

Online Learning Environments: Investigating the Factors Influencing Social Presence

By
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**Online Learning Environments: Investigating the Factors
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Abstract

Despite the decreasing rate of enrollment for face-to-face classes at higher education institutions, the last decade has seen an increase in enrollment for classes online. However, online learners suffer from several challenges, which may hinder desirable learning outcomes. These challenges include feelings of isolation as well as a lack of academic and social interaction, which has led to higher dropout rates and lower retention rates. All of these challenges have been associated with social presence, or a lack thereof, in online educational environments. Previous researchers have identified three indicators that influence social presence (i.e. affective association, interaction intensity, community cohesion). However, the way in which these factors were measured calls into question the validity of the research. Moreover, recent research has re-examined the original three indicators and added two additional indicators theorized to affect social presence (i.e. instructor involvement and instructor knowledge and experience), forming the *social presence model* (SPM).

This study: 1) evaluated three scales to measure the three indicators of social presence; 2) examined the relationships of these three indicators to social presence; 3) developed two additional scales to measure the two additional indicators of social presence; and 4) inspected the full SPM. The participants of the study consisted of 411 students taking fully online courses in the United States. For the measurement models, the author conducted six item factor analytic models to evaluate the social presence construct scale as well as the five construct scales of the social presence indicators. The results indicated a good to excellent fit of the measurement models as well as high correlation coefficients between social presence and the original three indicators of social presence. Conversely, the results indicated lower correlation coefficients among the three original social presence indicators with the two additional indicators.

To examine the structure of these relationships, the author conducted two structural equation models (SEMs). The first SEM inspected the three original factors, and the second SEM inspected the full SPM. The results of the first SEM indicated that the three social presence indicators are highly associated with social presence as well as with one another. They are statistically significant predictors of social presence; social presence is mostly affected by affective association ($\beta = 0.522$, $P < 0.001$), community cohesion ($\beta = .226$, $p = .001$), and then interaction intensity ($\beta = 0.163$, $p = .027$). For the second SEM, the results indicated that affective association was found to be a significant predictor ($\beta = .507$, $p < .001$); interaction

intensity was *not* found to be a significant predictor ($\beta = .120, p = .080$); group cohesion was found to be a significant predictor ($\beta = .173, p = .009$); instructor involvement was *not* found to be a significant predictor ($\beta = .092, p = .120$); and, finally, instructor knowledge and experience was *not* found to be a significant predictor of social presence ($\beta = .085, p = .098$). Affective association, as demonstrated through means such as humor and self-disclosure, is the most critical among the five social presence indicators. Sharing attitudes, feelings, personal experiences, and interests with one another is a highly effective way to increase social presence. The higher degree to which online community participants feel part of a cohesive group, the greater the degree of social presence. When instructors deliberately design activities to encourage affective association, they will also, in effect, enhance the levels of community cohesion and intensity of interaction. Although the involvement of instructors and their previous knowledge and expertise in the field are contributing factors to positive outcomes in online education, they were not found to contribute as much as the three original factors. The author concludes by discussing the implications as well as the limitations of these findings and suggests future research.

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Throughout my program of study, Dr. Zhao has inspired and shaped my thinking outside of the research arena, teaching me how to put my knowledge into practice and showing me how we can use our knowledge to help policymakers in education make informed, research-based decisions that can have a far-reaching positive impact in the field. I would also like to thank Dr. Ronald Aust, who was a great help to me in the earlier days of my PhD program. In addition to being a great source of wisdom in theories of technology, Dr. Aust was a supportive advisor in my quest to understand the role of technology in our lives. Dr. Aust has set the bar very high as I continue to evaluate new teaching methods and learning strategies in the field of education. Thank you to Dr. Suzanne Rice, who taught me about the origins of as well as the various philosophies behind education as an academic discipline.

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Dedication

To the memory of my mother and father: Although you are no longer on this earth, you continue to be my inspiration. I am so thankful to have had you as parents, always believing in my ability to be successful in the academic arena. Your encouragement of me has made this journey possible, and I so wish you were alive to witness this accomplishment and celebrate with us.

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Chapter One

Introduction

Institutions of higher education in the United States have become increasingly reliant on web-based tools to meet the administrative and educational demands of their students. Thus, online learning has been a critical component of educational environments in the last few decades. Over the last several years, with the continuous development of online learning tools, more and more classrooms have transitioned out of their physical spaces in favor of web-based learning space. Meanwhile, the total number of online class enrollments has been increasing while face-to-face enrollments have been decreasing (Seaman, Allen, & Seaman, 2018). Despite resistance from educators who prefer traditional, in-person instruction, researchers have found several instances where online programs have produced better results than their in-person counterparts. As part of the early history of the effectiveness of online education, Zhao, Lei, Yan, Lai, and Tan (2005) reviewed 51 studies of distance education programs that employed varying methodologies. Two thirds of the studies that they included in their review “produced better student outcomes than face-to-face education, whereas the remaining third showed just the opposite” (p. 19). In addition to producing more positive learning outcomes, online classes employ more flexible and convenient communication tools that are more fitting for instructors’ and students’ increasingly busy lifestyles.

Problem Statement

With the rapid growth of online learning environments (OLEs), educational researchers have constructed a robust framework, known as the Community of Inquiry (CoI) framework, for analyzing the educational experience of learners in an online community. This framework

explains how *online educational experience* results from the interaction of the three main CoI elements: cognitive presence, social presence, and teaching presence. Although all three of these elements have been subject to extensive research, *social* presence has recently attracted the most attention from online educational researchers (Annand, 2011; Chen, Fang, & Lockee, 2015; Lowenthal & Dunlap, 2014; Richardson, Maeda, Lv, & Caskurlu, 2017). Students have reported feelings of isolation and a lack of academic interaction when participating in online courses, which in turn affects the student's level of interaction overall. Without this sense of social presence, university programs risk losses in enrollment, tied in large part to student satisfaction and the perceived quality of instruction. Therefore, this research focuses on a model central to online learning environments: *The Social Presence Model*.

Purpose of the Study

This study examines the full Social Presence Model (SPM) as a framework to identify the indicators that influence social presence in online learning environments. In particular, this study evaluates scales for the three original social presence indicators, namely emotional expression (affective association), open/interactive communication (interaction intensity), and group/community cohesion, introduced by Garrison, Anderson, and Archer (2000). It also examines and confirms the relationships of these three indicators to social presence. Building on the work proposed by Whiteside (2015), the author developed and evaluated two additional social presence indicator scales: instructor involvement and instructors' knowledge and experience. Finally, this study investigates the relationships among the endogenous and exogenous variables of the social presence model and examines the structure of the SPM in its entirety.

