologies have been investigated for creating or operationalizing social presence in courses. Social presence has been studied with asynchronous audio (Ice, Curtis, Phillips, & Wells, 2007), blogs (Hall, 2008; Murphrey, Arnold, Foster, & Degenhart, 2012), Facebook (Cheung et al., 2011; Murphrey et al., 2012), GoogleDocs (Dunlap & Lowenthal, 2014), Jing (Murphrey et al., 2012), text messaging (DuVall, Powell, Hodge, & Ellis, 2007), Twitter (Dunlap & Lowenthal, 2009, 2014; Murphrey et al., 2012), web cameras (Dunlap & Lowenthal, 2014; Griffiths & Graham, 2009), VoiceThread (Borup et al., 2012, 2013; Dunlap & Lowenthal, 2014), wikis (Bassani & Barbosa, 2013), and YouTube (Borup et al., 2012)

Some of these studies investigated more synchronous text-based technologies studied text messaging (DuVall et al., 2007) and Twitter (Dunlap & Lowenthal, 2009).

Still other researchers have investigated asynchronous modalities, such as text-based feedback versus audio-based instructor feedback (Ice et al., 2007). Other researchers have investigated asynchronous video-based communication (Borup et al., 2012; Griffiths & Graham, 2009; Murphrey et al., 2012). Other researchers have investigated modality effects related to synchronous or asynchronous formats themselves (Borup et al., 2012).

Jing is a social network system similar to Facebook and has been studied regarding the use of asynchronous video communication via recorded video messages between participants (Murphrey et al., 2012). They found that there were still many students who were 'new' to online learning and that participants had a strong preference for audio feedback and immediacy as derived from the audio/video communication tool in Jing. Facebook was used to investigate social presence through the construct of the We-Intention (Cheung et al., 2011). The study found that social presence had a strongest impact on 'We-Intention' to use Facebook in the instructional setting.

Bassani and Barbosa (2013) conducted a qualitative case study investigating social presence in a specific instance where the wikispaces tool was used. Wikispaces is an online collaborative text-editing tool allowing participants to collaboratively edit documents. Participants can communicate asynchronously via messages and forums. If a special widget was applied, participants could communicate via text-chat.

Various technology modalities and their synchronous and asynchronous forms are outlined for comparison in Table 1.

Table 1: Technology Modality Grid

Modality	Asynchronous	Synchronous
Text	Email Discussion boards Blogs	Texting Instant Messaging GoogleDocs (Live co-editing) Text broadcasting (Twitter)
Audio	Recorded audio messages (Voicemail, Skype) Recorded voice discussion forums Recorded lecture podcasts (audio + slides)	Live audio broadcasts (podcasts) Live audio discussion (Telephone, VOIP, Skype)
Video	Recorded Video (YouTube) Recorded Video Messages (Skype) Video Discussion (FlipGrid) Video Assessment (Ave) Recorded presentations (WebEx) Recorded computer-screen videos	Live video (Skype, Google Hangouts, WebEx) Live-stream lecture (Vodcasts) Live screen sharing (Skype, Google Hangouts, WebEx)

Technologies, whether text, audio or video, can have a synchronous or asynchronous mode or can be used in more synchronous or asynchronous ways. In theory, moving from asynchronous text to synchronous video presents the sharpest rise in social presence, because synchronous video provides the greatest opportunity for real-

time non-verbal signals (e.g. gesturing, facial expressions). This aspect of how the technology provides communication signals relates to the other necessary element of social presence: immediacy (psychological closeness).

Social presence is an element in online learning which helps address issues of interpersonal connection, satisfaction, sense of community/belonging. Technologies play an important role in the perception of social presence. The question is: How has social presence evolved over the years in educational settings? Somewhat surprisingly, defining social presence is a moving target. The next section will describe the evolution of social presence and explore current conceptions of social presence in online learning today.

The Evolution of Social Presence

Social presence has been researched in educational settings and has evolved over time. One of the ways to chart the evolution of social presence theory is to observe how various researchers have defined it over the years. In one respect, the variety in social presence definitions has expanded the scope with which educational researchers could explore social presence in online learning. An opposing view is that while it has been useful for the forward progression of research to have various ways to conceive of social presence, there exists debate about what social presence actually is. This is especially the case when almost every researcher who investigates social presence defines it differently, as Lowenthal (2010) points out that:

> … despite its intuitive appeal, researchers and practitioners alike often define and conceptualize [social presence] differently. In fact, 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. (p. 125)

Thus, it is difficult to know exactly what social presence is because so many researchers conceive, define, describe and measure social presence in different ways. Social presence research is consequently "hampered by unexplored assumptions about the nature, role, and function of this critical element of computer-mediated interaction" (Kehrwald, 2008, p. 89). This controversy precipitates continued disagreement about social presence, how to define it, and how to measure it (Biocca et al., 2003; Kehrwald, 2008; Lowenthal, 2010; Pozzi, 2009). At least a portion of the debate arises from the advent of the Internet, the inception of online learning, and the technological experiences and differences of current students. The technological environment under which social presence is evolving is changing dramatically.

As described in an earlier section, Short et al's (1976) social presence scale included face-to-face elements. Social presence needs to be redefined or reexamined within the new context of online learning (Cui et al., 2013). This may be one reason for the varied conceptions of social presence. In the original view, 'classic' social presence was defined as "the degree of salience of the other person in an interaction and the consequent salience of the interpersonal relationships" (Short et al., 1976, p. 65). This view of social presence was used to explain how telecommunication media affected

communication between people for many years (Lowenthal, 2010). The upcoming paragraphs describe the evolution of social presence and its changing definition since Short et al's (1976) original seminal work on social presence theory.

Presence or Virtual Other.

To articulate social presence as a concept, presence itself must be defined, before describing 'social' presence *per se*. K. M. Lee (2004) expounds upon social 'presence' in both its mediated and non-mediated forms. This is notable in that it is far more typical for researchers studying social presence in online learning to solely mean interactions in mediated communication environments only (Biocca et al., 2003); and thus exclude social presence in face-to-face environments, even though social presence according to Short et al. (1976) held that face-to-face communication was the richest medium for attaining social presence. Yet, simply because an interaction occurs online, it is important not to forget that face-to-face interactions are still the benchmark for any human communication. Today, the concept of social presence is primarily discussed within the context of mediated environments, such as online learning, even though it originally incorporated non-mediated interactions, such as face-to-face communication, in its earliest framework (Cui et al., 2013). At the end of the day, we live in a real, physical world (at least for the moment).

In K. M. Lee's (2004) paper, the concept of presence was explicated using a philosophical stance; where authentic and simulated agents were discussed. The paper describes how Short et al. (1976) conceived of social presence as the social richness of

the communication medium. In Lee's view, social presence is "a psychological state in which virtual (para-authentic or artificial) objects are experienced as actual objects in either sensory or nonsensory ways" (p. 37). This definition is distinguished from other social presence definitions in that it exists to a largest extent when users do not seem to notice the communication medium at all (i.e., like face-to-face). In other words, social presence is highest in technology-mediated communications when the technology, whatever medium it is, almost disappears into the background.

Lee's (2004) stance views the dialog between people online as virtual, para-authentic or artificial. Others around this time defined social presence as the "level of awareness of co-presence of another human being or intelligence" (Biocca & Nowak, 2002); or rather, that social presence is the sense of being 'with' another person/entity in a virtual environment (Biocca et al., 2003). Still others have defined social presence as the "degree of feeling, perception, and reaction to another intellectual entity" (Tu & McIsaac, 2002, p. 146). This was extended further as "the degree of illusion that others appear to be a 'real' physical persons in either an immediate (i.e., real time/synchronous) or a delayed (i.e., time-deferred/asynchronous) communication episode" (Kreijns et al., 2011, p. 366).

The preceding definitions may be considered social presence as 'agent' or 'virtual other.' At the very least, studying social presence in online learning becomes important because it becomes a representation of what interactions would be between people *if they were* face-to-face (Ngoyi et al., 2014). In some sense, participants are interacting with

mediated representations of themselves, but the ultimate goal is to be face-to-face with each other. Perhaps the term 'virtual face-to-face' might be suffice.

Social Presence as Community.

In contrast to social presence as 'virtual other,' social presence as community focuses on the learning climate. The terms community and social presence appear frequently together in research of online learning. In general, community-oriented pedagogical frameworks focus on shared values and norms where interactions with others are an important part of feeling connected to the group. From this standpoint, the traditional community of practice (Wenger, 1998) views teaching and learning as occurring through a process of social participation (Lave & Wenger, 1991). As such, the evolution and development of a learning 'community' is organic in nature. For example, policies, rules, cultural/societal/group norms, and how things are organized or change, evolve naturally over time through active participation (and contribution!) by its members.

Most educators would agree that they seek a vibrant community of learners where multiple views are heard, shared and respected. In this sense, 'community' is both the aspiration of, and the inspiration for, the ideal learning environment. Such an interactive community can even be considered the *sine qua non* of higher education (D. R. Garrison & Cleveland-Innes, 2005; Herring, 2004). The quintessence of a learning community is a place where people engage in critical thinking, enter into constructive discussion, share diverse viewpoints, organically evolve governance, co-create artefacts, and create

meaning through the process of social negotiation. In educational contexts, learning is socially situated where members share their thinking within the community (Akyol & Garrison, 2011).

The social negotiation of meaning is an important part of a 'constructivist' view of learning, where the social dimension contributes to cognitive processes and development of new knowledge (Pozzi, 2009). A central idea of 'community' in a pedagogical framework is that being part of a community is more motivating for students (Huett, Moller, Harvey, & Engstrom, 2007). And, even though a community is comprised of multiple individuals, the 'meaning' a person ascribes to participation within the community is unique to him or her. It is impossible to divide interaction, collaboration, and community into separate parts within a constructivist framework (S.-M. Lee, 2014). Successful models for engaged learning in online contexts are based on constructivist principles, use strategies for interactions between participants, and incorporate elements of problem based learning (Hoskins, 2012). This is the environment in which social presence is created through a community-based approach.

Early on, social presence researchers Tu and McIsaac (2002, p. 131) used the term community to define social presence as being the "measure of the feeling of community" by learners in a course. Garrison (2009) refined this definition and suggested that course participants must identify with the course community and communicate in a trusting environment where inter-personal relationships are developed and individual personalities are projected. In general, social presence is a measure of quality of the learning climate focused on cohesion, interpersonal relationships and open

communication (Akyol & Garrison, 2011). As such, social presence is an interactional element which is "influenced by features of the communication environment, and also by the behaviours of participants within this environment" (Kear, 2010, p. 7).

A pedagogical model which incorporates social presence as one element of its framework, and which is based on a constructivist approach to learning, is the Community of Inquiry model (D. R. Garrison, Anderson, & Archer, 2000; D. R. Garrison et al., 2010). The framework has been used as a pedagogical model for online learning effectiveness, though there are still many problems which need to be addressed (D. R. Garrison & Arbaugh, 2007). It is a hugely popular framework which has gained substantial traction in research and educational practice in recent years (Arbaugh et al., 2008; Xin, 2012). The model focuses on the sense of community embedded as part of the environment fostering critical discourse in a classroom.

The framework has been empirically tested in a variety of learning contexts and in hundreds of studies, which gives it a certain amount of validity and reliability (Arbaugh et al., 2008; S.-M. Lee, 2014). It revolves around three overlapping core elements which "provide the structure to understand the dynamics of deep and meaningful online learning experiences" (D. R. Garrison et al., 2010, p. 32): cognitive presence, teaching presence and social presence. Its survey instrument consists of 34 items to assess the three presences within an educational setting (Arbaugh et al., 2008; D. R. Garrison et al., 2010). Because of its wide popularity, a description of the model is included here for the reader's reference.

Cognitive presence is the first element of the model. It is extent to which learners engage with and construct meaning from course content. The purpose of cognitive presence is to promote higher-order learning, which requires "systematic and sustained critical discourse where dissonance and problems are resolved through exploration, integration, and testing" (D. R. Garrison, Anderson, & Archer, 2001, p. 21). This higher-order thinking may be achieved through reflection, constructive discourse with others, and individual effort. It can be acquired through students interacting with and creating meaning from the content presented in the course or in making connections to prior learning.

Teaching presence is the second element of the model. It is defined as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (D. R. Garrison et al., 2001, p. 5). Teaching presence is the pedagogical element of the model; and as such, it requires many roles and skills from instructors: managerial, organizational, pedagogical, communicational, technical, intellectual and social skills.

It has been suggested that attentive, focused, and thoughtful teaching presence is required in order to establish and maintain a community of inquiry (D. R. Garrison et al., 2010). Using teaching presence, the instructor designs and facilitates cognitive presence and social presence by utilizing these various roles in order to create worthwhile and meaningful educational outcomes for course participants. Successful teaching presence can be evidenced through good course design, appropriate communication strategies, clear course guidelines, modeling communication behavior and democratic speech,

Crawford and Persaud (2013) report teaching presence as being a key element to successful online learning.

Social presence is the final element of the model and it was originally defined as "the ability of participants … to project their personal characteristics into the community, thereby presenting themselves to the other participants as 'real people'"(D. R. Garrison et al., 2000, p. 89) . Within the model, social presence is posited to support cognitive presence; and, teaching presence is what helps cognitive presence happen. Social presence has been reported as a mediating variable between cognitive presence and teaching presence (D. R. Garrison et al., 2010). And while students recognize they are real people and are not in a course for purely social reasons (D. R. Garrison & Arbaugh, 2007), social presence alone does not ensure substantive discourse among students. However, it has been proposed that it is difficult for a cognitive discourse to develop without a solid foundation of social presence (D. R. Garrison & Cleveland-Innes, 2005).

The community of inquiry model has been used to study the relationship of social presence and asynchronous video usage in online courses (Borup et al., 2012). In that study, the authors found that some students even commented that the interaction with their instructor was almost like face-to-face interactions. It has also been used as reference point in studying the use of Twitter in adding to the feeling of social presence, cognitive presence and teaching presence in a course (Dunlap & Lowenthal, 2009). The model has also been used to study the relationship between social presence, critical thinking skills and cognitive density (S.-M. Lee, 2014).

Akyol and Garrison (2011) recently used the model to investigate metacognition as a socially situated construct within the community of inquiry model. They sought to observe ways in which course participants demonstrated their metacognitive skills and knowledge and found that students learn more metacognitive skills through the acts of explanation, clarification, justification and sharing within the community of learners.

There are many studies investigating the community of inquiry model, literally hundreds (Arbaugh et al., 2008). However, its popularity does not come without some problems. In research, the connection between social presence and cognitive presence is still largely undefined and the value of social presence in online learning remains unresolved (S.-M. Lee, 2014). Xin (2012) criticizes the model for not accurately representing the fact that online discussions are complex and cannot neatly fit into the model's overlapping spheres.

In general, there is recent momentum to investigate how the three presences relate to each other in the model, but one significant issue with the model is the overlapping elements themselves. It creates complexity for defining and evaluating the elements, as well as investigating how they influence each other. The three elements create a Venn diagram with overlapping parts. See *Figure 2* for reference.

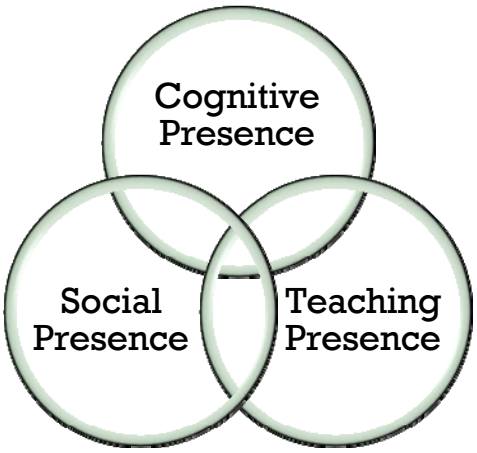

Figure 2: Community of Inquiry Model
adapted from Akyol and Garrison (2011)

The overlapping elements create opportunities for confusion. Teaching presence seems to refer to the logistical or administrative functions a teacher performs in facilitating the outcomes of the course, such as supporting the design and management of learning experience and consequent communication (Cui et al., 2013), but it appears to make the learning experience rather unidirectional. A more constructivist view would see all the presences as co-constructed. It may be better to term teaching presence as facilitative presence, as the teacher's influence can exist in any of the domains of the model, and presumably, so might the students' influence. This may be part of the reason for studies investigating teacher social presence and student social presence as sub-constructs of social presence within the model.

Another issue is that the community of inquiry framework provides little guidance as to how to actually design a course with the model, how to facilitate discourse within

the model, or how to develop social presence itself (D. R. Garrison & Arbaugh, 2007). It has also been suggested that the model needs to focus more on the interaction between the three identified elements as the model "does not explicitly reflect [the] functional entanglement of human communication" (Xin, 2012, p. ~3). Xin goes on to posit that all communication is social in nature.

In general, the community of inquiry framework is suggested as a pedagogical model, but there is little direction on how to specifically apply the elements in instructional settings. As such, practical questions remain as to the number of threaded discussions to implement, whether to use video or not, and other questions of implementation (Dunlap & Lowenthal, 2014). For this and other reasons it is important to clarify and explicate the meaning of social presence in any study and to explain its context within its study.

Social Presence as Realness of Interaction.

In contrast to social presence as 'virtual other' or 'community,' social presence may also be viewed through the lens of 'realness' of interactions between people. Social presence has been frequently defined over the years as the degree to which a person is perceived as being real, or presents themselves as being real, in a mediated communication environment (Cobb, 2009; Dunlap & Lowenthal, 2014; Gunawardena & Zittle, 1997). It is presumed that people in the learning environment are real, of course, but the question is 'does the interaction feel real' or 'does this interaction feel as vivid' as face-to-face interaction?

Focusing on interactions between people in online learning is a natural step in social presence research. This is not entirely surprising. People are social beings (Brooks, 2011; Brown & Duguid, 2000); learning is a social process (Kear, 2010; Laffey, Lin, & Lin, 2006); and the Internet is a social place (Biocca et al., 2003). In online learning, people use technology to further social imperatives towards meaningful human communication and sense-making, as well as to construct knowledge in course interactions.

Researchers investigating online learning and social presence look to interactions between people as an important part of the learning context. It has been recently proposed that much more research in social presence is needed due to serious communication issues between instructors and students in a technology-mediated environment (Cui et al., 2013). In this way, online learning is a good starting point for investigating interactions due to the affective and technological components of social presence (D. R. Garrison & Arbaugh, 2007). Social presence allows researchers to consider the technological and emotional aspects of interactions between people.

Without a doubt, the realness of interactions is a part of what makes a community feel real to its members. In a constructivist view of learning, the social negotiation of meaning is fundamental to sense-making. Social presence, then, is part of the assemblage of (and the motivation for) meaningful construction of knowledge. The perception of someone feeling real in interactions is important for grounding discourse in a meaningful way. Similar to media richness theory, where technologies are evaluated according to their capacity to convey more 'realness' in communication, the epitome of realness is

non-mediated interactions (Kehrwald, 2008) (i.e. how face-to-face the interaction seems). Social presence theory views interactions are most real when the technology seems to fade into the background (K. M. Lee, 2004)

This shift towards focusing less on the medium and more on the realness of interactions began with Gunawardena and Tu's contributions (Lowenthal, 2010). How people present themselves as being real and how people socially interact online using various technologies at their disposal, is at the heart of what social presence theory explains in online learning (Dunlap & Lowenthal, 2014). The feeling that a 'course' is real, and that the participants in an online course are 'real,' is important for any pedagogical model utilizing community, social presence, and a constructivist view of learning.

With the shift in viewing social presence as an interaction, the "need for users to feel connected with each other and to perceive each other as real people" (Kear, 2010, p. 1) is of paramount importance to online learning. A more recent definition focuses on social presence interactions as a 'communicative association' between instructors, students and other students, based on the individual's perception of the quality and quantity of interpersonal interactions (Reio & Crim, 2013). Mayne and Wu (2011) proposed that social presence is the feeling of 'connectedness of a group.' All of these definitions highlight the emotional and psychological connection in interactions among course participants.

Feeling authentically connected to others is an important part of social presence in online learning. Dunlap and Lowenthal (2014) use the term 'social presence'

interchangeably with 'social connection.' They focus on social connections as being the primary element to consider in social presence. Szeto and Cheng (2014) take a similar stance and use the terms 'social presence' and 'social dimension' interchangeably. Finally, it has been proposed that social presence is the connectedness among learners and the instructor, as a means to increase learning (Ngoyi et al., 2014).

It was suggested in a seminal work that immediacy may account for social presence entirely (Richardson & Swan, 2003). When considering that immediacy represents interactions and perceptions of interactions between people, this is plausible. Remesal and Colomina (2013) suggest that social presence is an interaction constructed among individuals towards achieving shared goals; and thus, social presence is an interactional process developed over time. Studying social presence as 'interactions' between people is, therefore, the recent trend in social presence research.

Social Presence Definitions Timeline.

To highlight the changing nature of social presence definitions over the years, Table 2 creates a contextual timeline of social presence definitions.

Table 2: Social Presence Definitions

Year	Social Presence Definition
1976	"the degree of salience of the other person in an interaction and the consequent salience of the interpersonal relationships" (Short et al., 1976, p. 65)

1997	"the degree with which a person is perceived as a "real person" in mediated communication" (Gunawardena & Zittle, 1997, p. 9)
1999	"the ability of learners to project themselves socially and affectively into a community of inquiry" (Rourke, Anderson, Garrison, & Archer, 1999)
2002	"a measure of the feeling of community that a learner experiences in an online environment" (Tu & McIsaac, 2002, p. 131) "degree of feeling, perception, and reaction to another intellectual entity" (Tu & McIsaac, 2002, p. 146)
2004	"a psychological state in which virtual (para-authentic or artificial) social actors are experienced as actual social actors in either sensory or nonsensory ways." (K. M. Lee, 2004, p. 45)
2009	"the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop interpersonal relationships by way of projecting their individual personalities" (D. R. Garrison, 2009, p. 352)
2010	"the need for users to feel connected with each other and to perceive each other as real people" (Kear, 2010, p. 1)

2011	"the degree of illusion that others appear to be a 'real' physical persons in either an immediate (i.e., real time/synchronous) or a delayed (i.e., time-deferred/asynchronous) communication episode" (Kreijns et al., 2011, p. 366).

	"connectedness to a group" (Mayne & Wu, 2011, p. 110) "the specific awareness of relations among the members in a mediated communication environment and the degree of proximity and affiliation formed through it." (Kim, 2011, p. 766)
2013	"…constructive and evolutionary discursive group interaction which promotes the creation of a community feeling, the maintenance of positive relational dynamics, and the enhancement of self- and collective efficacy in front of the learning task … where the learning process is supported." (Remesal & Colomina, 2013, p. 356)

In summary, the construct of social presence has changed over time, especially in how it is defined. One possibility for why social presence definitions have changed is that it emerged before computer mediated communication environments were widely available (Kehrwald, 2008). In addition, social presence originally incorporated a face-to-face element, but it has been widely applied in online learning environments, which frequently have no face-to-face component. A current view of social presence is that it is anchored and embedded in the learning situation. It is multidimensional view. The focus is on interactions between people for both social exchange and knowledge construction purposes.

Upon reaching an understanding of what social presence is, the next step might be to consider ways of 'creating' social presence in an online course. A number of researchers have tackled this question and provided strategies for cultivating social

presence in online learning. The next section looks at strategies for culturing social presence in online learning.