Research Questions

The investigator poses two primary research questions to evaluate the measurement and the structural parts of the Social Presence Model:

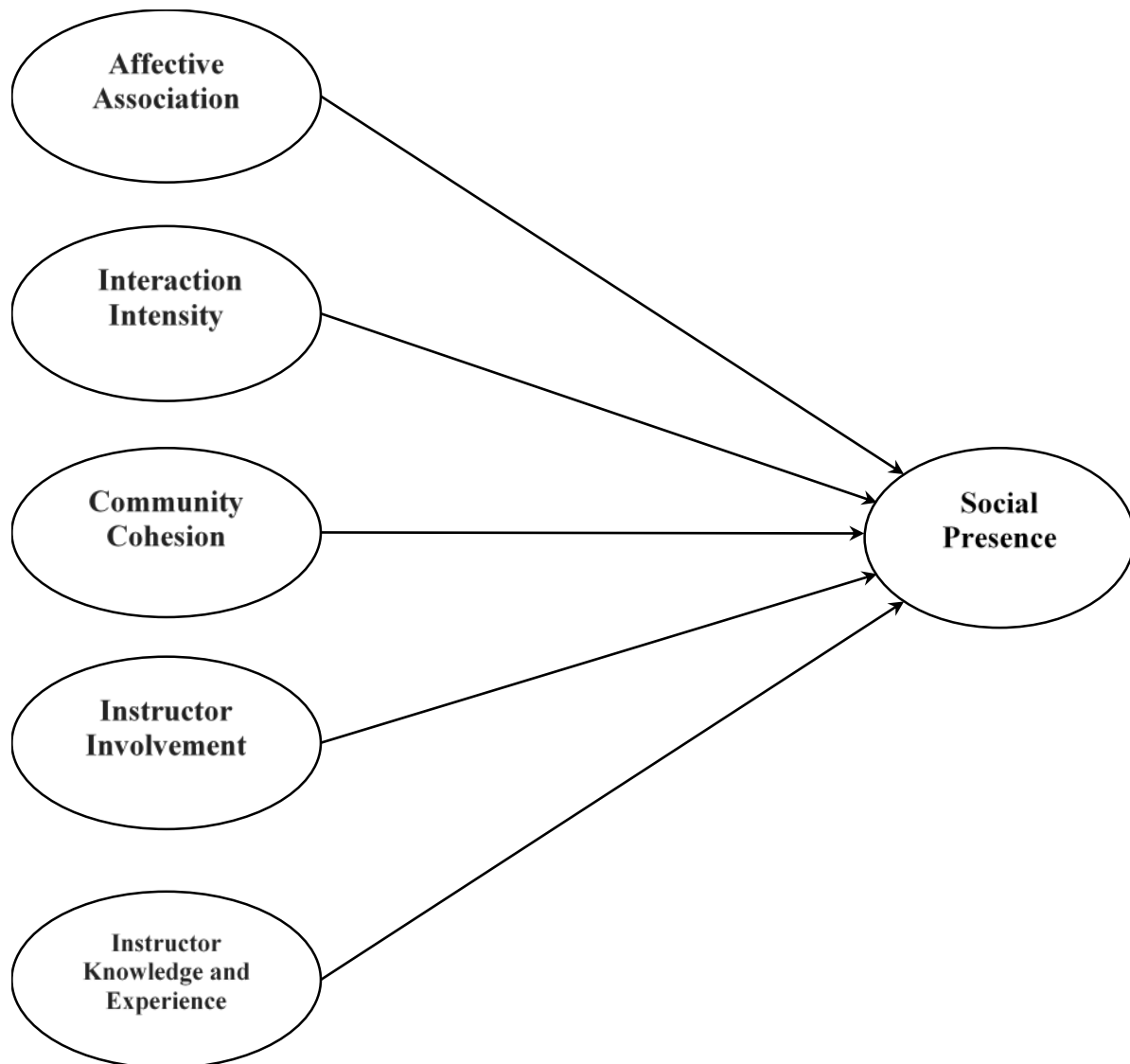
Research Question One: To what extent do affective association, interaction intensity, community cohesion, instructor involvement, instructor knowledge and experience, and social presence influence responses on their respective items?

Research Question Two: To what extent can affective association, interaction intensity, community cohesion, instructor involvement, and instructor knowledge and experience predict social presence?

Rationale of the Study

An intangible structure though it may be, social presence is the framework upholding online educational environments. While the model includes five *aspects* of social presence, the model as a whole has not yet to be fully investigated. Thus, a comprehensive evaluation of the aspects of social presence is required. To fill this gap in the literature, the author built and evaluated scales for each construct, examined the relationships between different items corresponding to each construct, conducted Item Factor Analytic (IFA) models, and then conducted Structural Equation Modeling (SEM) to describe the “relations of dependency—usually accepted to be in some sense causal—between the latent variables” (McDonald, & Ho, 2002, p. 65). Figure 1 below depicts the Social Presence Model.

Figure 1: The Social Presence Model (SPM)



Why Study Social Presence

Social presence is a critical component required to foster social interaction in online learning environments (Kozan & Caskurlu, 2018; Oyarzun, Stefaniak, Bol, & Morrison, 2018; Song, Kim, & Park, 2019; Tu, 2000). Rovai (2002) states that as social presence decreases, the sense of community decreases, indicating a positive relationship between social presence and the sense of community. Cobb (2009) and Kim, Glassman, and Williams (2015) report that social presence is key to learners' success and participation in online collaboration. Social presence affects how students interact in online environments (Swan & Shih, 2005; Tu & McIsaac, 2002), and learners with a positive social presence are more likely to complete their courses with better grades (Gregori, Zhang, Galván-Fernández, & de Asís Fernández-Navarro, 2018; Liu, Gomez, & Yen, 2009). This justification for focusing on social presence, which will be discussed later, elucidates a lack of retention rates in online learning environments. As cited by Ludwig-Hardman and Dunlap (2003), Knowles (1990) states that “the more people feel they are being treated as human beings— that their human needs are being taken into account— the more they are likely to learn and learn to learn” (p. 129). These research findings indicate the importance of social presence to learning outcomes.

The Importance of the Study

Based on what the literature tells us about social presence, it is a critical element of students' perceived learning and satisfaction in online learning environments (Wallace, 2003; Richardson et al., 2017). Social presence is “a direct contributor to the success of the educational experience” (Garrison et al., 2000, p. 3), and is affected by the overall online educational experience (Alanazi, Niileksela, & Templin, 2019). Student satisfaction is a major predictor of whether students drop out (Levy, 2007), and in addition, is highly associated with social

presence (Swan & Richardson, 2003). In other words, the higher the social presence students perceive in educational environments, the more satisfied they will be by the course, and therefore less likely to drop out (Levy, 2007; Swan & Richardson, 2003). One of the goals of this study, therefore, was to investigate the Social Presence Model (SPM) and to build on the educational research of Short, Williams, and Christie (1976), Gunawardena & Zittle (1997), Garrison et al. (2000), Tu (2002), Swan and Richardson (2003), Lowenthal and Dunlap (2010), Garrett Dikkers, Whiteside, and Lewis (2013), Whiteside (2015), and Gunawardena (2017) among others. Thus, this research was an evaluation of a recently proposed model that emerged from an extensive study conducted by Whiteside in 2015. This evaluation also highlights the need for more research on the social presence construct to assist educators in designing, developing, planning, and providing optimal educational experiences. Therefore, understanding social presence is paramount to the success of online learning environments.

Several studies (e.g., Picciano, 2002; Richardson & Swan, 2003; Richardson et al., 2017; Swan & Shih, 2005) have reported a positive correlation between perceived social presence and perceived learning in online learning environments. Effective interaction between collaborators is a means of communication to enhance educational outcomes. The more interaction between online communicators, the higher the social presence they may feel (Gunawardena, 2017). Because knowledge is constructed through communication, the more deliberate the communication/interaction, the more learners can construct knowledge (Hmelo-Silver, Duncan, & Chinn, 2007; Brown, Collin, & Duguid, 1989).

Definition of Terms

Social Presence. This term was defined originally by Short et al. (1976) as “the salience of the other in a mediated communication and the consequent salience of their interpersonal

interactions” (p. 65). Gunawardena & Zittle (1997) amended this definition to “the degree to which a person is perceived as “real” in mediated communication” (p. 1), and Garrison et al. (2000) defined it as “the ability of participants in the Community of Inquiry to project their personal characteristics into the community, thereby presenting themselves to the other participants as ‘real people’” (p. 89). While Dunlap & Lowenthal (2009) describe, “the degree of salience (i.e., quality or state of “being there”) between two communicators”, Rourke, Garrison, Anderson, and Archer (2001) defined social presence as “the ability of learners to project themselves socially and emotionally in a community of inquiry” (p. 3). Thus, the definitions of social presence indicate the salience of participants or how they feel others are ‘real’, as well as the ability of learners to project others in online mediated communication.

Affective Association. This factor addresses the emotional connections which occur within the course between online course participants. This may include the use of humor or emotional expression or a paralinguistic use of emoticons to express less formalized modes of communication. Fewer academic grammatical structures might also be present in addition to personal information being shared in individual posts as a trust building activity.

Interaction Intensity. This concept describes the level of interaction and communication between online course participants. The levels of agreement or disagreement may also play a part in the emotional (affective) connection students feel. This can include posting responses to others as well as asking other participants questions. All is done in a respectful manner appropriate to the classroom environment.

Community Cohesion. This factor relates to the course community, essentially describing the level of cohesiveness within the community. The correct use of names and pronouns as well as

the sharing of weblinks and personal information is encouraged. Social pleasantries are also encouraged, even if they do not necessarily contribute to the conversation as a whole.

Instructor Involvement. This factor indicates how much involvement students perceive their instructors as having within their online learning communities. Instructors who commented more, tailored their questions to draw upon students' experience, or responded directly to students' posts or concerns are seen as having higher levels of involvement. Students also expressed an appreciation for instructors that included outside weblinks or readings to build upon knowledge obtained from course readings and materials, not just those who set the tone of professionalism for the tasks.

Instructor Knowledge and Experience. This factor pertains to the perceived knowledge and experiences of the instructor by the online community participants. Just as students look to their instructor to be the expert in the discussion, they will have differing levels of participation in online discussions if they feel they are more or less informed on a subject than their colleagues. Instructors' practical knowledge and experience can facilitate a positive and richer social presence.

Summary

This chapter presented an introduction to the study, highlighting the importance of the online learning environment and the critical role of presence in educational context. The author discussed the need for research in this subject area, the problems that result from a lack of social presence, and a few salient challenges that both higher education institutions and students encounter in online courses. The author also presented the purpose of the study, as well as the two primary research questions guiding the research. Through the investigation of the two primary research questions and the construction of the social presence model, this research fills a

gap in understanding in online educational environments. The investigator hopes the findings of this study will identify means by which we can augment social presence in OLEs, thereby contributing to more positive learning outcomes.

Chapter Two

Review of Literature

Introduction

The increasing reliance on web-based technology has resulted in the formation of business partnerships between educational technology firms and academic institutions who wish to meet the new standards of excellence promulgated by the cultural shift towards online learning environments. Online education companies (e.g., Everspring Initiative) and higher education institutions (e.g., The University of Kansas) are collaborating to construct academic environments online that enhance learning and teaching outcomes. As the landscape of course design has changed, so too has research within the field of education. Researchers have shifted their focus to the study of online education with the aim of identifying solutions that best accommodate the modern student's busy lifestyle, thereby advancing educational outcomes. These partnerships require the use of advanced educational learning management system technologies to aid in increasing enrollment and retention rates, developing evaluation models, providing quality instruction, serving students and faculty, analyzing data, and developing theory and model-driven interpretations. While universities and their business partners focus on innovation and improving the online classroom experience, they are ultimately beholden to their investors. Whether the motivation is intellectual in terms of innovation and learning outcomes or financial in terms of enrollment and retention, all these actors have a stake in continuing research into this field.

A Brief History of Distance and Online Education

Although distance education has been around for a long time – starting in 1728 with shorthand lessons based in Boston – the use of technology for remote education is relatively new (Online College Plan, 2018). In comparison to other subfields of education, research in online learning is nascent and remains a largely unexplored territory. Before the advent of the internet, the term “online” described any activity that involved the connection of a device to a network or system of other peripheral devices, such as telephones or computers. According to Harasim (2000), the first completely online course (adult education) debuted in 1981, followed by the first fully online program (WBSI Executive Education, IEIS) in 1982. These were subsequently followed by the first online degree program, Adult Education, in 1986. While the growth of communication and collaboration strategies and educational platforms began in the 1980s, there has been a dramatic rise in their development and adoption since the 1990s, as everyday consumers’ access to the internet continued to spread. The World Wide Web (www) was invented by Tim Berners-Lee in 1989, and since that time, online learning has increased with the rapid growth of media richness (CERN Accelerating Science, 2019). Since their inception, online learning environments (OLEs) have grown spectacularly, led by different methods of communication and collaboration, both locally and internationally. As of June 30, 2019, there were more than 4.422 billion-internet users from all over the world (Internet World Stats, 2019). Thus, the 21st century has begun with a paradigm shift in attitudes – as well as communication and collaboration strategies – towards online education (Harasim, 2000; 2018). In addition, since the revolution of online learning management systems, networks, instructional platforms, and social media tools, millions of “virtual instructors” now teach “virtual learners” “virtual courses” in and out of “virtual schools,” in effect constructing distinct online learning communities.

Distance and Online Education

Online education programs usually are presented in two different communication formats: *asynchronous* and *synchronous* communication. Asynchronous communication describes communication between two or more communicators via a particular medium at different times for both communicative partners. Asynchronous communication is an effective and popular method of distance education (Holmberg, Bernath, & Busch, 2005). It happens to be more convenient for learners when they study on their own, unrestricted by being synchronously connected with others while learning is in progress. A great deal of distance students study asynchronously rather than synchronously. The Distance Education and Training Council in the USA (DETC) reports that 90% of American distance-education courses in higher education are asynchronous (Holmberg et al., 2005). Other advantages of asynchronous communication may include the convenience of time and place, more equitability for learners, and greater opportunity for learners to reflect (Ellis, 2001). Furthermore, in asynchronous communication, educators can better communicate with students who are shy or reserved, as well as with international learners who do not feel confident with their language proficiency, giving those learners a greater chance to participate (Bakar, Latiff, & Hamat, 2013).