Culturing Social Presence

A number of researchers agree that social presence is a pedagogical element; and thus, can be designed into a course (Aragon, 2003; Dunlap & Lowenthal, 2014; D. R. Garrison et al., 2000; Gunawardena & Zittle, 1997; Hostetter & Busch, 2013; Kear, 2010; Mayne & Wu, 2011; Reio & Crim, 2013; Richardson & Swan, 2003; Rovai, 2000; Swan & Shih, 2005). Unfortunately, developing a systematic instructional design strategy to create the optimal amount of social presence in online courses remains elusive (Cui et al., 2013). Hostetter and Busch (2013) suggest that more research on the relationship between social presence and learning is needed in order to aid faculty in designing courses in mediated environments like online learning. But is designing social presence into online courses really that challenging? The answer is yes and no.

Online courses are not the same as face-to-face courses; and, although the learning goals of an online course may be the same as a face-to-face course, instructional delivery needs to be modified for online learning (Aragon & Johnson, 2008). It is generally welcome news that instructional design can have a serious impact on the resulting perceptions of social presence in a course (Swan & Shih, 2005). This means that faculty can use good instructional design practices to design and develop social presence in an online course, if social presence is a desired course outcome (Cui et al., 2013).

As yet, however, little research has identified which strategies are better than others in creating online social presence (Dunlap & Lowenthal, 2014). One possibility is to conduct a communications analysis which selects the most appropriate communication method possible given the learning goals of the course (Cui et al., 2013). Such an analysis could help faculty determine text, audio or video-based modes appropriate for the learning task at hand. What is clear is that focusing on interactions between participants, and the resulting sense of community from those interactions, is likely to reach rewards in increasing social presence in the course.

One frequently suggested strategy for facilitating the development of social presence in online courses is having students create and post personal profiles, member bios or participate in various types of 'getting started' activities (Aragon, 2003; Dunlap & Lowenthal, 2014; Kear, 2010; Leong, 2011; Mayne & Wu, 2011; Oztok, Zingaro, & Makos, 2013). 'Getting started' types of activities assist students in orienting themselves to course content and the social climate. This is crucial in the earliest stages of a course as researchers have found associations that social presence facilitates cognitive learning (T. Anderson, Archer, Garrison, & Rourke, 2001; D. R. Garrison et al., 2010; Leong, 2011) and that social presence establishes a safe climate for discussion (Mayne & Wu, 2011); both of which are especially important to be modeled early in a course. Early interactions are important as the course momentum gets under way, in order to motivate academic persistence.

A novel view for facilitating social presence in online courses is using social capital theory to assist group dynamics (Oztok et al., 2013). It has been suggested that an

understanding of 'bridging' and 'bonding' social capital can assist in the design of communication activities. For example, bridging social capital can refer to the group dynamics involved when participants are sharing their opinions and backgrounds from previous experiences by implementing 'getting to know you' types of activities one can develop a greater sense of trust and belonging within the course group. Bonding social capital happens when the community participants begin to identify with the course as a community (i.e. the sense of 'we' begins to take shape).

This sense of 'we' aligns well with what Cheung et al (2011) describe as the 'we-intention' when studying student Facebook usage and the perception of social presence. They found that that the 'We-intention' to actively engage in online social networking activities, such as Facebook usage, was largely facilitated by social presence. Facebook is a social networking site which appears to align with the 'bonding' type of social capital of interpersonal connections as described by Oztok et al (2013).

Even seminal social presence researchers in online learning, such as Gunawardena and Zittle (1997), considered social presence within an instructor's skillset by suggesting that instructors can model and influence the perception of social presence in how they facilitate online discussions, introductions and salutations. However, it was Rovai (2000) who suggested one of the first concrete guidelines for optimizing social presence in an online course by stating that an online course should have an instructor-to-student ratio no higher than 30:1 (p. 295). This ratio was suggested to facilitate robust social presence for course participants.

In a more recent study, small class sizes surfaced again. Students reported that social presence was better in smaller classes; and thus, ensuring a smaller class size, especially in online courses, can enhance the social presence felt by students (Akyol, Garrison, & Ozden, 2009). A potential necessary condition for optimizing social presence is to actually enforce smaller class sizes (i.e., enrollment caps). Having smaller class sizes set at the program level could help to ensure better social presence for online students.

Aragon's classic article (2003) proposed the first compendium of strategies to create social presence in online courses. Aragon's article is notable in that it divided the strategies for creating social presence into three key areas predicated on a person's role: course designer (instructional design), instructors (delivery and management) and participants (students).[4] Some suggested design elements were to include instructor welcome messages, have students post personal profiles, use audio in the course, limit the class size and design collaborative learning activities. The strategies for the instructor and participant roles focused on strategies to facilitate interaction with others, feedback strategies for instructors and participants (e.g., peer feedback), and presenting useful tactical strategies for instructors (e.g., optimizing the timing of certain course elements).

More recently, Kear (2010) suggested constructing activities for participants to get to know one another as a strategy for increasing social presence online; a specific example, as noted earlier, was to include member profiles as an activity in the course. In

[4] This article was also one of the few to highlight (or even mention) the importance of the instructional designer's role in the creation of online courses and social presence. Instructional designers are a key element of success in creating online courses.

the study, students' experience of using online communication in a distance learning course was investigated and students were asked for ways to make improvements. The interviews revealed key problems, such as poor communication and consequent misunderstandings, are associated with a lack in social presence. Students highlighted system features they found useful, or would like to have available, and suggested ways to improve these issues. In particular, the investigation suggested that more frequent use of member profiles would help students get to know each other better and that synchronous communication tools, such as instant messaging, would be of practical and social value.

Mayne and Wu (2011) suggested that instructors increase social presence in online courses by including activities, such as 'getting to know you' type of activities, at the start of a course, as well as providing guidelines about student and instructor expectations. They also suggested that instructors model social presence behaviors, such as an instructor using self-presentation techniques, in order to encourage similar behaviors in student discussions. The authors stressed the importance of creating a safe climate for discussion: one where instructors and peers 'trust' each other. Finally, they suggested that instructors provide opportunities for students to practice social presence skills in ungraded and fair ways, in order to establish the crucial feeling of safety early on in the course.

Stating that social presence is a pedagogical element implies it can be learned by faculty over time. The modeling of instructor behaviors described in Mayne and Wu (2011) are in line with other researchers who also suggest that instructors can incorporate social presence into the design of their course by modeling strong social presence through

teacher immediacy behaviors (Hostetter & Busch, 2013). The suggestion that social presence is something which can be learned, suggests that social presence behaviors can be considered an internal competence, or something which can be achieved with sufficient education. Therefore, if social presence is determined to be an educational goal of the course experience, facilitating higher amounts of social presence is achievable through design and instructor behaviors when implementing the course. This speaks to an institutional need for faculty education programs providing practice with social presence techniques in online course design and implementation strategies. Cui et al (2013) suggests proper education for faculty and instructional designers to integrate effective strategies for creating social presence in online courses.

It is important to bear in mind that social presence is not just an instructor attribute. As such, some researchers are investigating social presence skills as learned by students. One study found that students in higher grades tended to have higher mean social presence scores (Kim, 2011). In that study, it was also found that social presence may have an experiential component unrelated to age, as there was no significant difference among age groups regarding social presence skills. Thus, students entering the final stages of their education may be skilled in using online technologies and have learned this tacit knowledge to convey both confidence and facility with the technologies frequently experienced in their online courses. In other words, social presence skills may be learned over time by students, as well.

However, when considering that there was no difference in social presence skills among age groups, one possibility might be that no difference exists among age groups

because younger, incoming students maybe already be more proficient with online technologies than older students to start with. The last five years alone have seen the exponential rise of technologies such as YouTube, Facebook and Twitter. Thus, younger incoming students may already match the 'achieved' social presence skills of older students who are five years or more ahead of them. The Internet has changed considerably in the last five years. It may be equally likely that students practice social presence skills outside of school and bring those skills to their online course interactions independent of course encouragement.

Hostetter and Busch (2013) found that students who demonstrated more social presence behaviors in an online discussion forum also perceived more social presence in the course overall. In addition, they found social presence behaviors and perceiving social presence was highly correlated with the number of online courses a student had taken. This begs the question as to whether or not students demonstrating higher social presence skills choose online courses or if social presence skills can be learned over time and create a history of success such that those students are more likely to continue with taking online courses.

Remesal and Colomina (2013) propose that social presence is an interaction constructed among individuals intending to accomplish shared goals; thus, social presence is an interactional process developed over time. Reio and Crim (2013) suggested ways to enhance social presence in online courses by emphasizing purposeful and communicative instructor behaviors in creating a feeling of connection and trust among participants. A trusting and supportive climate encourages students to

communicate. Instructors must be attentive to the social needs of the course through helpful feedback to individual students. The authors give specific emphasis to instructors providing dedicated attention in designing the social nature of learning activities in a course. They stress that social presence contains an element of affect and provide this guidance:

> Instructors should provide their expectations and guidelines revolving around appropriate engagement and participation to enhance students' comfort in exchanging constructive, collegial ideas with others. Appropriate instructor actions might include initiating and focusing discussion topics, exchanging information, helping students connect ideas, and encouraging collaboration and open communication. (Reio & Crim, 2013, p. 131)

Dunlap and Lowenthal (2014) impart a number of strategies for educators to facilitate richer social presence in online courses. They specifically emphasize the connections between people in the learning context: between instructors and students and between students and other students. The authors equate social presence to social connection and argue that social presence is an important part of the successful learning experience.

They further point out that approaches to increase social presence in online courses such as 'getting to know you' types of activities, instructor and student biographies or suggesting that students spend a "5 minute conversation" with instructors

during the first few weeks of the course as ways to support social presence development. Leong (2011) also suggested getting started or ice breaker activities at the start of an online course. Dunlap and Lowenthal (2014) go on to suggest activities such as having course participants join a course/syllabus scavenger hunt, which provides a strategy for orienting students to the online course (just like instructors might do in face-to-face courses) as a way to create social presence. Another suggestion is to have weekly announcements or agendas, and that instructors must provide rich, personalized feedback directly to individual students and use one-on-one or group emails to facilitate communication. They even suggest video feedback, as a 'high tech' way of giving feedback.

Dunlap and Lowenthal (2014) further add that new discussion protocols help facilitate online threaded discussions and can guard against the age-old practice of 'the instructor posts a question and students must post an original response' style of online discussions. Such a mode is a social presence killer, they explain. They also advocate group work and offer suggestions on making group work better, such as implementing peer review, making group work less stressful by making it low jeopardy and promoting the benefits of collaboration in group work, such as document co-creation. The authors suggest making group interaction less formal, and therefore, more free-flowing and organic, by using innovative tools which many students are already using (e.g., Twitter). Dunlap and Lowenthal (2009) had previously suggested the use of Twitter for facilitating less formal and spontaneous discussions. It can provide opportunities for participants to

build relationships with each other and open them up to working collaboratively and engagingly on course content.

Using the definitions of social presence, and the aforementioned works describing strategies for 'culturing' social presence in online courses, it might be easy to conclude that creating social presence is simple and straightforward task. Unfortunately, the various definitions of social presence and research on strategies to facilitate social presence in online courses suggest otherwise. Creating optimal social presence is a struggle, otherwise it would be easily accomplished and no debate would exist.

In addition to various definitions of social presence and a plethora of suggested strategies to facilitate social presence, there is another challenge altogether: measuring social presence. Unfortunately, there has been no unified way in which social presence has been measured over the years. In addition, it is highly debatable as to whether the social presence of 1995 is the same as social presence of 2015. Internet technologies have changed significantly during the last 20 years. Even in the last five years there has been exponential change. The next topic examines the ways in which social presence has been measured over the years.

Measuring Social Presence

Measuring social presence over the years has been variable and problematic at best (Annand, 2011; Cui et al., 2013; Kiliç Çakmak et al., 2014; Lowenthal, 2010). In general, it can be difficult to determine whether a researcher is talking about immediacy, intimacy, social interaction, connectedness or emotion (Lowenthal, 2010). The

development of research in social presence depends on researchers' theoretical frameworks, as well as valid and reliable measures of the social presence concept (Cui et al., 2013). Thus, measuring social presence is predicated on how researchers define social presence; and there are considerable differences of opinion about this as described in earlier sections.

Ever since Short et al.'s (1976) seminal work regarding social presence, researchers have labored over its measurement. A number of studies have designed new instruments for measuring social presence, as well as refining and adjusting existing ones (Kiliç Çakmak et al., 2014; Kim, 2011; Kreijns et al., 2011; Tu, 2002). The current energy for reevaluating social presence is at a timely moment in social presence research due to the maturation of the Internet and enormous changes in available technologies.

To begin with, Short et. al (1976) measured social presence using questions probing along four polar scales: personal to impersonal, sensitive to insensitive, warm to cold, and sociable to unsociable. In addition, the focus of the research was more business related in its setting. Some of the research dealt with phone communication or written communication or video communication.

With the advent of online learning, Gunawardena and Zittle (1997) adjusted the definition of social presence in order to use it for evaluating online instruction and created the Social Presence and Satisfaction Scale (SPSS) survey. This instrument consisted of 14 items measured using a 5-point Likert scale of agreement/disagreement. It was designed to measure the level of perceived social presence of participants in an online course. Gunawardena and Zittle's survey has been frequently used in educational

research over the years (Cobb, 2009) and continues to be used today by many researchers either directly or by creating derivatives from the survey.

Shortly after Gunawardena and Zittle's (1997) social presence survey, Tu (2002) decided to adjust it for better alignment with some changes the Internet was experiencing at the time. Specifically, Tu felt previous measurement instruments did not adequately measure key features of social presence; and, that certain variables had not been included, such as privacy. At the time, the Internet and online learning was just beginning to explode and Tu felt an adjustment was needed.

Toward this aim, Tu designed a new survey to measure social presence and included items related to privacy. The resulting Social Presence and Privacy Questionnaire (SPPQ) contained 17 items relating to social presence, 13 items related to privacy, and some demographic questions. The response items used a 5-point Likert type scale. The study concluded that the aspect of privacy was not an important component of social presence construct, at least within the survey instrument used in the study.

Another instrument measuring social presence is found in the the Community of Inquiry (CoI) model. Its instrument measures social presence using a survey consisting of a total of 34 items assessing for cognitive presence, teaching presence and social presence (Arbaugh et al., 2008; D. R. Garrison et al., 2010). The survey has been widely used and has reported high reliability. The items in the survey are randomized to minimize response-set error (D. R. Garrison et al., 2010). The survey instrument divides survey items into teaching presence, cognitive presence, and social presence categories,

though it should be noted that the model itself indicates overlaps between the three presences.

Kreijns et al (2011) recently constructed a self-reporting Social Presence Scale to measure the degree of perceived social presence in a computer-supported collaborative learning (CSCL) environment. The item construction was inspired by telepresence (Lombard & Ditton, 1997) research. The view of these researchers was to examine how the concept of social presence was demonstrated in learning collaborative settings. The final instrument had five items relating to social presence. A 5-point Likert type scale was used for each item ranging from 1 (not applicable at all) to 5 (totally applicable). A high internal consistency was reported for the scale (Kreijns et al., 2011).

In general, many researchers continue to use versions or adaptations of Gunawardena and Zittle's (1997) survey instrument. For example, Reio and Crim (2013) recently created a social presence survey using the social presence survey designed by Gunawardena and Zittle (1997) as a framework. They adjusted the measurement scale of the survey instrument to be a 6-point Likert type scale rather than a 5-point scale; thus, using a 'forced choice' option instead of allowing respondents to choose a middle or neutral value. A strong internal consistency was reported for the scale.

Yet, many researchers continue to use Gunawardena and Zittle's survey which was designed even before the year 2000. The Internet has changed enormously since that time. In addition, today's university students have much more experience with online technologies during their entire lifetimes as some students entering college have had much more experience using technologies from younger ages. With these changes in the

online learning landscape, as well as the general online climate, current online learning researchers are renewing the investigation into social presence and even questioning the original conception of online social presence.

A recent direction in re-evaluating social presence is to view it as a multidimensional construct, which could possibly have first been first broached by Biocca et al (2003). Recall that Short et al (1976) originally conceived of social presence as a unidimensional construct; the communication medium determined the way people could interact and communicate (Dunlap & Lowenthal, 2014; Lowenthal, 2010). It meant that the communication medium selected (i.e. face-to-face, video, audio or text) determined the resulting level of social presence between the communicators. Thus, in Short et al's (1976) view, social presence was as a unidimensional quality of the medium itself (Cui et al., 2013). For example, in an online learning scenario, using text based communication would result in the lowest level of potential social presence.

This unidimensional view was based on the premise that the medium selected determined how much social presence existed in the communication interaction (Kreijns et al., 2011). Put another way, simply using more face-to-face elements, or more video, or more audio, would increase the amount of social presence in the communication channel. This meant that choosing video, for instance, would result in an increase in perceived social presence over audio communication, for example. The question is: does this also occur in online learning, where face-to-face interactions are no longer part of the scale? Online learning operationalizes social presence in a different way from what was originally conceived in 1976.

An increasing number of researchers are proposing a multidimensional view of social presence (Kim, 2011; Liu, 2007; Liu et al., 2009; Remesal & Colomina, 2013; Shen et al., 2010). As such, investigations of social presence probing for multiple elements continue to emerge. Recent studies are employing factor analysis in social presence investigations, either exploratory or confirmatory, to examine the multidimensional nature of social presence (D. R. Garrison et al., 2010; Kiliç Çakmak et al., 2014; Leong, 2011).

Summary

Social presence has evolved in a number of ways over the years. Classic social presence involved a duality pf psychological closeness and technology modality. As online learning continued to evolve, the working definition and views of social presence evolved along with it. The rapid technological changes seen in the last twenty years have created growing pains for the field of educational research in deciding where to place social presence in overall framework of online pedagogy, as well as continued debate about how to create social presence, how to measure it, and contention about how technology modality influences the perception of interactions in online settings.

The literature reviews provides a framework for reference regarding social presence and the study. The upcoming section on methodology provides a description of the problem space, study design, a description of variables, the sample, and data analysis.

Chapter 3: Method

Phase I: Problem Space

The design and nature of the study was based on the review of literature suggesting that social presence in online learning was still in exploratory stages and educational researchers were refining the topic of social presence in online learning. The purpose of this study was to investigate the extent the independent variables of technology and 'immediacy' affected the dependent variables of satisfaction, future persistence and final course grade. The study was conducted at a university in the Midwestern United States. The study included only completely online courses.

The study contributes to research exploring the concept of social presence in online learning by seeking to test technology modality and perceived psychological closeness and its impact on the dependent variables. The findings of the study are purposeful in directing further research seeking to investigate online learning environments.

The overall structure of the research design was an observational or cross-sectional study. Thus, the study looked for the prevalence of outcomes given specific research questions. The study queried course participants regarding perceptions of naturally occurring class events during enrollment in a completely online course using a researcher-developed survey instrument. The study used an online, web-based survey to solicit answers to questions to measure perceptual information from voluntary study participants.

In summary, the study sought to renew the investigation of social presence in online courses as it existed in online courses at the time of study. The primary goal of the study was to explore the ways in which technology affected the impact of psychological closeness (immediacy) and to what extent these variables impacted the dependent variables of the study. The following research questions are restated from Chapter 1 for the reader's convenience:

RQ1: To what extent do the elements of technology immediacy and immediacy perceived satisfaction?

RQ2: To what extent do the elements of technology and immediacy affect future intended persistence in online courses?

RQ3: To what extent do the elements of technology and immediacy affect final course grade?

Phase II: Study Design

Much current research in social presence uses either the social presence survey designed by Gunawardena and Zittle (1997) or investigates social presence through the lens of the Community of Inquiry model (D. R. Garrison et al., 2010; Rourke et al., 1999). However, the researcher of this study sought to reexamine social presence by returning to the roots of social presence theory (Short et al., 1976). The original social presence theory held that technology had capabilities in influencing the perceived immediacy between communicators and the other instruments did not address technology modality specifically.

At the time that Gunwardena and Zittle (1997) developed their social presence instrument, online communication tools were primarily text-based and the Internet was still new. Also, research into social presence within online learning settings was scarce at best. The Community of Inquiry model, while widely popular, did not adequately address the proposed research questions of this study; and thus, was not utilized as a framework for reference.

Today's Internet has widely available and hugely popular video and interactive technologies. Today has currently popular technologies such as Facebook, Twitter, YouTube and LinkedIn. These have all become mainstream and are widely used by students. Today's students have different experiences with, and expectations regarding, the use of technology than pre-Internet or even early-Internet students had.

Finally, the literature review indicated a debate surrounding social presence in online learning. Part of the debate exists in how educational research is examining the way in which social presence manifests itself in online learning and in the pedagogy needed to support stronger social presence. Pedagogy involves instructor choices which facilitate learning. It involves the design of learning activities, as well as the culture an instructor models for students through academic discourse.

The pedagogical elements of social presence are manifested through immediacy behaviors and technology modality. Instructors choose how to communicate with others, thereby setting the tone and culture of the learning climate, as well as which technologies to use in course communication and content. In this way, immediacy and technology

modality are pedagogical elements within the instructor's control and the study sought to observe these choices through the lens of student perceptions via social presence theory.

To articulate this further, instructors are the ones who set the types of technologies used for designing and implementing online course activities. An instructor might require students communicate in an electronic discussion forum as part of the class activities or might require a video assignment. We know that text is a 'lean' medium (Mayne & Wu, 2011). In text communication, such things as humor can be difficult, meanings can be misinterpreted, and nonverbal cues are absent. We also know from classic social presence theory that people 'choose' the modality in which to communicate with others (Short et al., 1976), such as choosing to send a letter instead of phoning when the message. People choose which technology to implement.

Choosing text medium, due to its leanness, can have a distancing effect. Choosing 'richer' modalities, such as audio and video, presumably create a closeness effect. Even more so, choosing a synchronous form of the same modality should create a stronger closeness effect. Synchronous modalities are more engaging (Dunlap & Lowenthal, 2009; Kear, 2010). For example, an instructor might require that students post all questions in a discussion forum (asynchronous text) or encourage live web camera discussions (synchronous video). Discussion forums and other asynchronous technologies have a time lag and part of the message 'context' is lost (Dunlap & Lowenthal, 2009). An instructor chooses which technology modalities to implement in an online course, whether text, audio, or video, and whether the modality will be synchronous or asynchronous. If asynchronous, social presence theory would suggest

that video feedback would be better than text feedback, such as suggested by Dunlap and Lowenthal (2014) for using video as a 'high-tech' way of providing feedback to students. Thus, technology becomes a pedagogical element because it is part of the choice in how an instructor decides to operationalize the communication channel.

Immediacy is also a pedagogical element. Furthermore, it is an emotional one. Laborit asserts that all learning is emotional (Resnais, 1980). An instructor sets the emotional climate of the learning setting through his/her language and actions. Formal or distancing language pushes people away; inclusive and accepting language and behaviors create trust and a sense of community. An instructor decides how to communicate and the words chosen, whether consciously or unconsciously.

An instructor can model inclusivity through his/her behaviors, such as smiling or using humor or invoking praise. Inclusive language, such as using we/our (Cheung et al., 2011; Gorham, 1988) can influence the feeling of immediacy. The seminal work by Richardson and Swan (2003) addressed early on that immediacy accounts for something fundamental in the perception of social presence. For example, an instructor can use warm or vivid language and set an accepting atmosphere or he/she could avoid praise and be critical. Arguably, some instructors might have more capability in creating trust and caring. Immediacy is, therefore, a pedagogical element. Instructor immediacy behaviors help model social presence expectations, which influences student learning outcomes (Hostetter & Busch, 2013).

This study could not evaluate every course for the type of content of discussions and technologies. It could not interview every faculty member or every student.

However, the study could evaluate the frequency of technologies modalities experienced by students in online courses and the perception of immediacy behaviors students experienced from instructors. These elements are manifestations of the pedagogical landscape an instructor creates, both through the technologies used and the emotional climate of the learning setting. This information can then be used to launch future research on specific subtopics.

For all of these reasons, the researcher decided that using an existing social presence survey instrument was not suitable for accomplishing the goals of this study. The existing social presence surveys did not incorporate immediacy behaviors and technology modality, and many social presence surveys ignore technology modality altogether. It was the researcher's intent to harken back to the original conception of social presence and to see how the elements of technology and immediacy affected specific course outcomes. Therefore, the researcher designed a survey instrument aligned with the goals of the study: namely, to explore the interrelationship between technology modality and immediacy (psychological closeness) on selected dependent variables.

Phase III: Variables and Measurement

The survey in its entirety is presented in the Appendices. The questions are numbered on the survey for the reader's convenience and are referred to by those numbers, where referenced.

Prior online course experience.

Question 1 of the survey asked about the respondent's prior online course experience. It asked how many completely online courses the respondent had taken (including the class for which they were answering). The respondent could choose from one of four answer options: 1 (only this course), 2, 3, 4 or more.

Online course experience has been linked to future intended enrollment into online courses (Reio & Crim, 2013). Reio and Crim found that previous online course experience was positively correlated with the intent to enroll in future online courses. In another study, course participants with more hours of previous online course experience was linked to the greater probability of completing an online course: better course completion rates (Aragon & Johnson, 2008). In addition, this question was also considered a motivating question and one which a respondent could easily answer. This made it a useful first question for the survey and is in alignment with Dillman's Tailored Design approach for survey design and development (Dillman, 2007; Dillman, Smyth, & Christian, 2008).

Dependent Variable: Course Satisfaction.

The researcher placed a single question at the beginning of the survey (Question 2) to measure course satisfaction. This question measured the respondent's overall course satisfaction on a 1-to-4 Likert type scale (no middle option) of agreement/disagreement: strongly disagree, disagree, agree, strongly agree.

Course satisfaction has been measured in a number of ways in social presence studies. Leong (2011) used a set of questions from Tallman's (1994) satisfaction questionnaire. Reio and Crim (2013) based their satisfaction measure on Morton's (as cited in Reio and Crim, 2013, 1993) Satisfaction with Learning Experiences Scale (SLES). They used a 1-to-6 Likert scale of agreement/disagreement and a strong consistency was reported for the satisfaction measure.

The researcher opted to use a 1-to-4 Likert scale of agreement/disagreement on various items in the survey. There is debate among researchers about the optimum number of options in Likert scales, and whether to use an odd number or even number of answer options (Croasmun & Ostrom, 2011). A 1-to-4 scale leaves no answer option for a middle or neutral value. This is in contrast to a typical 1-to-5 Likert scales which are common in social presence research, such as, for example in Gunawardena and Zittle's (1997) social presence survey.

A design without a middle/neutral option is sometimes called a 'forced choice' option. By leaving out a middle or neutral value the researcher is seeking to require the respondent to choose between agreement or disagreement. By having no middle option, the design forces the respondent to pick a side instead of remaining neutral (Reio & Crim, 2013). A reason for choosing a design without a neutral option is that a respondent marking a middle value does not always mean the respondent actually holds a neutral opinion. He/she may be choosing the middle value in order to avoid indicating an opinion. In addition, if a respondent inaccurately chooses the middle option, it can bias the average response level (Frary, 1996).

It was the researcher's intent to have respondents choose either a measure of agreement or disagreement; and therefore implemented an even-ended Likert scale disallowing the respondent from choosing a neutral option. A few studies have used even-ended scales Likert scales, such as in Appleton et al (2006) and in social presence research, such as Hostetter and Busch (2013), Reio and Crim (2013), and Richardson and Swan (2003). The researcher chose a 4-point scale as it was the researcher's intent to measure the overall general directionality (positive/negative) at this point in the research.

Dependent Variable: Academic Persistence.

Question 4 of the survey measured the future intended persistence by asking the respondent that given the opportunity, what would be the chance he/she would enroll in more online courses in the future. The question measured intention using a 4-point scale ranging from "No Chance" to "Very Good Chance."

Depending on how it is defined, academic persistence can mean either current persistence or future persistence and/or retention. Course retention has been measured in a variety of ways, such as the number or percentage of students who remain in the course out of the total number of students who enrolled (Bernard et al., 2004) or a student receiving a grade of C or better (Liu, 2007). Aragon and Johnson (2008) defined completion as those course participants who had completed at least one online course in the study resulting in a final course grade of A, B, C or D. Non-completion was defined by a final grade of F, the action of withdrawing from the course (grade of W), the action of dropping the course (Dr) or a final grade of incomplete (I).

In contrast to retention, the researcher of this study desired to assess 'future' retention as measured by a person's 'intent' to continue taking online learning courses. A question measuring future intent has been used in some social presence studies. Reio and Crim (2013) measured future intended persistence using the Intention to Turnover Scale (ITS) and reported a strong internal consistency for the measure. Mayne and Wu (2011) used a question similar to the future intended persistence by asking course participants if the experience of taking the course made them want to take more online courses.

Dependent Variable: Final Course Grade.

The researcher of this study obtained final course grade information through secondary sources from institutional records. Various researchers have found social presence to impact learner outcomes (Hostetter & Busch, 2006; Liu, 2007; Liu et al., 2009; Richardson & Swan, 2003; Russo & Benson, 2005). Hostetter and Busch (2013) reported that students demonstrating higher levels of social presence behaviors in text-based discussion boards also had statistically significant higher ratings on an assessment test within the course. When the learner outcome was defined as final course grade, researchers have found a link between levels of social presence and final course grade (Liu, 2007; Liu et al., 2009). In addition, Russo and Benson (2005) found a statistically significant correlation between social presence and points earned in the class.

Independent Variable: Immediacy or Psychological Closeness.

The researcher of this study uses the terms psychological closeness and immediacy interchangeably, unless otherwise noted. From the literature review, it was determined that psychological closeness (immediacy) between course participants was apparent in three categories of interactions as determined by the researcher: Faculty as Teacher, Faculty as Human Being and Peers as Social Community.

The selection and construction of the response items for these categories was guided by two sources. The first was Gorham's (1988) original list of verbal and nonverbal instructor immediacy behaviors. The second source informed the design of further psychological elements as described in the Student Engagement Instrument (SEI) survey (Appleton et al., 2006). This source was used to fill a gap the researcher felt deemed missing in Gorham (1988), that is, the additional aspects of 'caring' and 'peers.' Two elements from this source were desirable in targeting psychological closeness, namely, the elements of Teacher-Student Relationships and Peer Support for Learning (Appleton et al., 2006, pp. 436–437).

Some of the researcher's questions were similar to the guiding source, while some questions the researcher constructed without a guiding source, where deemed appropriate. The goal of the researcher was to honor the spirit of the guide source, while adjusting as appropriate for the study goals. The researcher also avoided specific reference to media connected attributes, where applicable. For example, no questions in the immediacy category probed for non-verbal behaviors (e.g. movements, smiling), so as to keep them distinct from technology modality questions which would query about audio/video usage

(see next section). Questions 5 to 25 on the survey measured the respondents' agreement/disagreement of immediacy related interactions based on the three categories as described earlier. See Table 3 for reference.

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Table 3: Psychological Closeness Response Item Construction and Guiding Sources

Category	Code	Q#	Survey Response Item	Guide
Faculty as Teacher	FaT1	8	The instructor communicated with us as a class on a regular basis.	a
	FaT2	9	The instructor encouraged students to share their own views.	a
	FaT3	12	The instructor provided feedback in a timely way.	a
	FaT4	15	The instructor treated me fairly.	b
	FaT5	16	The instructor asked the class how we felt about assignments, due dates or discussion topics.	a
	FaT6	22	I addressed my instructor by his/her first name.	a
	FaT7	23	The instructor gave me useful feedback on my individual course work.	a
Faculty as Human Being	FHB1	5	The instructor shared personal examples about experiences he/she has had outside of the course.	a
	FHB2	7	The instructor felt real to me.	-
	FHB3	11	The instructor used humor in the course.	a
	FHB4	13	The instructor made it feel okay if I did not have the right answer.	a
	FHB5	14	The instructor was interested in me as a person, not just as a student.	b
	FHB6	17	I enjoyed interacting with the instructor.	b
	FHB7	25	The instructor was there for me if I needed him/her.	b
Peers as Social Community	PSC1	6	I felt comfortable interacting with other students in the course.	c
	PSC2	10	I felt other students in the course respected my views.	c
	PSC3	18	The instructor asked questions to solicit multiple viewpoints from everyone in the course.	a
	PSC4	19	Other students in the course felt real to me.	-
	PSC5	20	The instructor praised students generously.	a
	PSC6	21	The instructor referred to the class as “our” class” or what “we” are doing.	a
	PSC7	24	I enjoyed interacting with other students in the course.	c

a Gorham (1988): Verbal Immediacy
b Appleton et al (2006) SEI: Teacher-Student Relationships
c Appleton et al (2006) SEI: Peer Support for Learning

Independent Variable: Technology Modality and Frequency.

Short et al's (1976) social presence theory posited that richer media formats (e.g. video) resulted in greater social presence. In general, social presence has been stated to be a quality of the medium as well as users' perceptions of media (Cui et al., 2013). Based on the literature review, the researcher desired to distinguish between immediacy/psychological closeness elements and technology modality. In theory, according to social presence's original definition, greater frequencies of 'richer' technologies should result in more social presence. At a very basic level, social presence theory would hold that greater frequency of richer formats should result in richer social presence perceived by participants and that more synchronous modes would be better over asynchronous modes.

Questions 30 to 52 of the survey examined technology modality by measuring the type of technology the student reportedly experienced: text, audio or video. Each category asked specific questions about that modality's synchronous and asynchronous forms. For example, email is generally an asynchronous text modality while text chat is a synchronous modality. A 4-point frequency scale (Never, Seldom, Sometimes, Often) was used to assess how often each technology modality (text, audio, video) was experienced by the respondent.

The questions in each technology modality section used a matrix question type even though matrix questions are believed to be more cognitively challenging for

respondents to process (Dillman, 2007; Dillman et al., 2008). The researcher deemed the structure of the matrix question better suited for helping the respondent process each category more effectively. The question types also created a parallel structure format for each category, which the researcher deemed helpful for respondents in keeping track of which type of technology type they were responding to.

Questions 30 to 38 asked respondents about the frequency of text based modalities experienced by the respondent. This category asked about two forms of asynchronous text usage (email and discussion boards) and one form of synchronous text (text chat).

Questions 39 to 44 asked respondents about the frequency of audio based modalities experienced by the respondent. Asynchronous audio modalities were noted by referring to the audio as "recorded" (e.g. "Recorded voice-only broadcasts") while the synchronous audio modality was referred to as "Live, real-time" audio to distinguish it from asynchronous audio forms.

Questions 45 to 52 asked respondents about the frequency of video based modalities experienced during the course. Similar to the audio modality, the words "recorded" and "live, real-time" were used to distinguish between asynchronous and synchronous video forms, respectively. In addition, the video modality included a question describing experiencing an instructor's screen-recording video usage.

Finally, within each modality (text, audio, video) one of three 'stances' was evaluated. One question was written as the instructor addressing the class as a whole (i.e., not directed to a specific individual). This can be thought of as a broadcast

instructor message. A second question asked about that modality's usage to an individual student (i.e., directed to a specific individual). A third question asked about that modality's usage with respect to its being experienced in interaction with other students (e.g. peer interactions). Thus, the questions were written to assess the modality's usage to the whole class, to an individual personally, and between that individual and other non-instructor individuals: both synchronously and asynchronously.

Prior GPA.

Prior GPA was deemed as possibly impactful upon a student's current final course grade and/or likelihood in completing a current course. The variable related to prior GPA was received from institutional records and paired to the data by the survey administration group. This would be used to assess the representativeness of the responding sample.

Phase IV: The Sample

Expected Effect Size.

The researcher of this study opted for a conservative expected effect size of 0.25. Particularly when the effect size is expected to be small, it is deemed important to have enough power in the study design in order to achieve better validity in the study's results. This is important because an effect size conveys the estimated magnitude of the relationship between the variables in the study, without making a statement about

whether the relationship in the data reflects a true relationship in the population. By traditionally accepted standards, an effect size around 0.2 is considered a small effect, an effect size of 0.5 is considered a moderate effect, and an effect size of 0.8 is considered a large effect (Cohen, 1988).

In educational research it can be difficult to predict what an expected effect size of a study might be, partly due to many educational studies not providing an estimated expected effect size. Especially in educational research investigating instruction, it is important to not compare effects against some zero point (e.g., having computers to not having computers), but instead comparing "innovations to other innovations." (Hattie, 1999, p. 5). Toward this aim, Hattie examined various forms of instruction in the classroom for effect sizes and found that an instructor's constant and deliberate effort to improve the quality of instruction mattered the most, out of any other action. The next most powerful item impacting the quality of instruction was the form of and quality of instructional feedback. The third most impactful item was student achievement as enhanced by realistic, but challenging goals. The results of analyzing the typical overall effects of schooling, as derived from 357 meta-analyses, was an effect size of .40 (Hattie, 1999), which is considered a moderate effect size. The researcher of this study opted for a more conservative effect size, as noted earlier.

A Priori Power Analysis.

In order to estimate a minimum sufficient sample size to achieve adequate power given an expected small effect size, an *a priori* power analysis was conducted. The goal

of the study was to achieve a power of 0.8 (using alpha (α) = .05), in order to adequately avoid a Type II error. In Hattie's (1999) study, the overall average effect size was 0.4, but as previously noted, the researcher decided a more conservative effect size of 0.25 would be used. As a consequence of using a smaller effect size, the study required a larger sample in order to reduce sampling error.

The Optimal Design software program (*Optimal Design Software for Multi-level and Longitudinal Research*, 2011) was used to perform an *a priori* power analysis. The selected analysis was power vs. number of clusters (J). Alpha (α) was set to 0.05 and (n) was set to 20 (i.e., minimum number of participants within a course section).

In the *a priori* power analysis, *rho* is the expected similarity of the compared course sections. An assumption for this study was that the course sections would be mostly unique or distinct from each other. This was deemed plausible because most students in higher education self-select into courses and teaching styles vary by instructor, whereas in other school settings (e.g., elementary or high schools) cohorts are fairly stable and instructor selection is minimal. In addition, the power would also be greater when larger enrollment courses were sampled, so a minimum course section size was of at least 20 participants was required for inclusion, since the expected response rate to surveys is much less than 100% (Dillman, 2007).

The figure illustrating the results of the *a priori* power analysis was exported from the Optimal Design program (*Optimal Design Software for Multi-level and Longitudinal Research*, 2011). The results suggested an optimal sample size for the study to achieve a

minimum power of .8 was around 52 course sections, when the minimum course enrollment per section was 20 students or more. See *Figure 3* for reference.

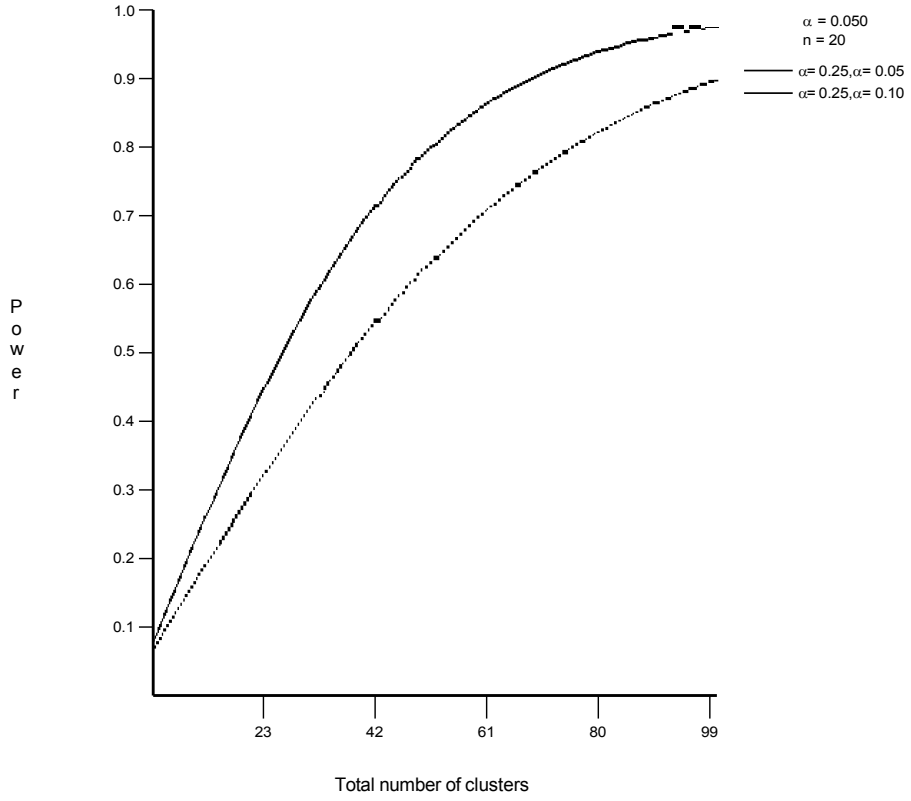


Figure 3. *a priori* Power Analysis

Cluster Sampling.

Two-stage cluster sampling was used to determine the participants in the study. The researcher determined there were a number of reasons for choosing cluster sampling over simple random sampling to select the study participants. First, courses were natural groups in the study design. Thus, it was deemed purposeful to sample by course sections

instead of random sampling all course participants taking online courses. Some group (class) effects were expected due to shared variance via the nested data structure.

There are some drawbacks to cluster sampling, however. One drawback is the reduced representation of the sample. This inherent loss in representativeness results in cluster sampling having higher sampling error, which is often called a "design effect" (Kerry & Bland, 1998). The higher sampling error occurs due to the disparity in the ratio between the number of participants in the study and the number of participants who *would have been* in the same study *if* simple random sampling had been used. The researcher decided to use hierarchical linear modeling in the analysis of the data as a way to better account for the shared variance naturally occurring in the study design. Another way to deal with the higher sampling error inherent to cluster sampling is to ensure the sample selection has enough Power, which was a reason for the *a priori* power analysis described earlier.

Defining the Population of Interest.

The population of interest was students enrolled in completely online courses. The courses were at a post-secondary institution of higher education in the Midwestern United States during a single semester of study. Because the membership (participant lists) could be obtained via institutional records, the sample was considered as coming from a closed population (Schonlau, Fricker, & Elliott, 2002). The data gathered from course participants was primary data, that is, data directly gathered directly from participants, while other data was obtained via institutional records.

To be included in the population, the courses needed to meet the following inclusion criteria. First, the course needed to be from a specific campus location at the university of interest.[5] This was necessary as it was deemed likely that group effects would occur based on the campus location, and the researcher desired to control this. Hence, only courses from a single campus were included in the sample pool and other campus locations were excluded.

Second, the course needed to be designated as 'completely online.' A designation of 'completely online' meant that the course required no required face-to-face meetings. This reduced the population because many courses were designated as 'partially online' or 'primarily online' courses. In addition, the researcher excluded courses where multiple designations were indicated for a course. The researcher desired to sample courses that had no in-person sessions.

Third, the course enrollment was required to be 20 participants or more. This condition was implemented to be in alignment with the previously conducted *a priori* power analysis, to achieve the desired minimum power for the study.

Fourth, the course had a single instructor. This was required as the researcher sought to assess the instructor's impact in course interactions. If the course had multiple instructors, it would be difficult to distinguish which instructor the respondent was assessing in the survey. This condition further reduced the population, but the researcher deemed it necessary to strengthen inferences to be drawn from the study results.

[5] The word 'course' is frequently used, but it generally refers to a course 'section.' The terms course and course section are used interchangeably in this study, unless otherwise noted.

Fifth, the start and end times of the course would be fairly similar (within a few weeks of each other). This was required to ensure that the length of the time a student spent in the course was consistent across the courses.

In summary, the courses in the population were from a single campus, completely online, having a minimum of 20 course participants, having a single instructor, and starting and ending around the same times. The resulting final population meeting the inclusion criteria resulted in 174 course sections. The courses ranged from a variety of disciplines and colleges across the university campus. From the list of course sections in the population, the researcher used the =rand( ) function in Microsoft Excel to perform a random selection of 52 course sections for the random sample.

Upon supplying university records with the list of sample courses, they indicated that approximately 10% of the sample participants were identified as participating in multiple courses in the random sample. This meant it was possible that a participant could be sampled more than once. The researcher decided to manage this occurrence with careful wording in the survey instrument indicating the participant should answer the questions with a specific course in mind. The course designation was listed on the survey in a number of places.

Comparison of Sample to Population.

The sample of 52 course sections was randomly selected from a population of 174 course sections. The total number of students in the population was 7,165. The total number of students in the sample was 2,171. The proportion of females in the population

was 0.661. The proportion of females in the sample was 0.694. The average GPA of the population was 3.274. The average GPA of the sample was 3.332. The average age of the population was 24.76. The average age of the sample was 24.97.

The researcher performed a one sample t-test to compare the sample to the population across proportion of females, the average age and average GPA. The results of the one sample t-test evaluating the average ratio of females in the sample to the population was statistically significant. The results of the one sample t-test on average age was not statistically significant. The results of the one sample t-test evaluating the average GPA of the sample to the population was statistically significant.

Though there were statistically significant differences in ratio of females in the sample (higher) than the population and average GPA (higher), the researcher was comfortable with the sample drawn. This was because, while the results might be statistically significantly different, in practical terms, the ratio of females in the sample was only approximately 3% higher than the population average and average GPA of the sample was only 0.05 GPA points higher than the population average. Given the higher proportion of females in the sample, it seemed plausible that average GPA would also be higher. The researcher was comfortable with the sample drawn.

Table 4: Comparison of Females in Sample to the Population

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
FemaleRatio	174	.661208	.1802917	.0136679

One-Sample Test

	Test Value = 0.694					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
FemaleRatio	-2.399	173	.017	-.0327917	-.059769	-.005814

Table 5: Comparison of Age of Sample to the Population

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
AVG_AGE	174	24.756	5.2698	.3995

One-Sample Test

	Test Value = 24.97					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
AVG_AGE	-.536	173	.592	-.2143	-1.003	.574

Table 6: Comparison of GPA of Sample to the Population

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
AVG_GPA	174	3.27399	.290081	.021991

One-Sample Test

	Test Value = 3.332					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
AVG_GPA	-2.638	173	.009	-.058006	-.10141	-.01460

Respondent Gender and Dependent Variables.

The researcher ran an independent samples non-parametric test hypothesizing that the predicted value would be the same for the three dependent variables (Satisfaction, future intended Persistence, and final grade) across respondent gender. The results of the test for Satisfaction and Final Grade indicated keeping the null hypothesis that the distribution of these variables was the same for males and females. The results of the test indicated rejecting the distribution of future intended persistence was the same for males and females.