However, asynchronous learning is not without its pitfalls. One of the disadvantages noted by Mackay (1988) is the potential for “information overload.” When individuals communicate by e-mail, for example, the e-mail generates more information than needed (Peters & Hewitt, 2010). Qualitative studies, such as Mackay’s (1988), have demonstrated that when the communication process occurs between two channels asynchronously, it generates more unnecessary information, and as a result, this information might confuse communicators (e.g., the learners). Moreover, asynchronous communication does not allow immediate interaction or

feedback (Shoemaker & Stam, 2010). Thus, communicators need to wait to receive feedback from their fellow classmates and instructors. Instructors encounter several challenges in online learning environments. For example, in asynchronous communication, learners have cyberspace identities that are distinct from their in-person classroom identities (Licona & Gurung, 2011), and this makes it challenging for educators to understand the nature of their students.

In contrast, synchronous distance communication occurs when two or more partners in different places interact with each other at the same time. Technologies used in synchronous distance learning include both textual-centric applications such as Facebook and Messenger, as well as media-centric applications such as Skype, Google Hangouts, and Adobe Connect. There are several disadvantages of synchronous communication. Time zones have been obstacles in scheduling real time communication. Vutborg, Kjeldskov, Paay, Pedell, and Vetere (2011) studied communication across time zones and stated that communicating with people in different time zones is more troublesome than communication with people in the same time zone or with people one or two time zones away. However, their study shows that it is more difficult to arrange a suitable time for both communicators when the difference is approximately eight hours, than when the difference was 12 hours.

Synchronous communication also depends largely on the speed of the internet connection. It can be a frustrating experience to collaborate in real-time if the connection is poor (Shoemaker & Stam, 2010). Semester scheduling differences are another obstacle, as scheduling differences are a critical issue in synchronous communication. Lack of synchronization presents challenges to finding a convenient time for both communicative partners (Jiang & Carpenter, 2013). For instance, some countries, such as the United States, start their spring semester in January, while other countries, such as Costa Rica, start their spring semester in March. This is

challenging in international collaboration when two global classrooms intend to work on the same subject matter. Despite its obstacles, synchronous communication has several advantages, such as immediate feedback and interaction as well increasing online users' social presence, an important subject of many recent studies (Biocca & Harms, 2002; Blaine, 2019; Gefen & Straub, 2004; Jung & Lee, 2018; Martin, Wang, & Sadaf, 2018; Poquet, Kovanović, de Vries, Hennis, Joksimović, Gašević, & Dawson, 2018; Shin, 2002; Song, Rice, & Oh, 2019).

In recent years, students' ability to navigate online learning environments has become an increasingly popular requirement for graduation. A significant number of higher education institutions in the U.S. now require students to take online courses as part of their degree program. Online programs have been implemented in almost every major, including person-centric majors such as social work, healthcare, and education which privilege interpersonal skills (Best Colleges, 2019). According to Dimeo (2017), "thirty percent of all students enrolled in college took at least one online class in Fall 2015; 2.9 million students took all courses online and 3.1 million took at least one class online" (p. 1). While overall college enrollment keeps decreasing, of those students who matriculate, the rate of online enrollment continues to increase steadily (Seaman et al., 2018).

Current Online Learning Enrollments

In accordance with enrollment trends, online education has become a critical component in higher education institutions' long-term strategic planning. Allen and Seaman (2014) report that the percentage of academic leaders who view academic outcomes in online coursework as the same as or superior to face-to-face settings has grown over the past few years. Moreover, the proportion of academic leaders who view online education outcomes as "inferior to those of face-to-face instruction" has dropped over the past few years (Allen & Seaman, 2014, p. 14).

Overall, the increase in confidence has corresponded with a steady decline in negative attitudes toward online instruction. Although there are clear advantages to OLEs, they also present a wide range of challenges that include – but are not limited to – social, environmental, cultural, educational theory-driven, and technology-related obstacles, in addition to instructional settings which are often unfamiliar to both the educator and the students. In an effort to overcome these challenges, educational technology has continued to develop, resulting in an ever-changing dynamic between teachers and students in online educational environments.

From 2003 to 2012, for example, the percentage of those academic leaders whose job included rating academic outcomes grew from 57% to 77% percent, indicating consistent growth. The number of students in the U.S. enrolled in at least one online course increased from 1.6 million to 7.1 million from 2002 to 2012, which is a 16.1% increase in the annual growth rate. In 2008, there were 4.6 million students taking at least one online course (Poulin & Straut, 2016). In the meantime, the overall growth rate of the higher education student body from 2002 (16.6 million) to 2012 (21.3 million) has grown annually by 2.52%.

In the fall of 2014, 2.85 million students enrolled in full distance courses and 2.97 million students enrolled in at least one distance course, making the total 5.8 million students taking online courses overall (Allen & Seaman, 2016; Online Learning Consortium, 2017; Poulin & Straut, 2016). Based on the previous statistics, students across U.S. higher education institutions “exclusively” enrolled in distance education in Fall 2014 were represented as 1,382,872 (48%) from public institutions, 632,341 (22%) from private non-profit institutions, and 843,579 (30%) enrolled from private for-profit institutions, totaling 2,858,792 students exclusively taking distance education courses (Poulin & Straut, 2016). Poulin and Straut (2016) report that in Fall 2014, 14% of students took all their courses at a distance, 14% of students took “some but not all

of their courses via distance”, and 28% of students were enrolled in at least one distance course (p. 3).

In 2014, public institutions received 147,169 new distance enrollments. Based on a survey conducted by Babson Survey Research Group in partnership with Online Learning Consortium (OLC), Pearson, WICHE Cooperative for Educational Technologies (WCET), StudyPortals, and Tyton Partners (Neghina, 2017), the number of higher education students taking at least one online distance course increased by 3.9% from 2014 to 2015. A 2015 survey found that across 4,836 higher education institutions, there was a total of 6,022,105 distance education students, of which 2,902,756 were taking only distance courses. This means that 29.7% of all students were taking at least one distance course (Allen & Seaman, 2017).

Although the total number of students enrolled in degree-granting institutions has decreased recently, (2012 had 20,928,443; 2013 had 20,680,352; 2014 had 20,508,530; and 2015 had 20,266,367), across those years, the number of distance enrollments has been increasing across those years with 5,425,406 distance students in 2012; 5,611,551 in 2013; 5,795,730 in 2014; and 6,022,105 in 2015 (Allen & Seaman, 2017). In the Grade Change-Tracking Online Education in the United States report (2017), the growth of online enrollment has been continuous over the years. On the other hand, the number of students not taking any distance courses has consistently dropped year after year. From 2012 to 2013, the number of students dropped by 434,236 and again dropped in the following year by 390,815 students (Allen & Seaman, 2016). There were 4,862,519 undergraduate students and 966,307 graduate students taking at least one online course in Fall 2015 (Allen & Seaman, 2016), with 83% (4,999,112) of the students being undergraduate students and 17% (1,022,993) being graduate students (Allen & Seaman, 2017).