Table 7: Comparing the Dependent Variables and Respondent Gender

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Qu2 Satisfaction is the same across categories of GENDER.	Independent-Samples Mann-Whitney U Test	.848	Retain the null hypothesis.
2	The distribution of Qu4 Persistence is the same across categories of GENDER.	Independent-Samples Mann-Whitney U Test	.046	Reject the null hypothesis.
3	The distribution of FINAL_GR is the same across categories of GENDER.	Independent-Samples Mann-Whitney U Test	.354	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Survey Design and Preparation.

The researcher decided to use a web-based survey without an option for a print-based survey alternative. There are advantages and disadvantages to using web-based surveys versus print-based alternatives. One large advantage of a web-based survey is that data collection is much easier and many web-based survey programs conveniently export the resulting data into a format suitable for statistical analysis.[6] Another

[6] One disadvantage to web-based survey is that it may exclude participants who might otherwise respond to a survey (e.g., participants without Internet access). However, this was deemed non-factor for this study because participants needed access to the web in order to follow a completely online course.

advantage in the current environment is that many people are familiar with web-based surveys and find them easy to complete.

Some studies continue to report that web-based surveys have lower response rates than traditional surveys (Fricker & Schonlau, 2002; Shih & Fan, 2008). Shih and Fan's (2008) investigation identified two important features which affected the response rates of web-based and mail/print surveys: population type and follow-up reminders. They found that college respondents were generally more responsive to web-based surveys than other populations. They also found that college respondents were less responsive to follow-up reminders; and thus, follow up reminders were less effective to that population of survey respondents. The participants of this study were college respondents, which according to Shih & Fan (2008) are more receptive to web-based surveys than mail surveys and less responsive to follow up reminders. This supported the use of a web-based survey for this study and suggested minimizing reminder messages.

The researcher used Dillman's (2007; 2008) Tailored Design Method in designing the survey and informing the operational procedures used to carry out the survey. The goal of this method is to optimize survey response rates through better design of the survey instrument and the implemented questions. The Tailored Design approach uses principles from Social Exchange Theory (SET) as a strategy for creating more effective survey designs. Social exchange theory is based on three concepts: rewards, cost, and trust.

In terms of a survey, a respondent recognizes there are rewards to participating in the survey, such as positive feelings about helping to further research on a particular

topic. A respondent also realizes there are costs to participating in the survey, such as time to fill out the survey questions, especially if a respondent may want to be doing something else. Finally, a respondent trusts that the rewards of taking the survey will outweigh the costs of participating. For example, a poorly designed survey or one that is insincere or jaded may be so demotivating that a respondent will quit the survey before finishing it. Dillman's (2007) tailored design approach outlines strategies to increase the rewards for responding to a survey and suggests strategies to reduce the perceived costs of time in participating in the survey, thereby helping respondents to feel that the rewards of participating will outweigh the costs in the end.

A cornerstone of Dillman's approach is to use a structured process to encourage respondents to participate. One of the strategies is to send encouraging reminders to participants in order to increase survey response rates and guard against nonresponse bias. Non-response bias is when participants do not complete a survey. For example, respondents might start a survey but then leave without finishing it (i.e., an incomplete survey). The method also provides suggestions helping control response bias. Response bias is to answer the question: Does the question answer what it is intended to answer?

The researcher tested the final draft of the survey using a convenience sample of students who had taken online courses in the past. The researcher used the approach of a cognitive interview. In a cognitive interview, the participant goes through the survey and the researcher asks the participant to think-aloud during the process. Cognitive interviews assist in clarifying language, addressing gaps in meaning, and identifying

points for clarification. Based on the feedback from the sessions, the researcher adjusted question wording in the survey and prepared for implementation.

An invitation to participate message was sent to potential respondents on the researcher's behalf by the survey administration body. The link in the message brought potential respondents to a landing page for the survey. This page contained more details about the research study and concluded with a consent question at the bottom. The consent question was the only required question on the survey. All the other questions on the survey were voluntary in nature.

To increase the voluntary participation rate in the study, the researcher implemented an incentive for participating in the study. Respondents who at least indicated 'consent' to the survey were entered into a drawing for one of two prizes. The respondent was still in the drawing pool even if he/she exited the survey early and did not complete all the questions. This was done to minimize coercion so that a respondent could feel confident that the survey was voluntary because they could exit at any time and still be in the drawing pool.

Respondents could skip over questions if desired and/or exit the survey at any time, but they would not be able to backtrack in the survey (i.e. could not go back to previous pages and their answers on those pages). This was done so that participants could not change answers to questions they had previously answered. The concern was that participants might guess the intent of the survey questions upon seeing later questions and might want to go back and change their previous answers to fit with a more socially acceptable view.

Survey Implementation.

The web-based software tool Qualtrics (*Qualtrics Research Suite*, 2013) was used to collect survey data from the study respondents. This research suite is a software product offering survey tools for distributing surveys online, collecting survey data, providing reports, and has the capability to export the data in a format suitable for external data analysis with standard statistical software packages.

Before any research activities were conducted, approval was obtained from the Institutional Review Board (IRB). Exempt status was secured for the study. Additional participant confidentiality for participants was implemented by having a neutral third-party service at the university administer the survey to potential participants and send any communications regarding the survey on behalf of the researcher. Using a neutral third party to administrate a survey instrument has been used in other social presence studies (Hostetter & Busch, 2013; Mayne & Wu, 2011). It is a way to manage undue pressure some students may feel regarding a concern that their instructor might see their responses and it could affect their final grade in the course.

The administrating body would know the identity of a student, but to the researcher all the participants would be anonymous. Their data record would be given a unique unidentifiable code. If the respondent had taken the survey more than once, that code would show up more than once in the data set, but for different classes. The administrating body would also merge a respondent's secondary data from institutional records with data from the survey.

To safe guard the respondent, the study description indicated to the respondent that the respondent's instructor would never know if they took the survey or not. In addition, the instructors of the courses in the random sample were not contacted regarding the study. It was also decided to not contact the instructors in order to further avoid situations where students might feel coerced into participating, such as receiving the invitation to participate message from the researcher via the instructor or that the instructor might alter his/her existing method of teaching.

The researcher constructed the survey questions inside the Qualtrics software. The survey administration group obtained the list of corresponding students registered for each course section in the sample from institutional records. The survey administration body sent the survey to the potential participants using an invitation to participate message designed by the researcher. The invitation to participate message was designed following the protocols in the Tailored Design Method (Dillman, 2007; Dillman et al., 2008).

The researcher (via the survey administration service) sent one brief reminder message to non-responders. In the Tailored Design approach, a timed series of communications are recommended to increase survey responses rates, for example, a pre-invitation message, an official invitation message, and a series of friendly reminder messages, typically between two to five, to participants who have not completed a survey (Dillman, 2007; Dillman et al., 2008). However, in keeping with the findings of Shih and Fan (2008) suggesting that college age respondents are open to web-based surveys, but

likely to be less responsive to reminder messages, only a single reminder message was used in the study.

The survey was available for sixteen days total. The single brief reminder message was sent to non-responders about four days before the survey closed. For timing purposes, the end date of the survey coincided closely with the final days of instruction for that semester of instruction at the institution. Timing was crucial as it was expected that response interest, and the corresponding response rate, would drop considerably once students were finished with their course experience. Survey responses were not accepted past the close date of the survey.

Data Analysis

Using Statistical Package for the Social Sciences (*IBM SPSS Statistics for Windows*, 2013), descriptive statistics were initially examined to assure appropriateness of measurement items. Bar charts of variables were examined before proceeding forward with more detailed analysis.

Missing Values.

Missing data values were analyzed by the researcher. The majority of missing values were respondents who had only answered the consent question (Page 0) and then exited the survey or had only completed Page 1 of the survey. These records were removed from analysis.

Of the remaining data, 33 records were missing three or more values, 11 records were missing two values and 51 records were missing a single value. The researcher decided to delete the records with three or more missing values and impute the 62 records missing one or two values in the following way. If the missing value existed in a question relating to immediacy, the mode of the respondent's answers for immediacy was imputed into the missing data cell. If the missing value was in a technology modality category, the missing data value was imputed by evaluating the respondent's answers within that category by examining what seemed a logical pattern for that respondent's answer to the missing data point. The final data set contained a total of 472 records.

Multivariate Outliers.

The data set was examined for multivariate outliers using the Mahalanobis distance. The Mahalanobis distance was computed for Questions 5 to 25 and 30 to 52. The results indicated 34 records having a Mahalanobis distance greater than the critical value of 78.750 (df = 44). The researcher considered these records multivariate outliers and removed from the dataset. The resulting final data set was 438 records.[7]

[7] It was earlier noted that some respondents were enrolled in multiple courses in the sample (approximately 10% of potential participants). These potential respondents could respond to the survey more than once. However, less than 2% of participants actually took the survey more than once (and never more than twice). The researcher decided to make no adjustments to control for this occurrence.

Multicollinearity.

Multicollinearity statistics were examined during data screening. The variance inflation scores, tolerance scores, correlations and condition index were consulted in determining which items were salient and which might be unstable or suitable to drop from further analysis. The correlations were used to evaluate items which were highly correlated, and therefore, might be measuring the same construct. The variance inflation scores and tolerance scores indicated items which carried more 'uniqueness' or more 'cross-loading,' respectively. After examining the multicollinearity statistics, the researcher dropped any items considered to be less suitable for a solution, and then a factor analysis was performed on the resulting items.

Factor Analysis.

An exploratory factor analysis was performed on the data to determine construct validity of the study. The researcher used common factor analysis. Principal axis factoring was used for extraction. The researcher used oblimin rotation to consider factor interdependence. The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity were used to evaluate the extent to which the factor analysis was elucidative for interpretation. Scree plots were consulted to determine the optimal factor solution as well as a visual representation of the factor solution.

Factor analysis has been used in studies investigating social presence such as Garrison et al (2010) and Hostetter and Busch (2013). Hostetter and Busch (2013) used principal components factor analysis with varimax rotation resulting in a two factor

solution: perceived social presence and perceived satisfaction with the learning community. Garrison et al (2010) performed exploratory factor analysis using principal components extraction with an oblimin rotation to extract three factors.

Reliability.

Reliability statistics were consulted for the items to inform the decision in selecting the strongest interpretable scale and in deciding which questions were to be retained for the scale. The Cronbach's alpha score was reported for resulting scales.

Hierarchical Linear Modeling (HLM).

The study used hierarchical linear modeling (HLM) for analysis. Multilevel modeling is particularly important when data are not independent. Non-independence of data is an issue in research because a major assumption when using a traditional single-level model is that independence of data exists (i.e., independence of observations and independence of error terms) (Luke, 2004, p. 21). However, independence does not exist with nested data, such as those commonly seen in educational settings. HLM correctly handles the correlated error in studies where observations are considered to not be independent (e.g., participants within classes).

Consequently, when natural groups occur or where multiple levels of analysis exist, using a general linear model approach would result in inaccurate standard errors. Such a situation would end up with less accurate results, and could in fact, lead to substantially different conclusions (Garson, 2013, p. 3). The data from this study are

nested data (e.g., students within classes, schools, states, and so forth) (Osborne, 2000) which makes HLM appropriate for analysis.

Prior to hierarchical linear modeling, aggregation and disaggregation methods were used to analyze this type of data. In disaggregation, Level 2 variables are pulled down and placed at Level 1; and in aggregation, Level 1 variables are pulled up and placed at Level 2 (Osborne, 2000; Woltman, Feldstain, MacKay, & Rocchi, 2012). In HLM, the initial data file is typically explored and prepared outside of HLM and then formatted and imported into the software HLM for multilevel analysis (Woltman et al., 2012). In this study, data were first externally explored and prepared using SPSS Version 21 (*IBM SPSS Statistics for Windows*, 2013). After exploring the overall data characteristics and performing an exploratory factor analysis in SPSS, the data were configured, exported, and then imported for further analysis in the software HLM Student Version 7.01 (*HLM - Hierarchical Linear and Nonlinear Modeling*, 2013) .

Chapter 4: Results

This section describes the results of the study.

Preliminary Information and Tests

The total number of participants who responded to the survey by at least answering in the affirmative to the consent question was 505 participants, resulting in an overall response rate of 23.2%. The overall gender of these participants was 76.4% female and 23.6% male.[8]

Exploratory Data Analysis

Distribution of Dependent Variables.

The researcher prepared bar charts of the variables of interest to the study to learn some descriptives about the results. The dependent variable for Satisfaction (Qu2) showed a peak in the 'Satisfied' category. In summary, around 84% of respondents answered either Satisfied (~60%) or Very Satisfied (~24%) to this question.

[8] A small number of people in the sample were listed as gender 'unspecified.' These were coded as 'female' in the data.

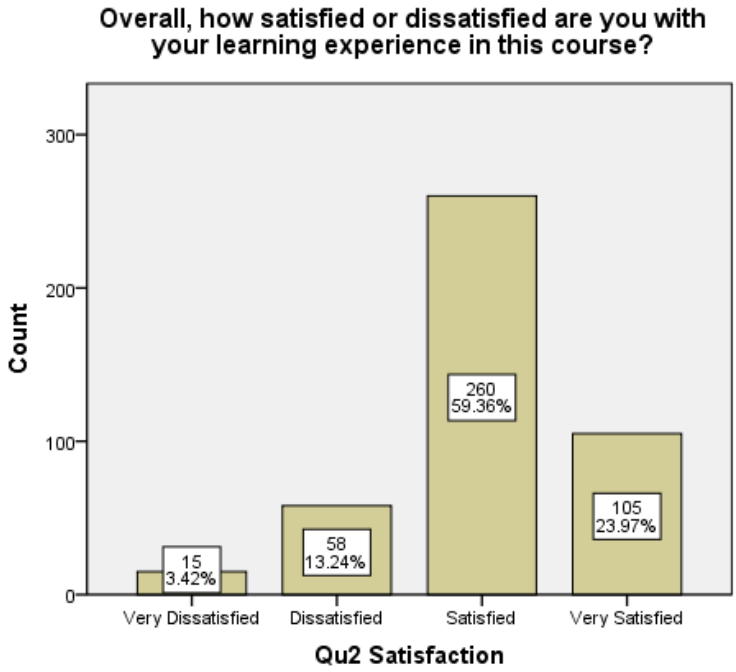


Figure 4. Bar Chart of Dependent Variable 'Satisfaction'

The dependent variable question for future intended Persistence in online learning (Qu4) showed a strong trend towards future intended persistence in online learning, with around 85% of respondents answering either Some Chance or Very Good Chance of their persisting in taking online learning courses. Close to 50% of respondents answered the highest category of 'Very Good Chance' of persisting in online learning.

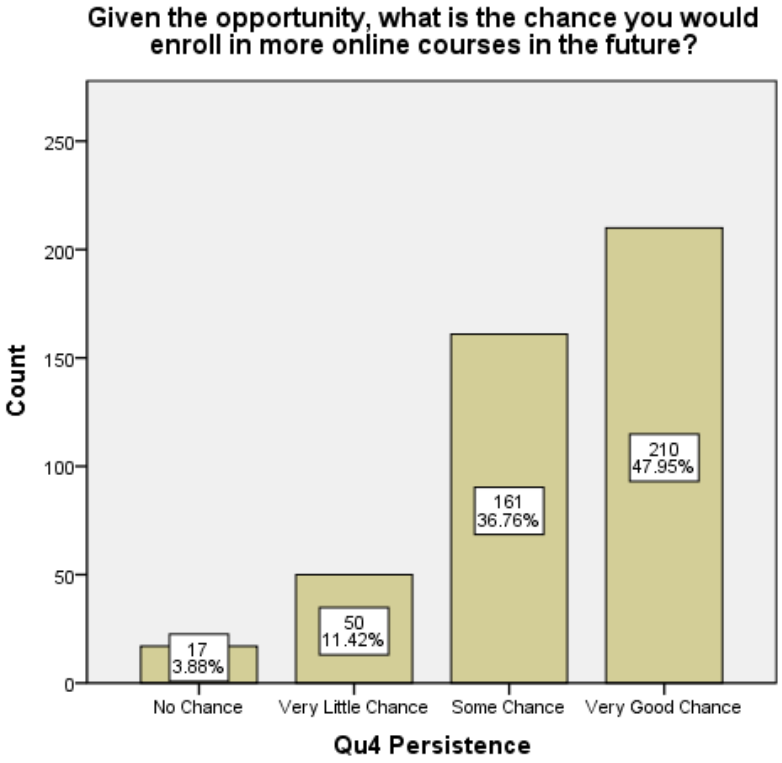


Figure 5. Bar Chart of Dependent Variable 'Future Persistence'

Immediacy Variable.

The distributions of the immediacy questions were fairly normal and nothing overly atypical was noted. The researcher moved on to the technology questions which exhibited more variability.

Technology Variable.

A look at the bar charts for technology modality indicated variation in the experiences reported by participants regarding technology modalities both within-modality (synchronous or asynchronous) and between modalities (text, audio, and video). Text modality was the most frequently reported modality by participants. Its distribution was more normal than the audio/video categories.

Audio and video modalities had much lower reported frequencies overall. Also, any asynchronous modality of audio/video was more frequently reported than synchronous modes of audio/video. The full set of bar charts from the technology modality variables of the survey are provided in the Appendices. Some highlights of the technology modality variables are presented in the following paragraphs.

Within text modality, asynchronous broadcast messages from the instructor to the class, such as variable Qu30 (instructor broadcast email to class) and Qu33 (instructor discussion board postings to class) were skewed to the left, indicating they were experienced frequently by participants.

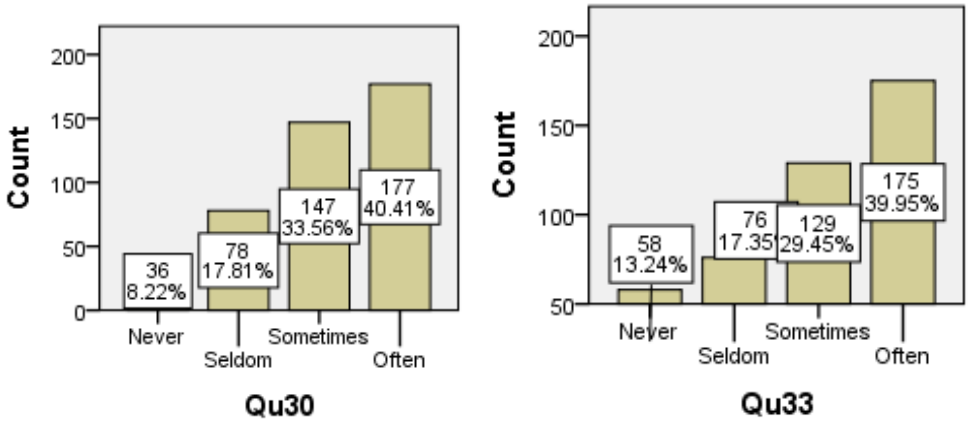


Figure 6. Instructor Email (Qu30) and Discussion Postings (Qu33) to the Class

In contrast, some distributions of text-based technology were skewed to the right, meaning less frequently experienced by course participants. For example, instructor personal messages to individual students (e.g. Qu31) and basically any form of synchronous text (i.e., text chat) had distributions skewed to the right, meaning less frequently reported.

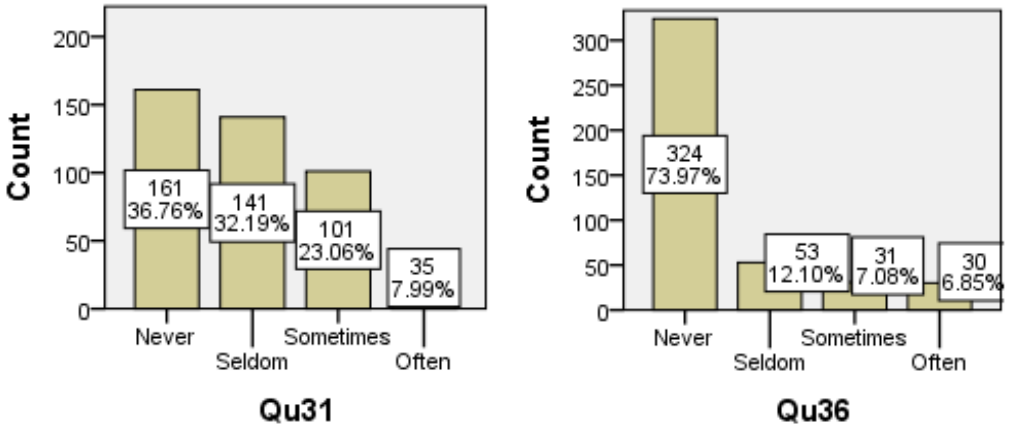


Figure 7. Instructor Email to Individuals (Qu31) and Text Chat to Class (Qu36)

The majority of audio and video variables, whether they were synchronous or asynchronous, were skewed to the right, indicating less frequently experienced. This indicated that audio or video technologies, with the primary exception of instructor asynchronous (recorded) communication/content, were experienced only on rare occasions. In general, this meant that very few audio/video interactions were experienced by participants only rarely, if at all.

In addition, the distributions for synchronous audio and synchronous video (i.e. live audio or video) were extremely skewed to the right. This indicated that study participants reportedly 'Never' experienced synchronous audio or video modalities in the course. The (basically) non-existent use of synchronous audio/video 'interactions' and the low overall frequency of audio/video modality in general was shocking to the researcher and will be discussed in Chapter 5.

There were a couple of instances within the technology modality as a whole which displayed bimodal distributions: Variable Qu35 representing discussion forum postings between students and Qu39 representing instructor recorded audio to the class. This type of distribution might indicate that some courses use little of that modality (e.g. discussion forum communication between students) and other courses use quite a bit.

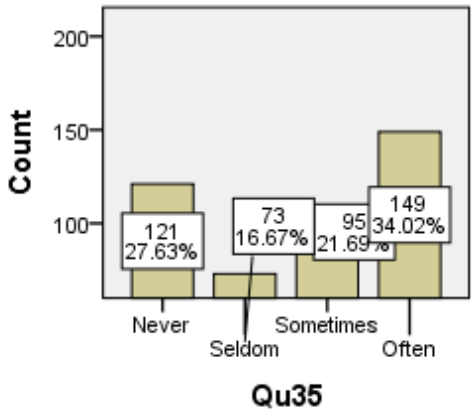


Figure 8. Asynchronous Text Discussion Forum Postings Between Students

In contrast to students reading discussion forum postings by other students, students hearing recorded voices of other students or seeing recorded video of other students was only rarely reported. Thus, while recorded (asynchronous) text communication between students was frequently reported (Qu35), hearing audio or seeing video of other students and between students (Qu41 and Qu47) was generally 'Never' experienced/reported by respondents.

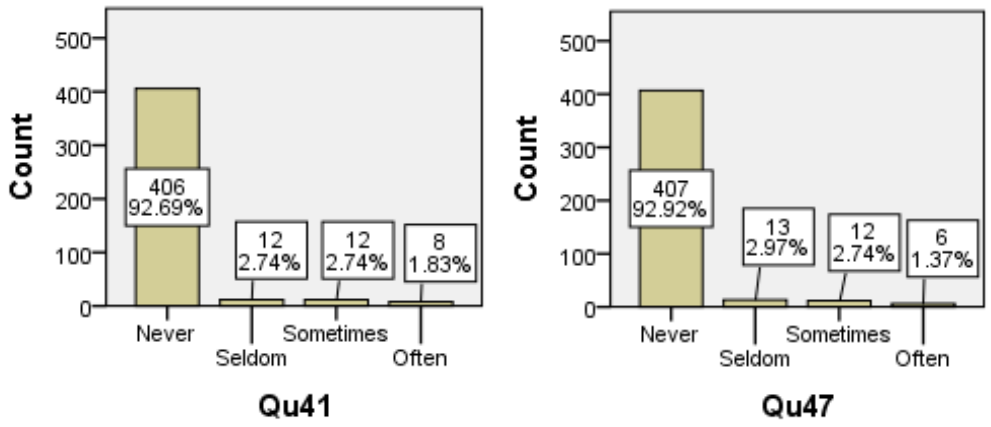


Figure 9. Asynchronous Audio (Qu41) and Video (Qu47) Between Students.

Due to the extremely low reported use within the audio and video modality (variables Qu39 to Qu52), the researcher questioned whether the data in these categories would converge to a solution during upcoming analysis.

Factor Analysis

A common factor analysis was performed first on the immediacy related items and then on the technology related items. Principal axis factoring was used for extraction. Kaiser-Meyer-Olkin Measure of Sampling Adequacy and KMO and Bartlett's Test of Sphericity were selected for examining the value of using factor analysis in analyzing the data. Similar to Garrison et al (2010), direct oblimin rotation was selected as the factors were expected to have correlation with each other.

Immediacy Variable.

The results of the multicollinearity statistics indicated moderate collinearity within the items of the three theoretical constructs for immediacy (Faculty as Teacher, Faculty as Human Being and Peers as Social Community). As a way to refine the solution, these immediacy-related items were evaluated with a factor analysis. Through iterative factor analysis certain items were dropped in order to converge a more parsimonious solution.

The results of the KMO test indicated a value suggesting the data were strongly suited for factor analysis. In addition, the Bartlett's Test for Sphericity resulted in statistical significance, demonstrating that a factor analysis was suitable for analyzing the data.

Table 8: KMO and Bartlett's Test for Immediacy Variable

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.946
Bartlett's Test of Sphericity	Approx. Chi-Square	2879.310
	df	91
	Sig.	.000

The communalities of the variables showed variation in the extent to which they were modeled by the solution but all of the included variables had acceptable extraction values. The solution indicated a single dominant global factor. The scree plot showed a decrease in explanatory power after the extraction of one factor. The researcher felt a one factor solution held the most explanatory power than a solution with more factors.

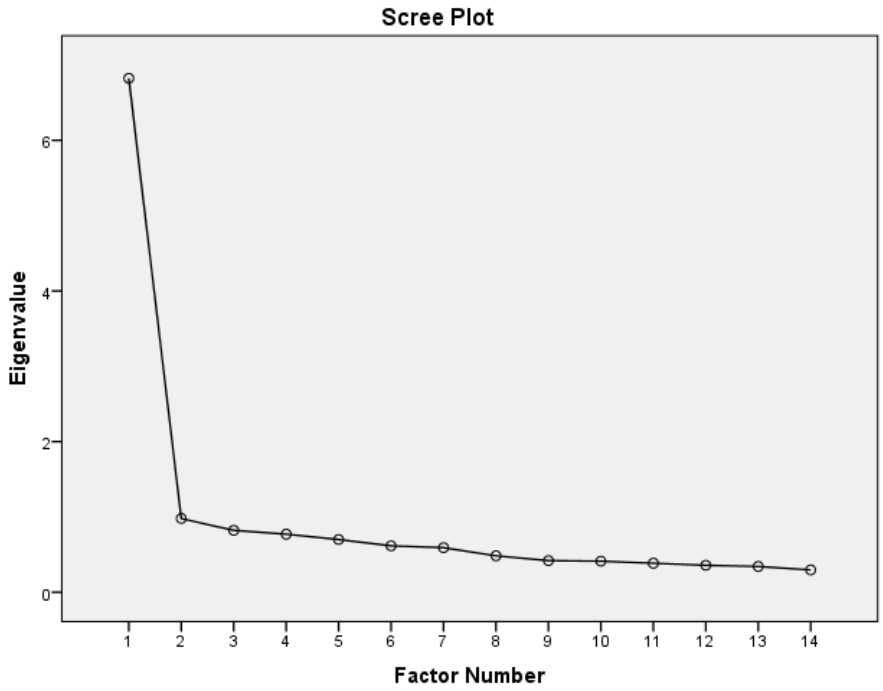


Figure 10. Scree Plot

The researcher named this factor 'Immediacy.' The final questions comprising the Immediacy factor were 14 survey questions: Questions 5, 6, 7, 8, 11, 13, 14, 16, 18, 20, 21, 22, 23, and 25. The single factor solution contained four 'Faculty as a Teacher' questions (Question 8, 16, 22, and 23), six 'Faculty as a Human Being' questions (Questions 5, 7, 11, 13, 14 and 25) and four 'Peers as Social Community' questions (Questions 6, 18, 20 and 21).

Table 9: Factor Matrix

Factor Matrix[a]

	Factor
	1
FaT 1 Qu8	.682
FaT 5 Qu16	.639
FaT 6 Qu22	.510
FaT 7 Qu23	.658
FHB 1 Qu5	.633
FHB 2 Qu7	.790
FHB 3 Qu11	.688
FHB 4 Qu13	.731
FHB 5 Qu14	.761
FHB 7 Qu25	.701
PSC 1 Qu6	.356
PSC 3 Qu18	.685
PSC 5 Qu20	.752
PSC 6 Qu21	.690

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 3 iterations required.

Technology Variable.

The researcher ran an initial factor analysis on the items relating to technology modality of text, audio and video (Questions 30 to 52). As noted earlier, there was very little data in the audio or video categories with the exception of asynchronous (recorded) instructor content. A factor analysis which included the Audio and Video components was unstable and did not factor well. This was not surprising as the earlier multicollinearity statistics and scant data indicated instability. The researcher re-ran the

data using only those audio/video variables which contained substantive data in them. Unfortunately, the solution suggested dropping questions 39, 45 and 48, which were the only audio/video questions which had much data in them to begin with. However, dropping them was also consistent with the text-variable which dropped similar non-interactive but instructor-generated content. For example Qu30 (instructor broadcast emails to the class) was dropped from the text category and questions 39, 35 and 48 would correspond to this type of modality, but in the audio/video categories. The scant data in the audio/video categories also contributed to a low KMO score when performing an initial factor analysis.

Due to the extremely low amounts of data in the audio/video categories, the researcher decided to exclude the audio and video categories from further analysis. As earlier noted, the finding that scant audio and video interactions other than recorded instructor-content, and basically no synchronous audio or video modality at all, will be discussed in more detail in Chapter 5.

The researcher then ran a factor analysis for the text modality items. There were only nine questions related to the text modality (Questions 31 to 38). Question 30 (instructor emails to the class) was dropped as it is not contribute much to the solution. The KMO score was 'fair' at .752, but given the small count of variables for the factor, the researcher deemed this suitable and decided to test the scale for reliability and move forward.

Reliability

A reliability analysis was performed on the 'Immediacy' factor computed in the earlier factor analysis. The Cronbach's alpha for the items in the Immediacy factor was .912, which indicated strong reliability for this scale.

A reliability analysis was performed on the items comprising the Text modality (Questions 30 to 38). The reliability analysis also indicated removal of Question 30 (Instructor broadcast emails) to improve the scale, so this item was dropped. The resulting Text scale consisted of Questions 31 to 38. The Cronbach's alpha for the scale was .740, which the researcher deemed acceptable.

HLM Analysis

The data were analyzed using hierarchical linear modeling and entered into the HLM software (*HLM - Hierarchical Linear and Nonlinear Modeling*, 2013). The predictor variables were centered around the grand mean and considered fixed effects.

Restatement of the Research Questions.

RQ1: How are the elements of technology modality and immediacy related to satisfaction?

RQ2: How are the elements of technology modality and immediacy related to intended persistence in online learning?

RQ3: How are the elements of technology modality and immediacy

related to final course grade?

Research Question 1.

The outcome variable for this question was satisfaction (Qu2). The predictor variables were the Text factor and the Immediacy factor. The results indicated that text modality was statistically significant and presented itself in a negative direction. The Immediacy variable was statistically significant and presented itself in a positive direction.

Table 10: HLM Analysis – Immediacy, Text Modality, and Satisfaction

Final estimation of fixed effects (with robust standard errors)

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	3.046895	0.035787	85.140	50	<0.001
For TEXT slope, β_1					
INTRCPT2, γ_{10}	-0.035247	0.008000	-4.406	385	<0.001
For IMMEDIAC slope, β_2					
INTRCPT2, γ_{20}	0.058232	0.003961	14.702	385	<0.001

Research Question 2.

The outcome variable for this research question was future intended persistence (Qu4). The predictor variables were text modality and immediacy. The results indicated that the text modality was not statistically significant and presented itself in a negative

direction. The Immediacy variable was statistically significant and presented itself in a positive direction.

Table 11: HLM Analysis – Immediacy, Text Modality and Future Persistence

Final estimation of fixed effects (with robust standard errors)

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	3.291065	0.038144	86.280	50	<0.001
For TEXT slope, β_1					
INTRCPT2, γ_{10}	-0.009882	0.009488	-1.042	385	0.298
For IMMEDIAC slope, β_2					
INTRCPT2, γ_{20}	0.036678	0.006568	5.584	385	<0.001

Research Question 3.

The outcome variable for this research question was final course grade. The predictor variables were text modality and immediacy. The results indicated that text modality was not statistically significant and presented itself in a negative direction. The Immediacy variable was statistically significant and presented itself in a positive direction.

Table 12: HLM Analysis – Immediacy, Text Modality and Final Grade

Final estimation of fixed effects (with robust standard errors)

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	3.593476	0.045154	79.582	50	<0.001
For TEXT slope, β_1					
INTRCPT2, γ_{10}	-0.001581	0.008236	-0.192	385	0.848
For IMMEDIAC slope, β_2					
INTRCPT2, γ_{20}	0.016327	0.005276	3.094	385	0.002

Limitations

External validity.

Although there are both theoretical and practical implications from this study, it also has a few limitations. One limitation is the threat to external validity. Due to the nature of the study, its findings are not generalizable to an outside population. The findings of this study are representative of this study alone, which represent its unique conditions, survey, course participants, random course sample, and instructors teaching those courses at a single semester of study at a single university. The results of this study should not be extended beyond this.

There are, however, aspects of the study which strengthen external validity. One element was the random sampling of courses. It is more common in educational research or program evaluation to use a convenience sample, snowball sample or a census (e.g.,

inviting everyone at the institution who has taken an online course) or having instructors coordinate the invitation to student (participants). Randomly sampling courses helped provide a view into reality of what is actually happening in online courses.

The random sample also provided for a random selection of courses from a range of disciplines. A broader range of course disciplines provides stronger external validity for results. For example, if the study findings are significant, and if there is a greater variety of course disciplines in the random sample, and those findings hold across the disciplines of courses, the study findings are more generalizable than a similar study which had courses from a single discipline or a limited set of disciplines. This is important because programs of study can vary by discipline, in pedagogical paradigms as well as research perspectives (Trowler, Saunders, & Bamber, 2012). For example, even teaching may vary by discipline. If the study findings hold across a range of disciplines, it is better for external validity, than if only a single discipline of courses were in the sample. Investigating social presence effects across wide range of disciplines is supported when studying social presence in online courses (D. R. Garrison et al., 2010; Gunawardena & Zittle, 1997; Hostetter & Busch, 2013).

Additionally, using a third party to administrate the survey on behalf of the researcher was an effort to minimize the influence of social desirability because it buffered the respondent. The third party kept user's responses private from the researcher. Additionally, the respondent's instructor would never know if the respondent took the survey or not. This was helpful because if the respondent thought that the instructor might know of his/her answers or that he/she had taken the survey, the

respondent may have been less likely to respond honestly, and therefore be susceptible to answering the questions in a socially desirable way. The intention of using the third party administrator to host and communicate about the study was designed to honor the respondent in a way to encourage honesty in answering. Using third party survey administration has also implemented by social presence researchers such as Hostetter and Busch (2013) and Mayne and Wu (2011).

Internal validity.

The literature review was conducted to strengthen the internal validity by providing a foundation and background for the study design and purpose. One possible challenge early on was to ensure better statistical validity by ensuring more statistical power. Educational researchers frequently study courses. This is a natural format when researching issues related to teaching and student perceptions of teaching. As such, cluster sampling is frequently implemented in educational research. The *a priori* power analysis was conducted to provide grounding for the sample size, selection and method.

The reliability of measures was strengthened by using research and other studies in which to inform the design. The survey was constructed by drawing upon work measuring immediacy behaviors, social presence, and other factors deemed suitable. Gorham (1988) was used as the platform for departure in constructing the verbal immediacy behavior questions. Appleton et al (2006) was used to bridge a gap of the researcher felt existed in Gorham's list, namely, the aspect of 'caring.' Survey

construction and design was informed by the Tailored Design approach (Dillman, 2007; Dillman et al., 2008) to seek best practice in designing and implementing the survey.

Finally, it is important to note the differences and values between practical and statistical significance. Sometimes studies do not have statistical significance but remain valuable due to practical significance. Resulting practical significance of the study can apply to institutions providing online learning, for instructors wanting to strengthen their online teaching, and for students taking online courses. Statistical significance contributes weight and importance to study findings, but it is also important to consider practical significance as an equally valuable outcome to any study. The researcher draws upon Dewey's practical reasoning approach (J. Garrison, 1999) in that the overarching goal of science and scientists is to create a better environment: in this case, a better environment for online learners.

Hypothesis guessing by participants was guarded against by not telling participants what the researcher expected to find. For example, study participants were not informed that the questions were related to immediacy. The two dependent variable questions of satisfaction and persistence were placed at the front of the survey before questions about immediacy and technology and no back tracking was allowed. Care was also taken to not give away the true intent of the study by carefully constructing questions and text in the survey, the consent message, and other communications.

The researcher of the study guarded against expectancies which might bias the data, by being engaged and open to the possibility that the proposed theory might not hold or that confounding results may be discovered. And, even if some findings were not

statistically significant, this was actually a finding in itself, and useful in furthering research in online learning and social presence.

Reliability of Factors.

The factor of psychological closeness (immediacy and caring) indicated strong reliability. The factor of text indicated acceptable validity. Future research is needed to refine what is meant by immediacy or psychological closeness and technology modality in online learning. Future studies investigating social presence and evaluating the perception of immediacy and technology modalities could use focus groups or other qualitative inquiry. This would be especially valuable.

The factors for audio and video factors were unstable and not examined beyond initial statistics. However, to a large extent, the data in the study could not be adequately evaluated because, beyond instructor recorded content, audio/video interactions were mostly 'Never' experienced. One of the goals the researcher had was to examine what was actually happening in online courses, and thus a random sample was drawn. The reality ended up being that audio/video was not being used much beyond instructor recorded audio/video content. With insufficient data, the scales could not be reliably examined. Future work might need to draw a targeted sample, instead of a random sample, in order to evaluate this construct more reliably and have more data points with which to evaluate this construct.

The researcher of the study proposed factors based on the literature review and designed them using the sources as described earlier. But with so few courses reporting

use of audio/video in the course, the researcher still has lingering questions about this scale. Elucidating these constructs will take future research, where actual course participants are queried as to their perceptions text, audio and video. This might be done in focus groups or other qualitative inquiry, or by further refining the basic constructs presented here in future survey implementations. Thus, while the reliability of audio/video needs improvement, it is the researcher's belief that the constructs identified in this study are worthy of future investigation to determine how or to what extent they affect students' perceptions of technologies and how this may relate to the perception of social presence elements.

Scale.

The agreement/disagreement scale in the study used a 1-to-4 point Likert type scale ranging from Strongly Disagree, Disagree, Agree, to Strongly Agree. However, it is possible that participants' opinions regarding the topics investigated are not strong or fully formed. An alternative scale that would account for participant opinions being less strong would be Strongly Disagree, Tend to Disagree, Tend to Agree, and Strongly Agree (or similar) as seen in Reio and Crim (2013) and Frary (1996). In addition, a 1-to-6 point scale could provide more granularity around the construct. The researcher in this study believed respondents' opinions would be well formed and that participants would be able to answer freely and openly regarding their opinions. In addition, the researcher was looking for the general direction of the effect and a 1-to-4 scale suited this. A future study could investigate participant opinions in order to assist in determining the strength

of respondents' opinions about the kinds of questions appearing in this study, as to whether the opinions are strongly held or not.

Immediacy or Psychological Closeness.

The results of the study indicated that psychological closeness, as presented through the constructs of verbal immediacy and caring behaviors through the researcher-identified elements of Faculty as Teacher, Faculty as Human Being and Peers as Social Community, were important in predicting the dependent variables. As much as possible, the study attempted to isolate immediacy behaviors from technology modality. However, future work could explore the perception of immediacy and caring behaviors and technology modality in course participants by using fMRI and seeing what goes on in the brain during exposure. For example, when instructors exhibit low immediacy or caring behaviors in all three modalities, whether text, audio or video, what happens in the brain? Being able to study the brain in real time would provide additional insights into this area which have not yet been seen in current research.

Qualitative Results.

This study focused on quantitative data and did not include areas for collecting qualitative data, such as follow up questions about certain questions, or general comments, or other types of qualitative data. Qualitative comments and data can be helpful in providing a context for interpretation and analysis. The researcher believes there is a great deal of information surrounding social presence in online learning that is

still in an exploratory stage; and thus, qualitative data could be helpful to a future study researching social presence in online learning. Therefore, the general suggestion is for future studies to include qualitative data or feedback questions in work building upon the work presented here.

Non-responders.

The study findings include only respondents who elected to complete the survey. Consequently, the findings do not represent the opinions or perceptions of students who did not respond to the survey or who officially withdrew from the course before the invitation to participate was sent. Presumably, participants who did respond to the survey might view online learning more positively or have more positive perceptions of immediacy and technologies experienced in such courses. Thus, the study may not adequately capture perceptions of students who were dissatisfied with the course or who were less interested in participating in research surveys. For example, fewer males responded to the survey than females. Future work could include ways to investigate the same topics with non-responders or participants who withdrew from the online course.

One point in time.

Another limitation to the study is that it only measures a single point in time and it is possible that student perceptions of social presence, immediacy and/or technology can vary over time. Social presence is something that can cultured into a course (Richardson & Swan, 2003). Additionally, instructors can use strategies to increase social presence in

courses (Aragon, 2003; Dunlap & Lowenthal, 2014), indicating it is a skill which can be learned. In line with this, students may become more proficient in conveying social presence as they gain more experience in online courses and as they progress toward degree completion. The 'one measurement in time' was largely unavoidable as surveying such a large group of students reliably over time can be difficult for a number of reasons.

Chapter 5: Discussion

If we teach today's students as we taught yesterday's,

we rob them of tomorrow. (Dewey, 1916)

The researcher, during the journey of inquiry, discovered the burning question first posed by Weinberg (2001) 40 years ago in 1975: Why are we so unable to anticipate the second order effects of the first order victories in science and technology? The primary goal of this research study was to explore how one can improve online learning through the lens of social presence and how social presence influences the online learning experience. During this odyssey it became apparent to the researcher that technology is playing a much greater role than the researcher anticipated or what current research is concentrating on.

In reflecting upon the literature review and the results of this study, the researcher suggests four directives for future exploration based on this study. The first two directives address overarching dimensions which emerged during the course of the study and were deemed important for the overall advancement of learning in a digital age. The final two directives are derived from, and related to, outcomes from this study.

I. Use existing and emerging technologies to more quickly create an improved learning environment at all levels of education.

II. Connect the emotional and rational part of the mind and incorporate this into course design.

III. Create virtual face-to-face interactions in online learning environments.

IV. Seek an improved balance of text, audio and video in online learning.

I: Paradigm Shift: Tomorrow's Students

In the last thousand years, arguably the number one technology impacting the progression of human society was Gutenberg's printing press. The printing press has influenced nearly every aspect of human thinking and has impacted the way in which we learn and assimilate knowledge in the world. Today's printing press is the Internet.

The social nature of the Internet is the second order effect from the first order victories in science and technology. Technology has turned social interaction inside out. The Internet is a social place (Biocca et al., 2003). People are social beings (Brooks, 2011; Brown & Duguid, 2000). Learning is a social process (Kear, 2010; Laffey et al., 2006). The Internet users of today generate their own content and place their voices and lives into 'the cloud.' People use online technologies to advance social imperatives in seeking of meaningful connection to others and engaging in sense–making processes.

Facebook, YouTube, Twitter, LinkedIn, and other social networking platforms are changing how we meaningfully connect to others. What the Internet has manifested through minute, iterative changes during the last twenty years challenges the way in which we understand our world. Geography does not mean the same thing anymore. With respect to online learning, instructors and students can be in rooms next to each other or on different continents. Virtual face-to-face technologies allow people to converse through video in real time.

In 2014, the most popular web sites were Google, Facebook and YouTube. YouTube has an enormous wealth of videos for everything from do-it-yourself (DIY) projects to world class presentations. Social networking platforms like Facebook, Twitter and LinkedIn fulfill a real human need for sharing and connection with others. This is what LinkedIn's founder, Reid Hoffman, has referred to as I to the power of We (I^{WE}).

What Facebook, a social networking platform, has in common with YouTube is video. However, Facebook video is outstripping YouTube in a number of ways. In 2014, more people uploaded video directly to Facebook than to YouTube (L. O'Reilly, 2014). In 2015, Facebook had more videos with 1 million views in a 30 day time period than YouTube did (Smith, 2015). But if both Facebook and YouTube have videos, what does Facebook video have the YouTube video does not? The answer is *video with engagement*. Facebook's social nature allows for the *meaningful sharing* of video with connected others, not just viewing. Facebook is 'video conversations' in contrast to YouTube's 'video watching.'

We must begin exploring the use of technologies, such as the functional MRI, as a means to understand the learning environment more concretely and to construct better learning environments. One challenge in survey research is that we cannot know how individuals *actually perceive* the constructs being measured. A future study could use the fMRI to allow us to see the neuroscience behind the perception of the constructs being measured. With the functional MRI, we could get a real-time, physiological view into how people actually (and unconsciously) perceive psychological closeness and in what ways technology modality might influence this perception. For researchers, it could be

incredibly elucidating to know what is actually happening at the intersection of psychology and technology. It could be incredibly helpful for faculty to understand what happens in the unconscious mind and the cognitive 'imprints' students have regarding 'video conversations' versus 'video watching.' We must better understand how more interactional elements could create a better learning environment.

A fundamental tenet of statistical research is that the patterns of the past will be the patterns of the future. How much do we assume how people learn today is the same as how they learned before the Internet? As Dewey so eloquently pointed out nearly 100 years ago, and decades before the Internet existed, we must be proactive as teachers and be flexible and adaptable for today's students. The students of even twenty years ago did not have Facebook, YouTube, or iPads. These technological breakthroughs had not yet occurred; but these breakthroughs have changed the face of how we communicate and learn about the world today.

How differently are the brains of young students wired compared to the brains of teachers teaching today? How are we adapting our pedagogies to account for the ways in which technologies are a part of the learning environment?