To provide a statistical snapshot of the massive growth of distance education students, currently one in seven students is learning exclusively online and one in four students is taking at least one online course. Overall, the future of online learning is promising, as the number of students enrolled online and the percentage of academic leaders who believe in the academic outcomes is inversely proportional to their counterparts in face-to-face settings. Despite these results, Babson Survey Research Group, in partnership with Pearson and The Sloan Consortium (Sloan-C), surveyed more than 2,831 colleges and universities asking fundamental questions about the extent of online education expansion. They reported that most higher education faculty do not know about open educational resources (OER).

Overall, the number of enrollments in online courses and the number of universities establishing new online programs (Bowers & Kumar, 2015; Goodman, Melkers, & Pallais, 2019; Mancini, Cipher, & Ganji, 2018; McClendon, Neugebauer, & King, 2017; Morueta, López, Gómez, & Harris, 2016) has been growing every year. In fact, a recent snapshot of online course statistics by Seaman et al. (2018) shows that the total enrollment in 2012 was 20,928,44 with 5,425,406 distance enrollments¹; the total enrollment in 2013 was 20,680,352 with 5,611,551 distance enrollments; the total enrollment in 2014 was 20,508,530 with 5,795,730 distance enrollments; the total enrollment in 2015 was 20,266,367 with 6,022,105 distance enrollments, and the number total of enrollments in 2016 was 20,124,203 with 6,359,121 distance enrollments. From 2002 to 2012, distance and overall enrollment grew. However, from 2002 to 2017, distance education has continued to steadily increase in enrollment while overall enrollments have declined in higher education nationwide. Likewise, the number of students who are not taking online courses has also been decreasing since 2002 (Seaman et al., 2018).

¹ Taking at least one distance course.

Massive Open Online Courses (MOOCs)

Although there is a growing popularity in and prevalence of online courses in the American university ecosystem, a few higher education institutions have yet to decide whether to integrate Massive Open Online Courses (MOOCs) since they were implemented in 2008 (Rodriguez, 2012). As described by Kop and Carroll (2011), “MOOC is described as “Cloud Learning Environment in that it uses cloud services/applications to implement the core features of the course. It is a web-based open learning environment made up of various cloud based applications, in which Open Educational Resources were produced, researched and shared by participants.” (p. 1). The percentage of higher education institutions that have MOOCs increased from 2.6% in 2012 to 5.0% in 2013, 8.0% in 2014, and 11.3% in 2015 (Allen & Seaman, 2016). However, 53% of institutions have not decided whether to incorporate MOOCs or not (Allen & Seaman, 2014) and 33% indicated that their institutions do not plan on implementing MOOCs. The greater the number of enrolled students (over 15,000 students) that higher education institutions have, the more likely those institutions are implementing MOOCs. The first institutions that are likely to implement MOOCs are doctoral and research institutions, while the least likely to implement MOOCs are baccalaureate programs (Allen & Seaman, 2014). Most MOOC offerings are currently not-for-credit (Poulin & Straut, 2016).

When Can We Call a Course “Online”?

With the synergy between educational technology and the internet, the term “online” in academic discourse is now used almost exclusively within the context of the web. According to distance learning reports produced by partnerships among Babson Survey Research Group, Quahog Research Group, Pearson, The Sloan Consortium (Sloan-C), and The Alfred P. Sloan Foundation (Seaman et al., 2018), classes are called “*Web Facilitated*” if 1-29% of the content is

delivered online, “*Blended/Hybrid*” if 30-79% of the course content is delivered online, “*Online*” if 80% or more of the course content is delivered online, and “*Traditional*” if none of the course content is delivered online (p. 5). A more general definition of distance education is defined by the Integrated Postsecondary Education Data System (IPEDS), which defines it as “a course in which the instructional content is delivered exclusively via distance education” and for which “requirements for coming to campus for orientation, testing, or academic support services do not exclude a course from being classified as distance education” (NCES National Center for Education Statistics, 2017, p. 10). In online educational environments, there is a well-established framework, the Community of Inquiry framework, which explains how the online educational experience forms. This framework breaks down the components that have come to define a learning environment as “online.”

Community of Inquiry (CoI) Framework

Online Community of Inquiry (CoI) is a critical component in online learning environments (Wallace, 2003). Known as the CoI, this framework accounts for a critical component of the learning process, known as *presence*. Bailey, Bailenson, Won, Flora, and Armel (2012) define presence as “the psychological experience of ‘being there’” (p. 1). The CoI framework consists of a group of online learners who collaboratively learn in educational learning environments. Garrison et al. (2000) state that learning in online environments occurs through interaction between learners and instructors, and that it manifests in three major elements: cognitive, social, and teaching presences. CoI posits a framework representing how meaningful learning occurs in online learning communities. The authors of this framework state that there are three critical elements that play significant roles in a CoI framework when

conducting educational transactions. These three elements of an educational transaction are what form and affect educational experiences online.

The first element is cognitive presence, which is indicated by knowledge construction, information sharing, idea connection, feedback provision, and learned skills application. Cognitive presence is well presented in collaborative learning projects to apply what learners have been taught as an indication of education outcomes. The medium used in online courses plays a critical role in shaping cognitive presence. Cognitive presence is the result of a combination of social presence and teaching presence as stated by the framework theorists (Garrison et al., 2000).

The second element in the CoI framework is social presence. It was first introduced by Short et al. (1976) as “the salience of the other in a mediated communication and the consequent salience of their interpersonal interactions” (p. 65). As cited by Garrison, Cleveland-Innes, and Fung (2010), Garrison (2009) differently defines social presence as “the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities” (p. 2). Social presence is divided into three categories: affective, interactive, and cohesive communities. Cognitive presence has a primary and supportive element in social presence (Garrison et al., 2000). Wanstreet and Stein (2011), Kozan and Richardson (2014), Morueta et al. (2016), and Alanazi et al. (2019) have found a high correlation coefficient between social and cognitive presence. Social presence is a cornerstone construct within the CoI framework.

The third element of any online educational transaction is teaching presence, which supports both cognitive and social presences. Teaching presence is a comprehensive construct

that includes teaching tasks, such as designing the course, selecting the topics, assigning homework, organizing content, presenting information, facilitating educational processes, developing and updating course content, and assessing and evaluating learning outcomes. In the CoI framework, teaching presence frames social presence, and social presence in turn enhances cognitive presence through socializing within the online community context. As documented in the literature, presence is a critical construct in a purposeful Community of Inquiry, a lack of presence can lead to feelings of isolation and detachment in students.