II. Achieving Consilience in Emotional and Rational Thinking

In 1962 Thomas Kuhn in his book on the structure of scientific revolutions challenged the scientific community's assumption that science was emotionally pure. He posited that emotion played a significant role in scientific thinking and demonstrated how 'culture' is a significant contributor (and inhibitor) for change, especially in paradigm

shifts. From there the researcher of this study was drawn to Daniel Goleman (2012) who describes the influence that emotions play in every day interactions. Goleman goes on to describe Gardner and the new way of measuring intelligence.

The world has never been more connected than it is today. Facebook has created a network (city) of individuals and data that the world has never seen before and that researchers have never had access to before! Technology is changing at an exponential rate (Kurzweil, 2005), especially for research. To complicate matters, "… while our emotions have been wise guides in the evolutionary long run, the new realities civilization presents have arisen with such rapidity the slow march of evolution cannot keep up" (Goleman, 2012, p. 5). The biological brain cannot keep up with the technological changes. Evolution works slowly. At the end of the day, we must acknowledge that we have an emotional relationship with technology (*The Trust Engineers*, 2015).

The emotional connection to technologies creates an enigma in learning. The unconscious mind is at work in learning; and learning is not just about concrete facts and hard skills. We have two minds: one that thinks and one that feels (Goleman, 2012). Henri Laborit, the famous physician, neurosurgeon, writer and philosopher asserts that all learning is emotional (Resnais, 1980). Emerging research in neuroscience reveals that technology is rewiring our brains (Small & Vorgan, 2009). Technologies are changing how we create, understand, socially negotiate meaning, and learn.

During the 1990s, the functional MRI was developed and this has led to burgeoning research transforming our understanding of how the brain works and how we

make decisions. A principal finding in recent neuroscience research is that our unconscious mind drives much of our behavior:

> WE PERCEIVE, WE remember our experiences, we make judgments, we act-and in all of these endeavors we are influenced by factors we aren't aware of….The truth is that our unconscious minds are active, purposeful, and independent. Hidden they may be, but their effects are anything but, for they play a critical role in shaping the way our conscious minds experience and respond to the world. (Mlodinow, 2013, p. 29)

Why are we not spending more time looking at how to better use technology to create virtual face-to-face environments supporting learning and the advancement of society? Are we researching enough how learning, emotion and technology are intertwined? Big data allows us access to the social nature of people on Facebook (*The Trust Engineers*, 2015), but how can we make a more socially friendly learning environment that better mirrors how we, as human beings, naturally learn and communicate?

The researcher believes many people have lost faith in the education system and posits if part of the reason is related to education having failed to meet the needs of a society. Part of the issue is tied to our inability to anticipate the tremendous positive effects, together with some negative effects, which emerging technologies have created: the second order causes.

Science is not emotionally pure (Kuhn, 2012). We, as researchers and educators, are encouraged to remember that learning is not emotionally pure either. Reason and emotion exist in consilience. Learning is both rational and emotional. Let us mindfully acknowledge the positive role emotion can play in the learning process and use positive emotional and affective elements in the design of our learning environments and in how we deal with others.

How do we manage the role which technology is playing in creating our learning environments and how it affects the affective part of learning?

III. eating Virtual Face-to-Face in Online Learning

This study examined a random selection of online courses. Part of the motivation for the random selection of courses was to find out what is actually happening in online learning in contrast to what we might aspire to. The researcher was stunned to learn how little video was used in the online courses (See Appendix B for reference). Recorded instructor computer-screen recordings were only reported by approximately one-third of respondents. Recorded instructor-video was only reported by approximately one-quarter of respondents. Recorded asynchronous-viewing other student video was only reported by approximately 7% of respondents. Instructor-to-individual-student video feedback was only reported by 1% of respondents. Finally, synchronous video of any kind was only reported approximately 1% of respondents.

Why are we not seeing more video in online courses when free and widely available video recording and video 'face-to-face' capabilities exist? And why is synchronous video nearly non-existent in online courses?

Facebook and YouTube demonstrate the meaning and value of other 'voices' in audio and video use. To some degree, Facebook and YouTube have become the standard for students' ways of communicating and learning about the world. Arguably, during the formative years of many faculty, the kinds of audio/video technologies available today did not exist during their teacher education. Thus, one reason that video may not be used much is that some faculty might have a different cognitive 'anchor' from which they design their online courses.

Max Planck remarked that "a new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it" (as cited by Kuhn, 2012, p. 151). With the challenges we face in education today, we cannot afford the luxury of being so slow to adopt audio/video technologies in online courses. Given the results of this study, it is apparent to the researcher that more research is needed exploring the use of new technologies in creating virtual face-to-face learning environments, both instructor-to-student and student-to-peers. Also, more research is needed regarding assumptions and limitations affecting technology usage. In addition, more study is needed on synchronous video elements within online courses.

Audio and video modalities are on the richer part of the continuum in social presence theory. The researcher hypothesizes that by incorporating more audio/video

into online courses we can better cultivate the perception of the faculty as a human being who cares about students' learning and cultivate a community of peers contributing to the social negotiation of meaning with others.

IV: Seeking Balance in Technology Modalities

Part of the driving energy for the study was to break open the topic of social presence by harkening back to its original conception nearly forty years ago with Short et al's (1976) work in social presence theory. This theory holds that technologies have differing capabilities to offer the communication channel. The researcher did not see this being addressed adequately in current social presence research in online learning and considered it an important gap in literature and research.

This study examined the current state of online learning in order to better understand how choices in immediacy behaviors and technology modality affected the perception of satisfaction, persistence and final grade. Specifically, this study examined psychological closeness, as demonstrated through verbal immediacy and caring behaviors, and technology modality (e.g. text, audio or video, and synchronous or asynchronous use) and its connection to the dependent variables.

Psychological closeness, in the form of verbal immediacy and caring behaviors, clearly makes a difference. The construct of immediacy was statistically significant on the three dependent variables of satisfaction, persistence, and final grade in the positive direction. More caring and immediacy behaviors were related to better outcomes on satisfaction, persistence and final grade. Enough said.

Text modality was also statistically significant on the variable of satisfaction, but in the negative direction. Thus, greater frequency (use) of text modality variables were associated with a decrease in satisfaction. Some could justifiably argue that the relationship was statistically significant but practically insignificant. The actual magnitude of the relationship was minute at best. The researcher believes, however, that this has the potential to be the most important result of this study: an increased use of text modality was associated with decreasing satisfaction.

Keeping in mind that satisfaction is not the sole outcome desired in a course, it remains a useful thermostat for gauging the overall (affective) experience of a course. In research, student satisfaction has been linked to increased course retention/completion rates (Hoskins, 2012; Leong, 2011) and the intention to enroll in future online courses (persistence) (Reio & Crim, 2013). Both of these associations are strong institutional measures of success.

The results of this study do not mean we should do away with text in courses, online or otherwise. Text is (and remains) a valuable and important means for communicating with others. Human society has relied on text as a means for communicating ideas and knowledge for hundreds of years. But we also must acknowledge that before text communication existed there was face-to-face communication. Evolutionarily, we have evolved many more years for face-to-face interaction than for text and there are other means readily available for communication today: audio and video.

In social presence theory, text-based communication is the nadir of the social presence scale. Text based communication is considered a 'lean' medium lacking nonverbal cues (i.e., voice inflection, facial expression, gestures and body language). Non-verbal cues present themselves in audio, video and face-to-face communication. In online settings, we can explore the expanded use of audio and video. The researcher proposes seeking a balance of text, audio and video elements in online courses.

The researcher wonders if the results of this study could also be an example of how the twenty year old mind has been rewired by technology? It may be possible that younger learners anticipate the greater use of video. The researcher believes this question could best be answered through emerging technologies, such as the use of fMRI, to examine what is actually happening in the perception of these elements within the mind.

With respect to instructional design, the results of this study might indicate exploring the use of less text in interacting with others or at least increasing the proportion of audio/video. The researcher conjectures that students may be seeking less use of text communication, perhaps due to the video and technological environment many students have grown up in. One hypothesis might be that an increase in the use of video would incorporate more non-verbal immediacy behaviors and thereby contribute to immediacy elements described in this study. Unfortunately, there was not enough data in the audio and video variables from the courses in this study to provide a view into the extent which audio/video interactions might have influenced the dependent variables. A future study could examine a selection where known audio/video use/interactions exists in online courses.

Some possibilities for varying the technology modality of an interaction would be to swap a text-based interaction with a video-based one or to change a written assignment to a video-based assignment. Faculty could receive education about immediacy and caring behaviors in their communications with students and be provided with information for how to model these behaviors for students to communicate with each other. Administrative programs, academic technologists, and instructional designers will all be crucial in this sea change.

A future study could examine faculty assumptions, concerns and cognitive frameworks concerning the design of audio and video elements in online courses through the use of a focus group. However, one of the drawbacks of a focus group research is that underlying 'concerns' may not be accurately voiced due in sensitive situations. The researcher believes a Delphi study will be valuable for a future examination of this topic. The Delphi method helps avoid potential 'group think' which can happen when voicing unpopular opinions in a group situation, such as where showing inexperience might be a concern, or where political or power structures place undue pressure on ability to share concerns transparently.

The results of this study also indicate the predominant use of asynchronous modalities in the online courses examined. It is not clear why asynchronous modality predominated in the online courses. One reason might be that online course participants expect asynchronous flexibility. Perhaps students do not want to be locked down to meeting at specific days and times when taking an online course and this comes out in their expectations of online courses. Such an expectation would be a powerful reality for

faculty who might respond by designing asynchronous forms of interaction. However, this is in direct contrast to studies stating that students are dissatisfied with the asynchronous and 'lean' format.

A future study could also examine the forces influencing a faculty member's decision to implement one technology modality over another. For example, research could examine the decision premises faculty go through in determining what technology modality (text, audio or video) to implement in designing course interactions or assessments. Or a researcher could examine how faculty evaluate or adjust how warm, inclusive and social their communication style is or how others perceive their communication style, especially with respect to technology modality. By better understanding the reasons and constraints which faculty experience in designing and implementing online courses, institutions can plan for and prepare better faculty support services to assist faculty in the challenges attendant to a social presence pedagogy.

The key is to understand the unconscious moments that people go through in choosing technology modalities or in how to communicate with others. We know that our unconscious mind drives much of our behavior (Mlodinow, 2013), but how does this affect the perception of immediacy behaviors or how those behaviors are perceived through technology modality? How does it affect course design? Future work using the functional MRI would allow us a window into answering this question.

Parting Words

The field of education is at an important inflection point. The researcher believes the answer resides in a consilience between the field of education and other disciplines. It is through integrative discourse that meaningful action takes place and change occurs. Sherry Turkle, a professor of the Social Studies of Science and Technology at the Massachusetts Institute of Technology, shows that technology can both bring us together and separate us at the same time (Turkle, 2011). Her research focuses on the interrelationships between psychoanalysis and human-technology relationship. In general, MIT's program in Science, Technology and Society asks upcoming scholars to investigate the history of science and technology through the lens of sociology, anthropology and literature. MIT has struck upon a crucial element for the advancement of knowledge and learning in the years ahead.

At this point, the researcher believes that we in education must take the lead in creating a new educational paradigm that embraces holism in learning. To use Aristotle's metaphor, we must seek the golden mean between traditional learning and online technologies. But Kuhn (2012) challenges us to remember the structure of scientific revolutions and that culture is a significant contributor and inhibitor for change.

A cultural revolution needs to take place in education. 'Distance' learning and 'traditional' learning are not separate; and online learning is not distance learning. It's not about distance or technology anymore. In order to move ahead, we must let go of traditional linear thinking regarding technologies in learning and consider the exponential changes which the Internet and its technologies have manifested during the last twenty

years. Kurzweil (2005) predicted this exponential trend in technology change and of the merging of technology and the human brain. Goleman (2012) reminds us that technology is changing faster than our evolutionary adaptation to technologies.

This study is a call to the field of education to help other disciplines towards the mindful design of online learning experiences. We have a passion for learning. We are moving towards a paradigm that is highly connected, visually oriented and globally situated in a learning environment where knowledge is co-constructed. Video is a dominant force in this space. The field of education must look ahead to find ways to retain the psychological closeness in learning settings which we have enjoyed for many years in face-to-face settings, but where this closeness must now include settings where virtual face-to-face is also part of the online solution. Our challenge as educators and researchers is to forge a new path ahead and to help all disciplines along the path of mindful pedagogy: be it face-to-face, or online, or face-to-face *with* online experiences.

References

Akyol, Z., & Garrison, D. R. (2011). Assessing metacognition in an online community of inquiry. *The Internet and Higher Education*, *14*(3), 183–190. http://doi.org/10.1016/j.iheduc.2011.01.005

Akyol, Z., Garrison, D. R., & Ozden, M. Y. (2009). Online and blended communities of inquiry: Exploring the developmental and perceptional differences. *The International Review of Research in Open and Distance Learning*, *10*(6), 65–83.

Allen, I. E., & Seaman, J. (2014). *Grade change: Tracking online education in the united states, 2013*. Babson Survey Research Group and the Sloan Consortium. Retrieved from http://sloanconsortium.org/publications/survey/grade-change-2013

Allen, M., Witt, P. L., & Wheeless, L. P. (2006). The role of teacher immediacy as a motivational factor in student learning: Using meta-analysis to test a causal model. *Communication Education*, *55*(1), 21–31. http://doi.org/10.1080/03634520500343368

Anderson, J. F. (1979). Teacher immediacy as a predictor of teaching effectiveness. In D. Nimmo (Ed.), *Communication Yearbook 3* (pp. 543–559). New Brunswick, NJ: Transaction Publishers.

Anderson, T., Archer, W., Garrison, D. R., & Rourke, L. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, *5*(2), 1–17.

Angelino, L. M., Williams, F. K., & Natvig, D. (2007). Strategies to engage online students and reduce attrition rates. *The Journal of Educators Online*, *4*(2), 1–14.

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.

Appleton, J. J., Christenson, S. L., Kim, D., & Reschly, A. L. (2006). Measuring cognitive and psychological engagement: Validation of the student engagement instrument. *Journal of School Psychology*, *44*(5), 427–445. http://doi.org/10.1016/j.jsp.2006.04.002

Aragon, S. R. (2003). Creating social presence in online environments. *New Directions for Adult and Continuing Education*, (100), 57–68. http://doi.org/10.1002/ace.119

Aragon, S. R., & Johnson, E. S. (2008). Factors influencing completion and noncompletion of community college online courses. *American Journal of Distance Education*, *22*(3), 146–158. http://doi.org/10.1080/08923640802239962

Arbaugh, J. B. (2001). How instructor immediacy behaviors affect student satisfaction and learning in web-based courses. *Business Communication Quarterly*, *64*(4), 42–54.

Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, D. R., Ice, P., Richardson, J. C., & Swan, K. P. (2008). Developing a community of inquiry instrument: Testing a measure of the Community of Inquiry framework using a multi-institutional sample. *The Internet and Higher Education*, *11*(3–4), 133–136. http://doi.org/10.1016/j.iheduc.2008.06.003

Argyle, M., & Dean, J. (1965). Eye-Contact, Distance and Affiliation. *Sociometry*, *28*(3), 289–304. http://doi.org/10.2307/2786027

Baker, J. D. (2004). An investigation of relationships among instructor immediacy and affective and cognitive learning in the online classroom. *The Internet and Higher Education*, *7*(1), 1–13. http://doi.org/10.1016/j.iheduc.2003.11.006

Bassani, P. B. S., & Barbosa, D. N. F. (2013). Cooperation and participation in online education: Social presence in collective writing environments. *International Journal of Web Based Communities*, *9*(4), 434–447. http://doi.org/10.1504/IJWBC.2013.057207

Bernard, R. M., Abrami, P. C., Lou, Y., Borokhovski, E., Wade, A., Wozney, L., … Huang, B. (2004). How does distance education compare with classroom instruction? A meta-analysis of the empirical literature. *Review of Educational Research*, *74*(3), 379–439. http://doi.org/10.3102/00346543074003379

Biocca, F., Harms, C., & Burgoon, J. K. (2003). Toward a more robust theory and measure of social presence: Review and suggested criteria. *Presence: Teleoperators & Virtual Environments*, *12*(5), 456–480. http://doi.org/10.1162/105474603322761270

Biocca, F., & Nowak, K. (2002). Plugging your body into the telecommunication system: Mediated embodiment, media interfaces, and social virtual environments. In *Communication technology and society: Audience adoption and uses* (pp. 407–447).

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. http://doi.org/10.1016/j.iheduc.2011.11.001

Borup, J., West, R. E., & Graham, C. R. (2013). The influence of asynchronous video communication on learner social presence: a narrative analysis of four cases. *Distance Education*, *34*(1), 48–63. http://doi.org/10.1080/01587919.2013.770427

Brooks, D. (2011). *The social animal: The hidden sources of love, character, and achievement* (1 edition). New York: Random House.

Brown, J. S., & Duguid, P. (2000). *The social life of information*. Boston: Harvard Business School Press.

Caspi, A., & Blau, I. (2008). Social presence in online discussion groups: testing three conceptions and their relations to perceived learning. *Social Psychology of Education*, *11*(3), 323–346. http://doi.org/10.1007/s11218-008-9054-2

Cheung, C. M. K., Chiu, P.-Y., & Lee, M. K. O. (2011). Online social networks: Why do students use Facebook? *Computers in Human Behavior*, *27*(4), 1337–1343. http://doi.org/10.1016/j.chb.2010.07.028

Chien, A. A., & Karamcheti, V. (2013). Moore's Law: The First Ending and a New Beginning. *Computer*, *46*(12), 48–53. http://doi.org/10.1109/MC.2013.431

Christophel, D. M. (1990). The relationships among teacher immediacy behaviors, student motivation, and learning. *Communication Education*, *39*(4), 323–340.

Christophel, D. M., & Gorham, J. (1995). A test-retext analysis of student motivation, teacher immediacy, and perceived sources of motivation and demotivation in college classes. *Communication Education*, *44*(4), 292.

Clark, A. (1998). *Being there : Putting brain, body, and world together again*. Cambridge, Mass: MIT Press.

Clark, R. E. (1994). Media will never influence learning. *Educational Technology Research and Development*, *42*(2), 21–29.

Cobb, S. C. (2009). Social presence and online learning: A current view from a research perspective. *Journal of Interactive Online Learning*, *8*(3), 241–254.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New Jersey: Lawrence Erlbaum.

Crawford, C., & Persaud, C. (2013). Community colleges online. *Journal of College Teaching & Learning*, *10*(1), 75–82.

Creasey, G., Jarvis, P., & Gadke, D. (2009). Student Attachment Stances, Instructor Immediacy, and Student–Instructor Relationships as Predictors of Achievement Expectancies in College Students. *Journal of College Student Development*, *50*(4), 353–372. http://doi.org/10.1353/csd.0.0082

Croasmun, J. T. ., & Ostrom, L. (2011). Using Likert-Type Scales in the Social Sciences. *MPAEA Journal of Adult Education*, *40*(1), 19–22.

Cui, G., Lockee, B., & Meng, C. (2013). Building modern online social presence: A review of social presence theory and its instructional design implications for

future trends. *Education and Information Technologies*, *18*(4), 661–685. http://doi.org/10.1007/s10639-012-9192-1

Daft, R. L., & Lengel, R. H. (1986). Organizational Information Requirements, Media Richness and Structural Design. *Management Science*, *32*(5), 554–571.

Dewey, J. (1916). *Democracy and Education: An introduction to the Philosophy of Education.* New York, NY: The Macmillan Company.

Dillman, D. A. (2007). *Mail and internet surveys: The tailored design method* (2nd ed.). John Wiley & Sons Inc.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2008). *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method*. John Wiley & Sons.

Dunlap, J. C., & Lowenthal, P. R. (2009). Tweeting the Night Away: Using Twitter to Enhance Social Presence. *Journal of Information Systems Education*, *20*(2), 129–135.

Dunlap, J. C., & Lowenthal, P. R. (2014). The power of presence: Our quest for the right mix of social presence in online courses (in press). In A. A. Piña & A. P. Mizell (Eds.), *Real life distance education: Case studies in practice* (pp. 41–66). Greenwhich, CT: Information Age Publishing. Retrieved from http://patricklowenthal.com/publications/The_power_of_presence--our_quest_for_the_right_mix_of_social_presence_in_online_courses.pdf

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.

Elwood, S., McCaleb, K., Fernandez, M., & Keengwe, J. (2014). A theoretical framework and model towards media-rich social presence design practices. *Education and Information Technologies*, *19*(1), 239–249. http://doi.org/10.1007/s10639-012-9212-1

Fernandez, V., Simo, P., Sallan, J. M., & Enache, M. (2013). Evolution of online discussion forum richness according to channel expansion theory: A longitudinal panel data analysis. *Computers & Education*, *62*, 32–40. http://doi.org/10.1016/j.compedu.2012.10.020

Frary, R. B. (1996). Hints for Designing Effective Questionnaires. *Practical Assessment, Research & Evaluation*, *5*(3). Retrieved from http://pareonline.net/getvn.asp?v=5&n=3

Fricker, R. D., & Schonlau, M. (2002). Advantages and Disadvantages of Internet Research Surveys: Evidence from the Literature. *Field Methods*, *14*(4), 347–367. http://doi.org/10.1177/152582202237725

Garrison, D. R. (2009). Communities of inquiry in online learning. In P. Rogers, G. Berg, J. Boettcher, C. Howard, L. Justice, & K. Schenk (Eds.), *Encyclopedia of distance learning* (2nd ed., Vol. I, pp. 352–355). Hershey, PA: IGI Global.

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. http://doi.org/10.1016/S1096-7516(00)00016-6

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, *15*(1), 7–23. http://doi.org/10.1080/08923640109527071

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. http://doi.org/10.1016/j.iheduc.2007.04.001

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating Cognitive Presence in Online Learning: Interaction Is Not Enough. *American Journal of Distance Education*, *19*(3), 133–148. http://doi.org/10.1207/s15389286ajde1903_2

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. *The Internet and Higher Education*, *13*(1–2), 31–36. http://doi.org/10.1016/j.iheduc.2009.10.002

Garrison, J. (1999). John Dewey's Theory of Practical Reasoning. *Educational Philosophy and Theory*, *31*(3), 291–312. http://doi.org/10.1111/j.1469-5812.1999.tb00467.x

Garson, G. D. (Ed.). (2013). *Hierarchical Linear Modeling: Guide and Applications*. Thousand Oaks, California: SAGE.

Giesbers, B., Rienties, B., Gijselaers, W. H., Segers, M., & Tempelaar, D. T. (2009). Social presence, Web videoconferencing and learning in virtual teams. *Industry and Higher Education*, *23*(4), 301–309. http://doi.org/10.5367/000000009789346185

Ginder, S. (2014). *Enrollment in Distance Education Courses, by State: Fall 2012* (No. NCES 2014023). U.S. Department of Education. Retrieved from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014023

Glazer, H. R., & Wanstreet, C. E. (2011). Connection to the academic community: Perceptions of Students in Online Education. *Quarterly Review of Distance Education*, *12*(1), 55–62.

Goleman, D. (2012). *Emotional Intelligence: 10th Anniversary Edition*. Random House Publishing Group.

Gorham, J. (1988). The relationship between verbal teacher immediacy behaviors and student learning. *Communication Education*, *37*(1), 40–53.

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.