The Challenges of Online Education Programs

Students face several challenges, such as a lack of social presence, which can hinder their completion of online programs. Aside from the normal challenges any university student encounters (e.g., cost of tuition, juggling a work schedule, etc.), the pressure of meeting a program's graduation requirements in a timely manner and concerns about the potential for employment upon graduation can be overwhelming. One can see how the added stress of a seemingly disconnected instructor and classmates in an online course would never be beneficial. Many students express a preference for speaking to someone in person when they are facing difficulties, and an online class needs to offer this potential as well. Online coursework is perceived as beneficial so long as it meets the needs of students with less traditional schedules. However, this can come at a cost.

As in any learning environments, there are several concerns addressed in the literature about online learning from different angles. Online learning has spread extensively in the United States in both undergraduate and graduate programs. Moreover, there are several states (e.g., Michigan, Arizona, Arkansas, and California) implementing online high schools. In fact, the number of states implementing virtual free public schools has been increasing recently in K-12

education (Littlefield, 2019). Surrounding literature has identified both the potential benefits of and concerns about such programs and their learning outcomes. This section has addressed the most commonly documented concerns in the literature such as lack of presence, lack of interaction, retention rates, and dropout rates in online learning environments.

Students' Isolation

Unfortunately, students in online educational settings often feel isolated and detached from their peers and instructors (Ames, Berman, & Casteel, 2018; Dixson, 2015; Gillett-Swan, 2017; Herrington, Oliver, & Reeves, 2003; Lewis, 2019; Ludwig-Hardman & Dunlap, 2003; Shelton, Hung, & Lowenthal, 2017). There are several factors that affect students' feelings of social climate in online learning. This research explores and discusses these factors. One of the social barriers in online learning environments is that instructors and learners tend to rely on text-based technologies, and as a result, these technologies hinder an opportunity to express their emotions and empathy (Lowenthal & Dunlap, 2010). Accordingly, those learners feel isolated behind the screen and not immersed within social interaction. Consequently, learning does not occur effectively because learning is an inherently social activity. This social detachment ultimately results in poorer learning outcomes. Not only does it affect the level of interaction (Lewis, 2019; McCreery, Vallett, & Clark, 2015), but a lack of social presence can also lead to other serious challenges in online education programs, such as lack of social and academic interaction (Song et al., 2019; Tu & McIsaac, 2002).

Retention Rate

Social presence is also a key to students' continuous enrollment and persistence in online learning. There is a growing concern by academic leaders regarding the retention rate in online

courses compared to that of traditional face-to-face environments. Carr (2000), O'Brien (2002), Herbert, 2006, De Freitas, Morgan, and Gibson (2015), Bawa (2016), and Friðriksdóttir (2018) state that one of the greatest concerns of online learning is the retention rate. Allen and Seaman (2014) state that the percentage of chief academic officers who agreed that retaining students in online learning is harder than retaining students in face-to-face settings is increasing. This percent of concern has increased over time. In 2004, it was 27.2%, later growing to 28.4% in 2009 and eventually to 40.6% in 2013. Liu et al. (2009) report that social presence is a significant predictor of course retention, noting that students with positive social presence are more likely to complete their courses with better grades. Summers (2003) states that several factors contribute to student attrition in community colleges, including the institutions' effectiveness, financial factors, enrollment management, or a lack of technology skills (Herbert, 2006), while the attrition rate continues to be a concern knowing that student satisfaction is also a major driver in student retention (Levy, 2007; Richardson et al., 2017).

Dropouts

Results of several studies documented in the literature report that students in e-learning environments drop out substantially more often than those in traditional face-to-face courses (Ludwig-Hardman & Dunlap, 2003). Higher dropout rates continue to be a challenge for administrators of online courses (Bowers & Kumar, 2015; Goodman et al., 2019; Mancini, Cipher, & Ganji, 2018; McClendon, Neugebauer, & King, 2017), and one of the most commonly stated reasons for dropping out is students' feelings of isolation and disconnectedness (Carr, 2000; Clay, Rowland, & Packard, 2008; Diaz, 2002; Herbert, 2006; Lee & Choi, 2011; Levy, 2007; Li, Yao, & Hong, 2019; Ludwig-Hardman & Dunlap, 2003; Onah, Sinclair, & Boyatt, 2014; Park & Choi, 2009; Richardson et al., 2017; Tello, 2008; Trespalacios & Lowenthal,

2019). Students' satisfaction and amount of college experience also play a role (Levy, 2007). In other words, the greater the college experience the students have, the less likely they are to drop out from online courses. The number of students taking at least one online course grew by 11.3 %, whereas the number of students taking at least one online course in for-profit education institutions dropped by 2.8% (Allen & Seaman, 2016). Although some students do not complete their degree, the number of enrollments has continued to increase in higher education institutions (Herbert, 2006). Relevant to social presence, many students report that when they are new to online environments, they feel isolated (Lowenthal & Dunlap, 2010).

Student Satisfaction

Learners' satisfaction about the online course is positively correlated with social presence (Gillow-Wiles & Niess, 2019; Richardson et al., 2017), meaning that the higher social presence learners perceive, the higher level of satisfaction they report. A recent study found that social presence has a positive effect on students' satisfaction (Oyarzun et al., 2018). When students are satisfied with the online courses, they are more likely to interact with their peers, resulting in higher social presence. Social presence is a major driving factor that highly correlated to student satisfaction (Akyol & Garrison, 2008; Cobb, 2009; Gillow-Wiles & Niess, 2019; Gunawardena & Zittle, 1997; Gunawardena, 1995; Hackman & Walker, 1990; Newberry, 2001; Oyarzun et al., 2018; Picciano, 2002; Russo & Benson, 2005). If students feel connected and feel a high level of social presence in e-learning settings, they are more likely to feel satisfied with the online course and consequently less likely to drop the course.

Quality of Instruction

With the advancement of learning management system technology and communication, educational strategy concerning online course instruction is decreasing. Poor course design is one reason why online learners drop courses (Herbert, 2006). The view that online course instruction is inferior to face-to-face instruction has become less common over the last few years. Allen and Seaman (2014) report that the percentage of academic leaders who are concerned about the limited outcomes of online education in higher education institutions has dropped slightly from 36% in 2011 to 32% in 2013. Picciano, Seaman, and Day (2011) and Picciano and Seaman (2010) identified the most concerning factors for school principals across the country as online course quality. Akyol and Garrison (2008) and Alanazi et al. (2019) have shown that establishing social presence early in a course is a dynamic construct that is important in any online course. Kim, Kwon, and Cho (2011) found that quality of instruction is a significant predictor of social presence in online courses.

Not surprisingly, the social presence construct has become more prevalent with the rapid growth of technological companies, information systems, virtual reality environments, and educational games. As a challenge, the forces that influence instructor and learner presence are vital to identify. Social presence has likewise been an arena of educational researchers' focused interest recently, especially with the rapid growth of higher education online programs (Weinel, Bannert, Zumbach, Hoppe, & Malzahn, 2011). However, to enhance social presence, both educators and researchers need to understand the factors that contribute to and increase levels of social presence.