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. http://doi.org/10.1080/08923649709526970

Hall, K. D. (2008). *Discussion forum versus learning blogs: a comparison of student understanding, student interaction, and social presence* (Ed.D.). Texas Tech University. Retrieved from http://repositories.tdl.org/ttu-ir/handle/2346/11878

Hattie, J. (1999, August). *Influences on student learning*. Inaugural address presented at the Inaugural address, University of Auckland. Retrieved from http://www.education.auckland.ac.nz/webdav/site/education/shared/hattie/docs/influences-on-student-learning.pdf

Herring, S. C. (2004). Computer-mediated discourse analysis: An approach to researching online communities. In S. A. Barab, R. Kling, & J. H. Gray (Eds.), *Designing for virtual communities in the service of learning* (pp. 338–376). New York: Cambridge University Press.

HLM - Hierarchical Linear and Nonlinear Modeling. (2013). (Version 7.01). Skokie, IL: Scientific Software International, Inc. Retrieved from http://www.ssicentral.com/hlm/

Hogan, R. L., & McKnight, M. A. (2007). Exploring burnout among university online instructors: An initial investigation. *The Internet and Higher Education*, *10*(2), 117–124. http://doi.org/10.1016/j.iheduc.2007.03.001

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. http://doi.org/10.1016/j.chb.2007.02.009

Hoskins, B. J. (2012). Connections, Engagement, and Presence. *The Journal of Continuing Higher Education*, *60*(1), 51–53. http://doi.org/10.1080/07377363.2012.650573

Hostetter, C., & Busch, M. (2006). Measuring up Online: The Relationship between Social Presence and Student Learning Satisfaction. *Journal of Scholarship of Teaching and Learning*, *6*(2), 1–12.

Hostetter, C., & Busch, M. (2013). Community matters: Social presence and learning outcomes. *Journal of the Scholarship of Teaching and Learning*, *13*(1), 77–86.

Hrastinski, S. (2008). The potential of synchronous communication to enhance participation in online discussions: A case study of two e-learning courses. *Information & Management*, *45*(7), 499–506. http://doi.org/10.1016/j.im.2008.07.005

Hrastinski, S., Keller, C., & Carlsson, S. A. (2010). Design exemplars for synchronous e-learning: A design theory approach. *Computers & Education*, *55*(2), 652–662. http://doi.org/10.1016/j.compedu.2010.02.025

Huett, J. B., Moller, L. A., Harvey, D., & Engstrom, M. E. (2007). Examining the use of learning communities to increase motivation. In R. Luppicini (Ed.), *Online learning communities* (pp. 189–203).

IBM SPSS Statistics for Windows. (2013). (Version 22.0.0.0). Armonk, NY: IBM Corp. Retrieved from http://www-01.ibm.com/software/analytics/spss/

Ice, P., Curtis, R., Phillips, P., & Wells, J. (2007). Using Asynchronous Audio Feedback to Enhance Teaching Presence and Students' Sense of Community. *Journal of Asynchronous Learning Networks*, *11*(2), 3–25.

Kear, K. (2010). Social presence in online learning communities. Presented at the Proceedings of the 7th International Conference on Networked Learning 2010,

Aalborg, Denmark. Retrieved from http://www.networkedlearningconference.org.uk/

Keegan, D. J. (1980). On defining distance education. *Distance Education*, *1*(1), 13–36.

Kehrwald, B. (2008). Understanding social presence in text-based online learning environments. *Distance Education*, *29*(1), 89–106. http://doi.org/10.1080/01587910802004860

Kerry, S. M., & Bland, J. M. (1998). Statistics Notes: The Intracluster Correlation Coefficient in Cluster Randomisation. *BMJ: British Medical Journal*, *316*(7142), 1455. http://doi.org/10.2307/25179150

Kiliç Çakmak, E., Çebi, A., & Kan, A. (2014). Developing a "Social Presence Scale" for E-learning Environments. *Educational Sciences: Theory & Practice*, *14*(2), 10–14. http://doi.org/10.12738/estp.2014.2.1847

Kim, J. (2011). Developing an instrument to measure social presence in distance higher education. *British Journal of Educational Technology*, *42*(5), 763–777. http://doi.org/10.1111/j.1467-8535.2010.01107.x

Kim, J., Kwon, Y., & Cho, D. (2011). Investigating factors that influence social presence and learning outcomes in distance higher education. *Computers & Education*, *57*(2), 1512–1520. http://doi.org/10.1016/j.compedu.2011.02.005

Kozma, R. B. (1994). Will media influence learning? Reframing the debate. *Educational Technology Research and Development*, *42*(2), 7–19.

Kreijns, K., Kirschner, P. A., Jochems, W., & Buuren, H. van. (2011). Measuring perceived social presence in distributed learning groups. *Education and*

Information Technologies, *16*(4), 365–381. http://doi.org/10.1007/s10639-010-9135-7

Kuhn, T. S. (2012). *The Structure of Scientific Revolutions: 50th Anniversary Edition*. University of Chicago Press.

Kurzweil, R. (2005). *The Singularity Is Near: When Humans Transcend Biology*. Penguin.

Laffey, J., Lin, G. Y., & Lin, Y. (2006). Assessing social ability in online learning environments. *Journal of Interactive Learning Research*, *17*(2), 163+.

Lave, J., & Wenger, E. (1991). *Situated learning : legitimate peripheral participation*. Cambridge England ; New York: Cambridge University Press.

Lee, K. M. (2004). Presence, Explicated. *Communication Theory*, *14*(1), 27–50. http://doi.org/10.1111/j.1468-2885.2004.tb00302.x

Lee, S.-M. (2014). The relationships between higher order thinking skills, cognitive density, and social presence in online learning. *The Internet and Higher Education*, *21*, 41–52. http://doi.org/10.1016/j.iheduc.2013.12.002

Lengel, R. H., & Daft, R. L. (1984). *An Exploratory Analysis of the Relationship between Media Richness and Managerial Information Processing*. Retrieved from http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA143503

Leong, P. (2011). Role of social presence and cognitive absorption in online learning environments. *Distance Education*, *32*(1), 5–28. http://doi.org/10.1080/01587919.2011.565495

List of most popular websites. (2014, December 21). In *Wikipedia, the free encyclopedia*. Wikimedia Fouancation, Inc. Retrieved from http://en.wikipedia.org/w/index.php?title=List_of_most_popular_websites&oldid=638445052

Liu, S. Y. (2007). *Community college online course retention and grade predictors* (Ed.D.). The George Washington University, United States -- District of Columbia.

Liu, S. Y., Gomez, J., & Yen, C.-J. (2009). Community college online course retention and final grade: Predictability of social presence. *Journal of Interactive Online Learning*, *8*(2), 165–182.

Lombard, M., & Ditton, T. (1997). At the Heart of It All: The Concept of Presence. *Journal of Computer-Mediated Communication*, *3*(2), 0–0. http://doi.org/10.1111/j.1083-6101.1997.tb00072.x

Lowendahl, J.-M. (2013, July 25). Hype Cycle for Education, 2013. Retrieved from Gartner Database.

Lowenthal, P. R. (2010). The Evolution and Influence of Social Presence Theory on Online Learning. In S. Dasgupta (Ed.), *Social Computing: Concepts, Methodologies, Tools, and Applications* (pp. 124–139). IGI Global. Retrieved from http://www.igi-global.com

Luke, D. A. (2004). *Multilevel modeling: Quantitative applications in the social sciences*. Thousand Oaks, California: SAGE Publications. Retrieved from http://www.sagepublications.com/

Mayne, L., A., & Wu, Q. (2011). Creating and Measuring Social Presence in Online Graduate Nursing Courses. *Nursing Education Perspectives*, *32*(2), 110–114. http://doi.org/10.5480/1536-5026-32.2.110

Mehrabian, A. (1967). Attitudes inferred from non-immediacy of verbal communications. *Journal of Verbal Learning and Verbal Behavior*, *6*(2), 294–295. http://doi.org/10.1016/S0022-5371(67)80113-0

Melrose, S. (2009). Instructional immediacy online. In P. Rogers, G. Berg, J. Boettcher, C. Howard, L. Justice, & K. Schenk (Eds.), *Encyclopedia of Distance Learning* (2nd ed., Vol. III, pp. 1212–1215). Hershey, PA: Information Science Reference. Retrieved from http://auspace.athabascau.ca/handle/2149/2316

Miller, C., & Doering, A. (Eds.). (2014). *The new landscape of mobile learning : redesigning education in an app-based world*. New York, New York ; Oxfordshire, England: Routledge. Retrieved from http://www.routledge.com/books/details/9780415539241/

Mlodinow, L. (2013). *Subliminal: How Your Unconscious Mind Rules Your Behavior* (Reprint edition). New York: Vintage.

Moody, J. (2004). Distance Education: Why Are the Attrition Rates so High? *Quarterly Review of Distance Education*, *5*(3), 205–210.

Moore, G. B. (1965, April 19). Cramming More Components onto Integrated Circuits. *Electronics Magazine*, *38*(8). Retrieved from http://www.computerhistory.org/semiconductor/timeline/1965-Moore.html

Moore, M. G. (1972). Learner autonomy: The second dimension of independent learning. *Convergence*, *5*(2), 76–88.

Moore, M. G. (1973). Toward a Theory of Independent Learning and Teaching. *The Journal of Higher Education*, *44*(9), 661–679. http://doi.org/10.2307/1980599

Moore, M. G. (2007). The theory of transactional distance. In M. G. Moore (Ed.), *Handbook of distance education* (2nd ed., pp. 89–105). Mahweh, New Jersey: Lawrence Erlbaum Associates.

Moore, M. G., & Kearsley, G. (2005). *Distance education: A systems view* (2nd ed.). Belmont, California: Thomson Wadsworth.

Morton, S. T. (1993). *Socialization-related learning, job satisfaction, and commitment for new employees in a federal agency* (Ed.D.). Virginia Polytechnic Institute and State University, United States -- Virginia.

Murphrey, T. P., Arnold, S., Foster, B., & Degenhart, S. H. (2012). Verbal immediacy and audio/video technology use in online course delivery: what do university agricultural education students think? *Journal of Agricultural Education*, *53*(3), 14+.

Ngoyi, L., Mpanga, S., & Ngoyi, A. (2014). The Relationship between Student Engagement and Social Presence in Online Learning. *International Journal of Advances in Computer Science and Technology*, *3*(4), 242–247.

Noer, M. (2012). Reeducating Education. *Forbes*, *190*(9), 84–100.

Nowotny, H. (2001). *Re-thinking science : knowledge and the public in an age of uncertainty*. Cambridge: Polity: Malden, Mass.

Optimal Design Software for Multi-level and Longitudinal Research. (2011). (Version 3.01). Retrieved from http://www.wtgrantfoundation.org/resources/optimal-design

O'Reilly, L. (2014, December 9). Facebook Video Is Driving YouTube Off Facebook. Retrieved April 28, 2015, from http://www.businessinsider.com/facebook-video-v-youtube-market-share-data-2014-12

O'Reilly, T. (2007). *What is Web 2.0: Design Patterns and Business Models for the Next Generation of Software* (SSRN Scholarly Paper No. ID 1008839). Rochester, NY: Social Science Research Network. Retrieved from http://papers.ssrn.com/abstract=1008839

Osborne, J. W. (2000). Advantages of hierarchical linear modeling. *Practical Assessment, Research & Evaluation*, *7*(1). Retrieved from http://PAREonline.net/

Oztok, M., Zingaro, D., & Makos, A. (2013). What social capital can tell us about social presence. *British Journal of Educational Technology*, *44*(6), E203–E206. http://doi.org/10.1111/bjet.12079

Parker, J. (2010). The Online Adult Learner: Profiles and Practices. In T. T. Kidd (Ed.), *Online Education and Adult Learning: New Frontiers for Teaching Practices* (pp. 1–10). Hershey, PA: IGI Global. Retrieved from http://www.igi-global.com/reference

Parsad, B., & Lewis, L. (2009). *Distance education at degree-granting postsecondary distance education at degree-granting postsecondary institutions: 2006–07*.

Washington, DC: US Department of Education. Retrieved from http://nces.ed.gov/pubs2009/2009044.pdf

Pelowski, S., Frissell, L., Cabral, K., & Yu, T. (2005). So far but yet so close: student chat room immediacy, learning, and performance in an online course. *Journal of Interactive Learning Research*, *16*(4), 395–407.

Pozzi, F. (2009). Evaluating the Social Dimension in Online Learning Communities. In A. A. Ozok & P. Zaphiris (Eds.), *Online Communities and Social Computing* (pp. 498–506). Springer Berlin Heidelberg.

Qualtrics Research Suite. (2013). Provo, Utah. Retrieved from http://www.qualtrics.com

Reio, T. G., & Crim, S. J. (2013). Social Presence and Student Satisfaction as Predictors of Online Enrollment Intent. *American Journal of Distance Education*, *27*(2), 122–133. http://doi.org/10.1080/08923647.2013.775801

Remesal, A., & Colomina, R. (2013). Social presence and online collaborative small group work: A socioconstructivist account. *Computers & Education*, *60*(1), 357–367. http://doi.org/10.1016/j.compedu.2012.07.009

Resnais, A. (1980). *My American Uncle (Mon oncle d'Amérique)*. Gaumont.

Richardson, J. C., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, *7*(1), 68–88.

Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (1999). Assessing Social Presence In Asynchronous Text-based Computer Conferencing. *International Journal of E-Learning & Distance Education*, *14*(2), 50–71.

Rovai, A. P. (2000). Building and sustaining community in asynchronous learning networks. *The Internet and Higher Education*, *3*(4), 285–297. http://doi.org/10.1016/S1096-7516(01)00037-9

Rovai, A. P. (2002a). Building Sense of Community at a Distance. *The International Review of Research in Open and Distance Learning*, *3*(1), 1–16.

Rovai, A. P. (2002b). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *The Internet and Higher Education*, *5*(4), 319–332. http://doi.org/10.1016/S1096-7516(02)00130-6

Rovai, A. P., & Downey, J. R. (2010). Why some distance education programs fail while others succeed in a global environment. *The Internet and Higher Education*, *13*(3), 141–147. http://doi.org/10.1016/j.iheduc.2009.07.001

Rovai, A. P., Wighting, M. J., & Lucking, R. (2004). The Classroom and School Community Inventory: Development, refinement, and validation of a self-report measure for educational research. *The Internet and Higher Education*, *7*(4), 263–280. http://doi.org/10.1016/j.iheduc.2004.09.001

Russo, T., & Benson, S. (2005). Learning with Invisible Others: Perceptions of Online Presence and their Relationship to Cognitive and Affective Learning. *Journal of Educational Technology & Society*, *8*(1), 54–62.

Rutter, D. R. (1984). *Looking and seeing : the role of visual communication in social interaction*. Chichester ; New York: Wiley.

Rutter, D. R., Pennington, D. C., Dewey, M. E., & Swain, J. (1984). Eye-contact as a chance product of individual looking: Implications for the intimacy model of

argyle and dean. *Journal of Nonverbal Behavior*, *8*(4), 250–258. http://doi.org/10.1007/BF00985982

Schonlau, M., Fricker, R. D., & Elliott, M. N. (2002). *Conducting Research Surveys via E-mail and the Web* (e-pub). Santa Monica, CA: RAND Corporation. Retrieved from http://www.rand.org/pubs/monograph_reports/MR1480.html

Shen, K. N., Yu, A. Y., & Khalifa, M. (2010). Knowledge contribution in virtual communities: accounting for multiple dimensions of social presence through social identity. *Behaviour & Information Technology*, *29*(4), 337–348. http://doi.org/10.1080/01449290903156622

Shih, T.-H., & Fan, X. (2008). Comparing Response Rates from Web and Mail Surveys: A Meta-Analysis. *Field Methods*, *20*(3), 249–271. http://doi.org/10.1177/1525822X08317085

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. London ; New York: Wiley.

Small, G., & Vorgan, G. (2009). *iBrain: Surviving the Technological Alteration of the Modern Mind* (1st edition). New York: William Morrow Paperbacks.

Smith, D. (2015, March 25). Here's one big reason Google needs to worry about Facebook. Retrieved April 28, 2015, from http://www.businessinsider.com/one-big-reason-google-needs-to-worry-about-facebook-2015-3

So, H.-J., & Brush, T. A. (2008). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and

critical factors. *Computers & Education*, *51*(1), 318–336. http://doi.org/10.1016/j.compedu.2007.05.009

Sprecher, S. (2014). Initial interactions online-text, online-audio, online-video, or face-to-face: Effects of modality on liking, closeness, and other interpersonal outcomes. *Computers in Human Behavior*, *31*, 190–197. http://doi.org/10.1016/j.chb.2013.10.029

Stephan, E., Liberman, N., & Trope, Y. (2010). Politeness and psychological distance: A construal level perspective. *Journal of Personality and Social Psychology*, *98*(2), 268–280. http://doi.org/10.1037/a0016960

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+.

Szeto, E., & Cheng, A. Y. N. (2014). Towards a framework of interactions in a blended synchronous learning environment: what effects are there on students' social presence experience? *Interactive Learning Environments*, *22*(1), 1–17. http://doi.org/10.1080/10494820.2014.881391

Tallman, F. D. (1994). Satisfaction and completion in correspondence study: The influence of instructional and student-support services. *American Journal of Distance Education*, *8*(2), 43–57. http://doi.org/10.1080/08923649409526854

The Trust Engineers. (2015). [Podcast article]. Radio Lab. Retrieved from http://www.radiolab.org/story/trust-engineers/

Trowler, P., Saunders, M., & Bamber, V. (Eds.). (2012). *Tribes and territories in the 21st century: Rethinking the significance of disciplines in higher education*. New York, NY: Routledge.

Tu, C.-H. (2000). On-line learning migration: from social learning theory to social presence theory in a CMC environment. *Journal of Network and Computer Applications*, *23*(1), 27–37. http://doi.org/10.1006/jnca.1999.0099

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. *American Journal of Distance Education*, *16*(3), 131–150. http://doi.org/10.1207/S15389286AJDE1603_2

Turkle, S. (2011). *Alone together : Why we expect more from technology and less from each other*. New York: Basic Books.

Walther, J. B. (1992). Interpersonal Effects in Computer-Mediated Interaction A Relational Perspective. *Communication Research*, *19*(1), 52–90. http://doi.org/10.1177/009365092019001003

Walther, J. B. (1996). Computer-Mediated Communication Impersonal, Interpersonal, and Hyperpersonal Interaction. *Communication Research*, *23*(1), 3–43. http://doi.org/10.1177/009365096023001001

Walther, J. B. (2007). Selective self-presentation in computer-mediated communication: Hyperpersonal dimensions of technology, language, and cognition. *Computers in Human Behavior*, *23*(5), 2538–2557. http://doi.org/10.1016/j.chb.2006.05.002

Weinberg, G. M. (2001). *An Introduction to General Systems Thinking (25th Anniversary Edition)* (25 Anv edition). New York: Dorset House.

Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity*. Cambridge University Press.

Wiener, M., & Mehrabian, A. (1968). *Language Within Language: Immediacy, a Channel in Verbal Communication*. Ardent Media.

Wilson, E. O. (1999). *Consilience: The Unity of Knowledge*. Vintage Books.

Wise, A., Chang, J., Duffy, T., & Valle, R. D. (2004). The Effects of Teacher Social Presence on Student Satisfaction, Engagement, and Learning. *Journal of Educational Computing Research*, *31*(3), 247–271.

Woltman, H., Feldstain, A., MacKay, J. C., & Rocchi, M. (2012). An introduction to hierarchical linear modeling. *Tutorials in Quantitative Methods for Psychology*, *8*(1), 52–69.

Xin, C. (2012). A Critique of the Community of Inquiry Framework. *International Journal of E-Learning & Distance Education*, *26*(1). Retrieved from http://www.ijede.ca/index.php/jde/article/view/755

Appendix A: Definition of Terms

Asynchronous: Within online learning situations, asynchronous means when interactions occur with delays in time. For example, when online learners access information at any time and communicate with others in a delayed communication format this is referred to as asynchronous (Parker, 2010). In addition, the feature of being asynchronous is frequently attributed or categorized to certain technologies. For example, discussion boards are typically viewed as 'asynchronous' technologies, because there is usually a greater delay between messages, whereas text chat is considered more synchronous in nature. See also Synchronous.

Attrition: Attrition is the decrease in the number of students involved in course activities or a degree program (Angelino, Williams, & Natvig, 2007). Attrition can occur at the course level, such as dropping a course. It can also occur at the program or the institutional level, such as when students leave a program or an institution. Attrition is frequently attributed to being a problem of quality (Moody, 2004), be it the course, program or institution.

Community of Inquiry: A community of inquiry (T. Anderson et al., 2001; D. R. Garrison et al., 2000) is pedagogical model consisting of three overlapping elements situated within a community-oriented context; one of which is social presence. The other two elements are cognitive presence and teaching presence.

Consilience: Consilience refers to the 'jumping together' of knowledge through the linking of facts and fact-based theory across disciplines towards creating a common groundwork for explanation (Wilson, 1999). It urges the joining of knowledge between

diverse disciplinary silos. Consilience aligns well with Mode 2 research (Nowotny, 2001) which is also transdisciplinary in nature.

Cuelessness Theory: Cuelessness theory (Rutter, 1984; Rutter et al., 1984) was developed around the same time as social presence theory. Rutter argued that intimacy in communication was based on a wide range of social cues. Essentially, the more access to a greater number of cues (e.g., face-to-face communication) the less the psychological distance between people.

Distance Education: Distance education has been defined as a system consisting of the component processes that accompany teaching and learning at a distance, including learning, teaching, communication, design and management (M. G. Moore & Kearsley, 2005). A more recent definition of distance education is an education which uses technologies to deliver instruction to students who are separated from the instructor and which aids in the support of regular and substantive interaction between students and the instructor in both synchronous or asynchronous ways (Ginder, 2014).

Hybrid Course: A hybrid course combines both online and face-to-face instruction in the delivery of the course. The percentage of online and face-to-face (F2F) interaction can vary. Some programs draw a distinction among completely online, primarily online and partially online courses, as a way to indicate the degree of course 'hybridity.' Hybrid courses are sometimes also called blended courses.

Immediacy: Immediacy is one element of the social presence model. The other is technology. Immediacy is classically referred to as the perceived physical and/or psychological closeness between people (Mehrabian, 1967). Immediacy may be both

verbal and non-verbal. See also the definitions for Instructor Immediacy Behaviors and Social Presence, as well as the topic of immediacy.

Instructor Immediacy Behaviors: Instructor immediacy behaviors are verbal and non-verbal actions which instructors produce or exhibit and which students perceive or observe. Verbal behaviors are actions which are typically said or written, e.g. choice of words. Non-verbal behaviors are things which are observed or sensed, e.g. tone of voice or gestures.

Media Richness Theory: Media richness theory (Daft & Lengel, 1986; Lengel & Daft, 1984) states that communication media influence the information richness of a message. In the theory, face-to-face communication had the highest richness, then telephone communication, then personal (informal) writing, then formal writing, and finally, numeric output (e.g., computers).

Modality: Modality refers to the format or form or the way something exists or is observed in nature. In this study, modality typically refers to the technology modality. For example, modality may refer to the nature of the technology, such as text, audio or video (or a combination thereof) and/or whether it is synchronous or asynchronous.

MOOC: The term stands for Massive Open Online Course. Typically, MOOCs are offered online, without charge, to large numbers of participants. Many participants are not registered at the hosting institution, and there is generally no official educational credit given for completing a MOOC. Consequently, there is increasing concern about credentials for MOOC completion causing concerns regarding legitimacy of higher education degrees (I. E. Allen & Seaman, 2014).

Online Course: One notable source defines an online course as one where 80% to 100% percent of the course content is delivered online, typically without any face-to-face meetings (I. E. Allen & Seaman, 2014). However, for the purposes of this study's participants, only courses with 100% of course is conducted online are considered online courses. See also Hybrid Course.

Persistence: Persistence in this paper refers to a student's continuation in a program, course or institution. It is a similar construct to retention, mentioned earlier, except that the focus with persistence is on completion or future intended persistence in a program or at an institution. It may also be thought of in opposition to attrition or exit from a course, program or institution.

Retention: Retention in this study refers to the students remaining enrolled to the end of a course, a degree, a program or an institution. It is sometimes also referred to as persistence.

Social Information Processing Theory: Social information processing theory takes a stance regarding media utilization, in that, people essentially finds ways to use media to convey their presence to others and find ways around limitations in media (Walther, 1992, 1996).

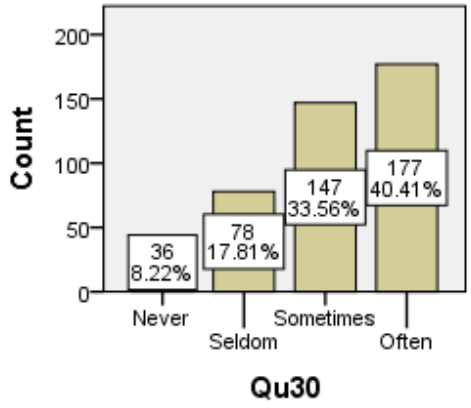
Social Presence Theory: Social presence was originally defined as "the degree of salience of the other person in an interaction and the consequent salience of the interpersonal relationships" (Short et al., 1976, p. 65), but is more currently investigated as the interactions between people in online environments. More information about this theory is presented in the literature review in Chapter 2.

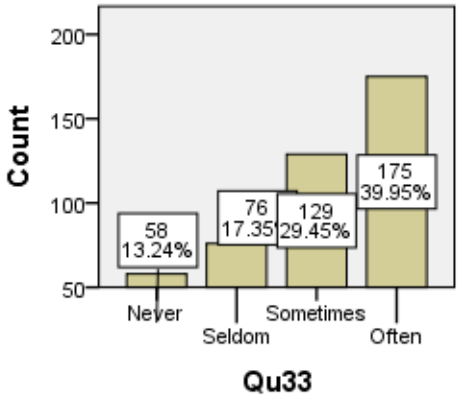
Synchronous: In this study, synchronous technology modality is in contrast to asynchronous modality. For example, asynchronous interactions are time-lagged. Synchronous means actions or feedback performed in real-time, such as when a person is web conferencing with someone.

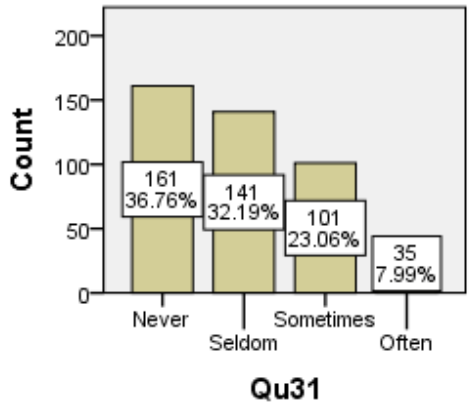
Theory of Transactional Distance: The theory of transactional distance has been successfully implemented in distance teaching and focuses on the psychological distance between people in learning situations and assumes that people are separated by geographical distance (M. G. Moore, 2007), making it especially relevant in distance education.

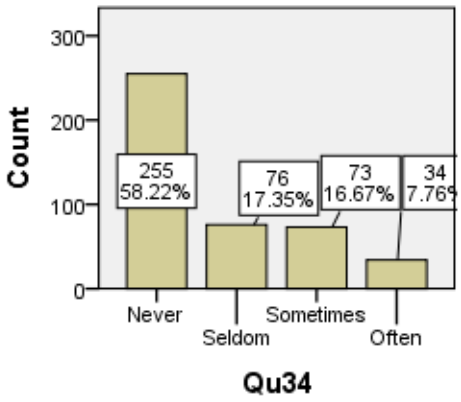
Web 2.0: Web 1.0 was the first version of the Internet and Web 2.0 was the next version. Web 2.0 is characterized by user-generated content. It harnesses collective intelligence through user-generated content. It is focused on services with cost-effective scalability. It harnesses the power of multiple devices and apps through lightweight user interfaces, development models and business models. See O'Reilly (2007) for reference.

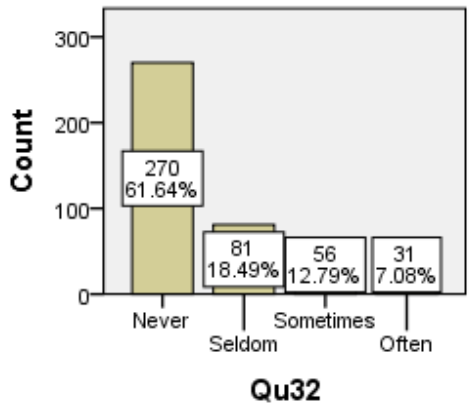
Asynchronous Text

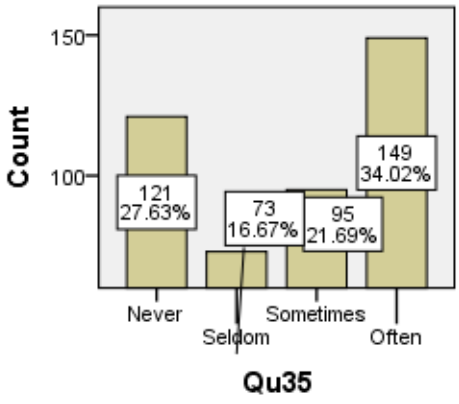












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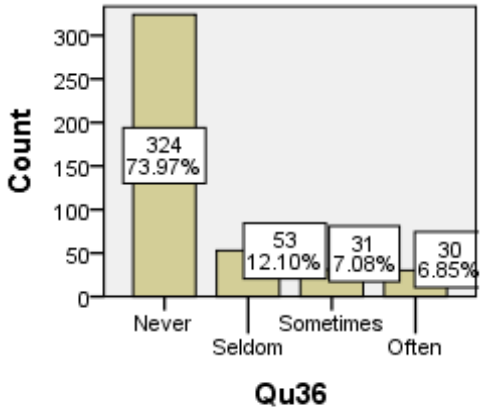

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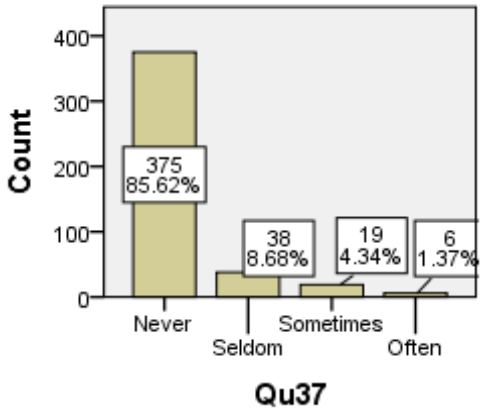

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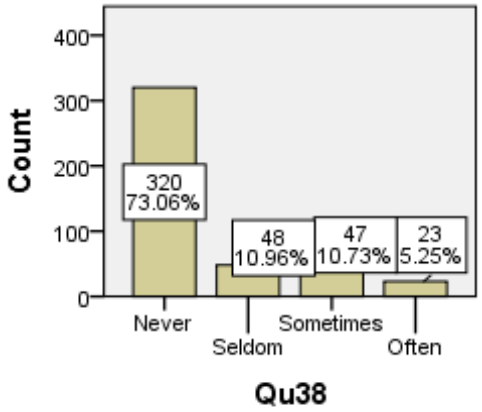

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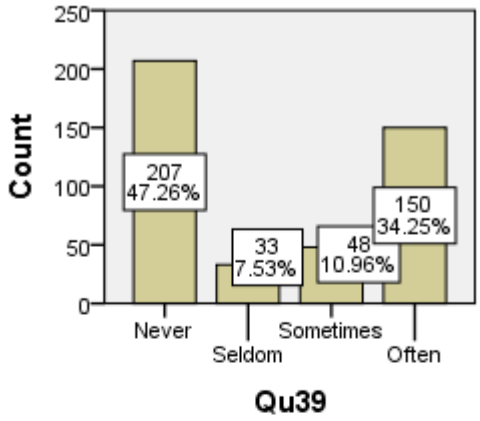

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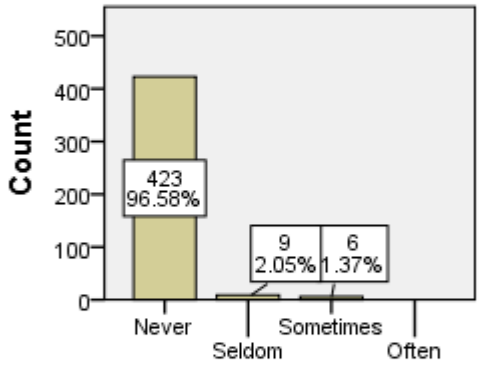

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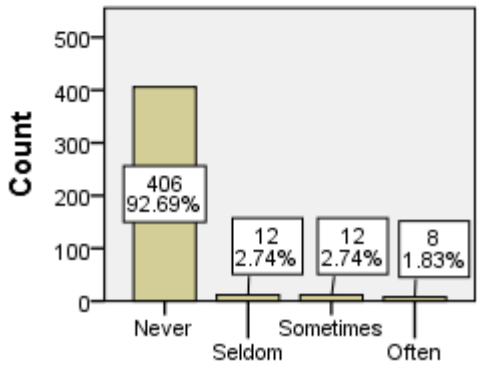

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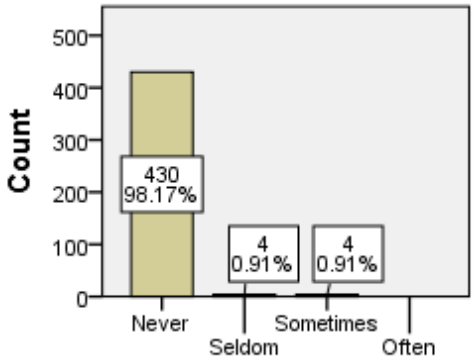

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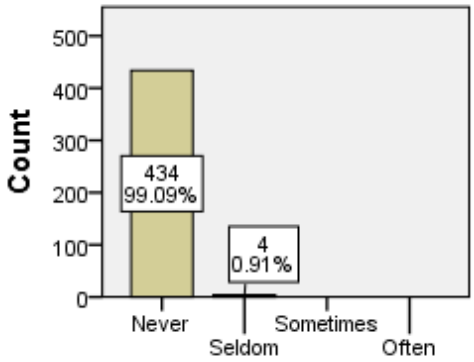

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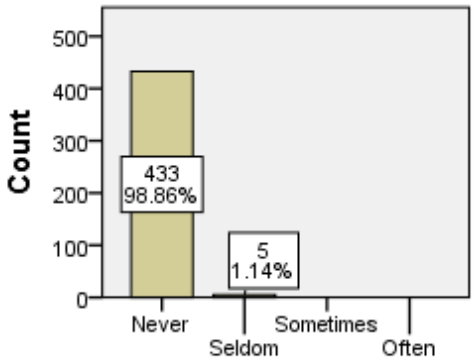

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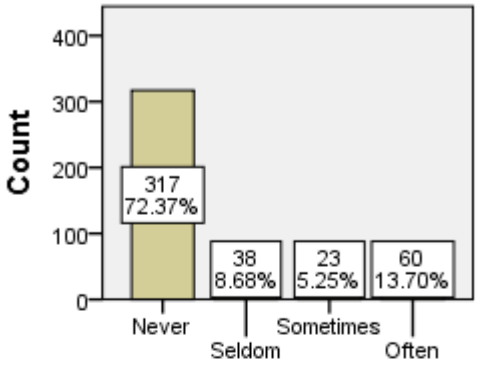

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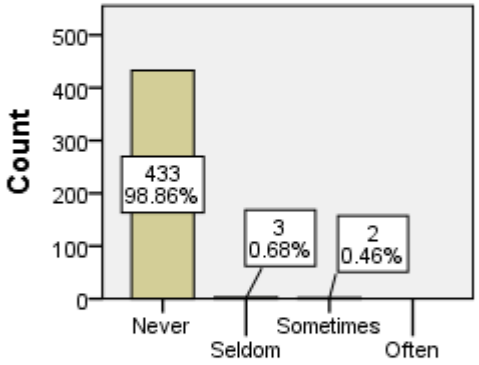

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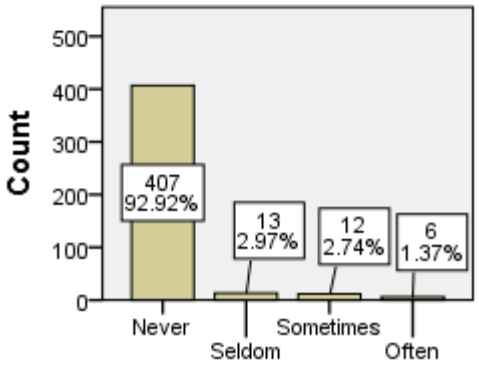

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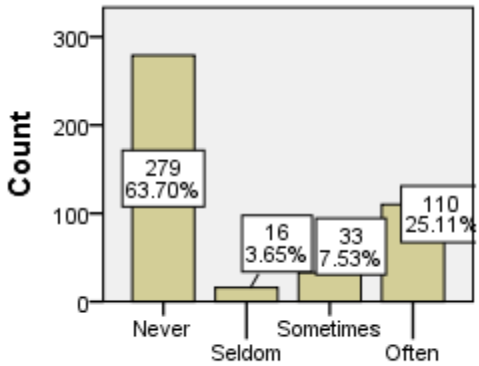

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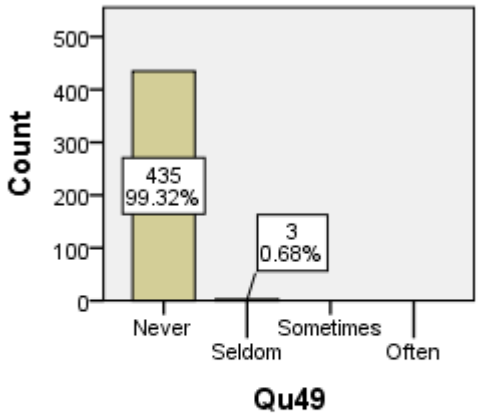

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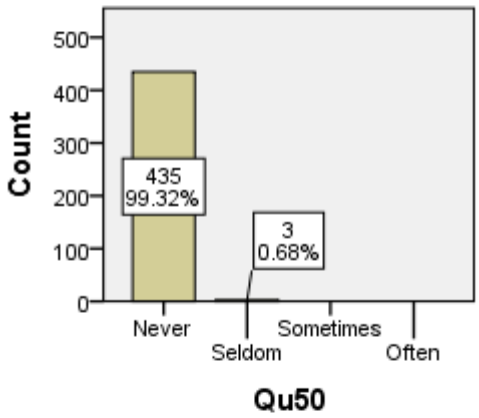

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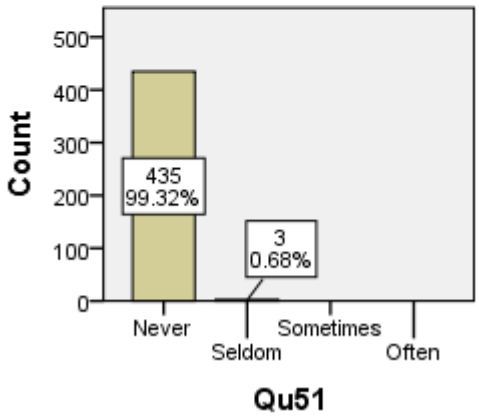

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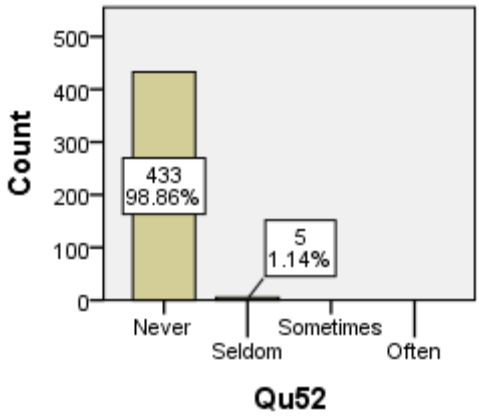

Qu52

Appendix C: Survey

1 Including this course (${e://Field/Course%20Number}), how many completely online courses have you participated in at the college level in total?

- 1 (only this course)
- 2
- 3
- 4 or more

2 Overall, how satisfied or dissatisfied are you with your learning experience in this course?

Very Dissatisfied	Dissatisfied	Satisfied	Very Satisfied
○	○	○	○

3 How frequently did you interact with other students in the course?

Never	Seldom	Sometimes	Often
○	○	○	○

4 Given the opportunity, what is the chance you would enroll in more online courses in the future?

No Chance	Very Little Chance	Some Chance	Very Good Chance
○	○	○	○

Personal Interactions

We'd like to know how you perceived personal interactions with others in the course. The following questions will ask you how much you agree or disagree with a given statement.

Your voice is important; so please answer the questions as honestly as you can by reflecting upon your real experience in this one course **${e://Field/Course%20Number}.**

5 The instructor shared personal examples about experiences he/she has had outside of the course.

Strongly Disagree | Disagree | Agree | Strongly Agree

6 I felt comfortable interacting with other students in the course.

Strongly Disagree | Disagree | Agree | Strongly Agree

7 The instructor felt real to me.

Strongly Disagree | Disagree | Agree | Strongly Agree

8 The instructor communicated with us as a class on a regular basis.

Strongly Disagree | Disagree | Agree | Strongly Agree

9 The instructor encouraged students to share their own views.

Strongly Disagree | Disagree | Agree | Strongly Agree

10 I felt other students in the course respected my views.

Strongly Disagree | Disagree | Agree | Strongly Agree

11 The instructor used humor in the course.

Strongly Disagree | Disagree | Agree | Strongly Agree

12 The instructor provided feedback in a timely way.

Strongly Disagree | Disagree | Agree | Strongly Agree

13 The instructor made it feel okay if I did not have the right answer.

Strongly Disagree | Disagree | Agree | Strongly Agree

14 The instructor was interested in me as a person, not just as a student.

Strongly Disagree | Disagree | Agree | Strongly Agree

15 The instructor treated me fairly.

Strongly Disagree | Disagree | Agree | Strongly Agree

16 The instructor asked the class how we felt about an assignments, due dates or discussion topics.

Strongly Disagree | Disagree | Agree | Strongly Agree

17 I enjoyed interacting with the instructor.

Strongly Disagree | Disagree | Agree | Strongly Agree

18 The instructor asked questions to solicit multiple viewpoints from everyone in the course.

Strongly Disagree | Disagree | Agree | Strongly Agree

19 Other students in the course felt real to me.

Strongly Disagree | Disagree | Agree | Strongly Agree

20 The instructor praised students generously.

Strongly Disagree | Disagree | Agree | Strongly Agree

21 The instructor referred to the class as "our" class or what "we" were doing.

Strongly Disagree | Disagree | Agree | Strongly Agree

22 I addressed my instructor by his/her first name.

Strongly Disagree | Disagree | Agree | Strongly Agree

23 The instructor gave me useful feedback on my individual course work.

Strongly Disagree	Disagree	Agree	Strongly Agree
○	○	○	○

24 I enjoyed interacting with other students in the course.

Strongly Disagree	Disagree	Agree	Strongly Agree
○	○	○	○

25 The instructor was there for me if I needed him/her.

Strongly Disagree	Disagree	Agree	Strongly Agree
○	○	○	○

Technology

The following questions ask you about the frequency you experienced various kinds of technology in the course.

Please answer the questions by reflecting upon your true experience in this one course ${e://Field/Course%20Number}.

With what frequency did your instructor use any of the below items as part of the course?

		Never	Seldom	Sometimes	Often
26	Online Files (e.g. PPTs, PDFs, Word documents, etc.)	○	○	○	○
27	Online Grade Book	○	○	○	○
28	Online Assignments	○	○	○	○
29	Online Quizzes	○	○	○	○

With what frequency did you experience any of the below TEXT activities as part of the course?

		Never	Seldom	Sometimes	Often
30	Email messages from the instructor to the whole class	○	○	○	○
31	Email messages from the instructor to you personally	○	○	○	○
32	Email messages between you and other students	○	○	○	○
33	Instructor discussion postings to the whole class	○	○	○	○
34	Instructor discussion postings to you personally	○	○	○	○
35	Discussion postings between you and other students	○	○	○	○
36	Instructor-led text chats with the **whole class**	○	○	○	○
37	Instructor text chats with **you personally**	○	○	○	○
38	Text chats between you and **other students**	○	○	○	○

With what frequency did you experience any of the below AUDIO activities as part of the course?

		Never	Seldom	Sometimes	Often
39	Recorded voice-only broadcasts of instructor to the whole class	○	○	○	○
40	Recorded voice-only messages from the instructor to you personally	○	○	○	○
41	Recorded voices of other students	○	○	○	○
42	**Live, real-time** audio-only broadcast of	○	○	○	○

	instructor to the **whole class**				
43	**Live, real-time** audio conversations with the instructor and **you** personally	○	○	○	○
44	**Live, real-time** audio conversations with **other students**	○	○	○	○

With what frequency did you experience any of the below VIDEO activities as part of the course?

		Never	Seldom	Sometimes	Often
45	Recorded video of instructor to the whole class	○	○	○	○
46	Recorded video of instructor to you personally	○	○	○	○
47	Recorded video of other students	○	○	○	○
48	Recorded video of instructor's computer (e.g. PPT, computer screen, etc.)	○	○	○	○
49	**Live, real-time** video of instructor to the **whole class**	○	○	○	○
50	**Live, real-time** video with instructor and **you** personally	○	○	○	○
51	**Live, real-time** video of other students	○	○	○	○
52	**Live, real-time** video of instructor's computer (e.g. PPT, computer screen, etc.)	○	○	○	○

Demographics

To help us better understand responses from a variety students studying online courses like yours, we would appreciate some personal information about you. Again, your answers will not be linked to you in any way and will be used for comparative purposes

53 If you needed to register for a traditional face-to-face course, which schedule would be the MOST convenient for you?

- ○ Most anytime
- ○ Daytime, week days
- ○ Evenings, week days
- ○ Weekends
- ○ There really is no convenient time for me

54 If this course had originally been offered in a variety of formats, which one would have been your strongest preference?

- ○ Completely face-to-face
- ○ Partially online
- ○ Completely online

55 Have you taken other courses taught by this instructor before?

- ○ Yes
- ○ No

56 What formats were those previous courses? (You may select all the apply.)

- ☐ Completely face-to-face
- ☐ Partially online
- ☐ Completely online

57 What is the chance you would enroll in more online courses with this same instructor?

No chance	Very little chance	Some chance	Very good chance
○	○	○	○