Convincing Faculty Members

The most important audience of online education is faculty members. However, online education continues to fail in increasing the percentage of faculty members who “accept the value and legitimacy of online education” (p. 26). In annual reports, Allen and Seaman (2016) state that “a continuing failure of online education has been the inability to convince its most important audience – higher education faculty members – of its worth” (p. 26). Having surveyed more than 3,000 institutions in the U.S., 32% chief academic officers in higher education institutions “agree,” 51% are “neutral,” and 17% “disagree” that faculty attitudes are a significant obstacle to the further growth of online education (Allen & Seaman, 2016). Convincing faculty members of the quality of online learning outcomes is still a challenge for higher education institutions (Kentnor, 2015; Markova, Glazkova, & Zaborova, 2017; Shea, Bidjerano, & Vickers, 2016).

Presence

A growing body of research illustrates that presence is established and enhanced by several factors in online social contexts. Before the advancement and proliferation of virtual communication methods, communication and collaboration was mostly achieved orally. However, technological growth has shifted the communication and collaboration formats from oral communication to methods of virtual interaction. The absence of presence has been a critically increasing concern documented in online learning literature. Picciano (2002) defines presence in online courses as “a student's sense of being in and belonging in a course and the ability to interact with other students and an instructor although physical contact is not available” (p. 22). Bailey et al. (2012) define presence as “the psychological experience of ‘being there,’” (p. 1). They concentrate on the impact of presence in relation to the impact of mediated experiences

on cognition. However, pioneering authors in the Community of Inquiry field have conducted extensive research in an effort to define presence and presence-related factors, as well as to identify types of presence.

The construct of *telepresence*, according to Shin (2002), was first introduced in the field of industry in 1981. As defined by Buxton (1992), the term telepresence “is the use of technology to establish a sense of shared presence or shared space among geographically separated members of a group” (p. 1). As cited by Picciano (2002), Biocca (1995) divides presence into three types: spatial presence, self-reflective presence, and social presence. Garrison et al. (2000), on the other hand, introduced a framework for Community of Inquiry that consisted of three types of presence which form educational transactions, including cognitive presence, social presence, and teaching presence. In 2002, Picciano stated that the concept of presence had expanded to include several types of presence including telepresence, cognitive presence, social presence, teaching presence, and other forms of presence, such as emotional presence (Stenbom, Hrastinski, & Cleveland-Innes, 2016; Kozan & Caskurlu, 2018; Majeski, Stover, & Valais, 2018). In addition, Shin (2002) presents the construct of transactional presence, defining transactional presence “as the degree to which a distance education student perceives the availability of, and connectedness with, other parties involved in a given distance education setting” (p. 1).

In 2010, Shea and Bidjerano introduced a fourth type of presence as an additional element of the Community of Inquiry framework called “learning presence” which results from the interaction of the three CoI framework elements introduced by Garrison et al. (2000), and which they then call the *Revised Community of Inquiry* framework. Learning presence “represents elements such as self-efficacy, as well as other cognitive, behavioral, and

motivational constructs supportive of online learner self-regulation” (Shea & Bidjerano, 2010, p. 1). Although there are several types of presence, this research focused mainly on social presence for critical reasons mentioned in the research. Furthermore, the concept of presence has been vital in all human-computer interaction for decades (Lee & Nass, 2003; Lombard & Ditton, 1997; Sheridan, 1992).

The Definition and the History of Social Presence

The construct of social presence has been defined in a representational number of research articles with some variations in its core meaning. Earlier research focused on two main concepts associated with social presence, including immediacy, or the psychological closeness between people using a medium (Wiener & Mehrabian, 1968), and intimacy, or the degree of affiliation between communicators (Argyle & Dean, 1965). Later research has since shifted to the other factors discussed later in this research.

Originally introduced and defined by Short et al. (1976) as “the salience of the other in a mediated communication and the consequent salience of their interpersonal interactions,” (p. 65), social presence was originally a psychological concept attached to the communication medium and a characteristic of the medium itself (Tammelin, 1998), rather than as a characteristic that depends on the social context. The root of social presence was drawn from computer-mediated communication, not from learning sciences (Lowenthal, 2010). In the 1990s, specifically in Gunawardena and Mason’s research, the definition of social presence became more general. Their work defined the construct not as a characteristic of the communication medium, but as a construct affected by the experiences of online learners during different types of interactions in online social contexts. McIsaac and Gunawardena (1996) define social presence as the feeling of a human presence. Moreover, Mason postulates that “it is not the technology but the way it is

used which ultimately affects the learner”, adding that “a good teacher has presence in any medium” (1994, p. 34). Mason supports the previously stated idea that social presence is not a characteristic of the communication medium, but rather that it is enhanced by other factors outside the quality of the communication software medium itself.

When differentiating between telepresence and social presence, Tammelin (1998) defines social presence as “the sense of being present in a social encounter with another person” (p. 222). Garrison et al. (2000) define social presence as “the ability of participants in the Community of Inquiry to project their personal characteristics into the community, thereby presenting themselves to the other participants as ‘real people’” (p. 3). Rourke, Anderson, Garrison, and Archer (2007) define social presence as a learner’s ability to effectively project themselves in an online Community of Inquiry.

Short et al. (1976), Daft and Lengel, (1986), and Sproull and Kiesler (1986) state that the type of medium is the most significant factor in determining the degree of social presence and the effect of a characteristic of the medium itself. On the other hand, there is broad consensus within the literature that the degree of social presence depends not on the medium itself, but on the social context in which it occurs and the factors that affect it (Garrison et al., 2000; Gunawardena & Zittle, 1997; Gunawardena, 1995; 2017; Richardson & Swan, 2003; Richardson et al., 2017; Richardson, Swan, & Lowenthal, 2016; Whiteside, 2015). Garrison et al. (2000) state that “social presence, in the form of socio-emotional communication is possible in computer mediated communication (CMC), but it is not automatic” (p. 9). Picciano (2002) adds that because social presence is subjective, it varies from one learner to another. In other words, dynamism is a characteristic of social presence. Picciano also found that there is a highly significant correlation between the perception of social presence and the overall perception of

student interaction, $r = .84$. There is also a statistically significant positive correlation of $r = .51$ between social presence and the overall perception of learning (Richardson et al., 2017). This body of research indicates that social presence is an outcome of different types of factors' interaction within a social context. Researchers continue to work toward identifying additional factors that may have a bearing on social presence.

Conceptual Framework

The conceptual framework used to guide this research is the newly introduced Social Presence Model (Whiteside, 2015). This model was not borne of the commonly used Social Presence Theory (Short et al., 1976). Rather, this model was developed using Vygotsky's notion of inner speech, which helped analyze how thoughts can be conveyed into written text within online discussions. Although other articles (e.g., Garrett Dikkers et al., 2013) have used this model, Whiteside's 2015 article was the *introductory* article of this model. Whiteside's Social Presence Model also used the Zone of Approximate Development (ZPD), which involves the distance between what learners can learn by themselves and what they can learn with the help of others. Social Development Theory (Vygotsky, 1978) constitutes the theoretical foundation which guided the author in developing the Social Presence Model.

The Social Presence Model framework indicates that there are five dimensions, or elements, which formed the model, and which contribute to high social presence in online learning environments. These five dimensions are: affective association (emotional expression), interaction intensity (open communication), community/group cohesion (Rourke et al., 2001), instructor involvement, and instructors' knowledge and experience (Whiteside, 2015). In this study, the researcher builds upon and evaluates scales for these five factors of social presence, in addition to investigating the paths and directionality of the relationships between the items and

each latent construct. This study also investigates the relationships and the directionality between the latent constructs. The model was built on the Social Presence Coding Scheme presented by Rourke et al. (2001). Rourke and his colleagues originally presented three categories of social presence: affective, interactive, and cohesive.

The Social Presence Model

The Social Presence Model (SPM) is a recently proposed model in the field of educational technology and online learning environments in general. Using Vygotsky's social development theory as a conceptual framework to guide the study, Whiteside's research used two other major concepts from Vygotsky: inner speech, to understand how thoughts are conveyed into online medium, and Zone of Proximal Development (ZPD), to exemplify how knowledge is presented in learning experience (2015). Some of the SPM constructs have previously been investigated in different fields, but the model of social presence with its own proposed constructs is still in the early stages of development. As shown in the figure below, the model identifies five integrated elements (Whiteside, 2015).

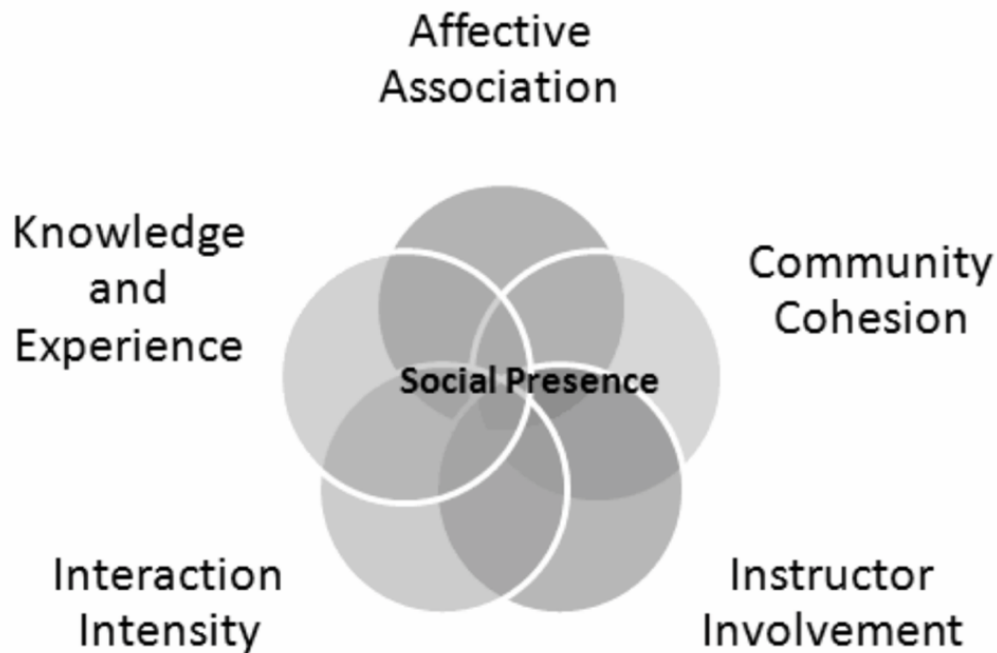


Figure 3: The Social Presence Model

Affective Association. Dewey (1916), Vygotsky (1980), Bandura (1986), and Brown et al. (1989) describe how learning is a human social activity. Affective association “addresses the emotional connections which occur within the [online] program” (Whiteside, 2015, p. 11). Affective association is an important element that discusses the emotional connection within a community. The model theorizes that this involvement is crucial to students’ success, whether it is through a feeling of ease with the instructor or classmates, or with students’ use of paralinguistic in their communication style. Just as instructors need to believe in their students, students also need to be invested in the course content. These educational processes occur through an emotional connection. This connection presents itself using humor, paralinguistic, and a degree of self-disclosure. Through this online community, the level of emotion, humor and sarcasm, paralinguistic, and self-disclosure are associated with and shape the level of trust, comfort, and subsequent social presence participants feel within that community.

Interaction Intensity. Some educational environments are text-based environments where social presence needs to be enhanced to promote socialization and knowledge construction.

Traditionally, this is done through guided pair work and group or class discussions (Alanazi, 2016). Garrison et al. (2000) state that learning occurs through interaction between learners and instructors, and manifests in three major elements: cognitive presence, social presence, and teaching presence. Whiteside (2015) points to participants acknowledging one another, giving compliments, agreeing or disagreeing, and asking one another questions as indicators of interaction. Picciano (2002) found that there is a statistically significant correlation between students' perception of social presence and students' perception of interaction. Picciano further reports strong relationships between student social presence, perceptions of interaction, and learning. Dewey (1916), Vygotsky (1980), Bandura (1986), and Brown et al. (1989) state that learning is a human and social activity. Instructor-learner interaction in online learning is a central and primary element in forming a beneficial educational experience (Garrison & Cleveland-Innes, 2005).

Garrison and Cleveland-Innes (2005) state that the higher level of interaction in online learning could result from increased cohesion in a group. Therefore, one of the aims of this study was to examine the correlations between these constructs of interaction intensity and community cohesion. However, community interaction by itself does not guarantee a higher level of engagement or presence (Garrison & Cleveland-Innes, 2005). Researchers such as Hay, Hodgkinson, Peltier, and Drago (2004) found that instructor-student interaction is positively correlated with teaching effectiveness in online courses and builds on the level of emotion students may invest in the course. However, simple interaction is not enough for effective learning. Interaction must be well-structured and purposeful to be effective, and students must

feel that there is a level of professionalism required from them. On the other hand, DeSchryver, Mishra, Koehler, and Francis (2009) report that they did not find differences between social presence and the frequency and length of students' discussion interactions.

Community Cohesion. Community cohesion has had a long history as part of social presence. Garrison et al. (2000) state that group cohesion is a category of social presence, and that it can be demonstrated through the use of names, pronouns, and social pleasantries as part of online discussions. Recent research about the cohesiveness of online communities has addressed the importance of cohesion. Moreover, several studies reported that there is a positive relationship between social presence and educational outcomes (Garrison & Arbaugh, 2007; Kim et al., 2011; Yoo, Kanawattanachai, & Citurs, 2002). Garrison and Arbaugh (2007) state that "cohesion requires intellectual focus (i.e., open and purposeful communication) and respect." (p. 4). In addition, they state that other studies (e.g., Dixon, Kuhlhorst, & Reiff, 2006) report that online community and group cohesion are associated with higher-quality outcomes. Whiteside (2015) states that the results of the Na Ubon and Kimble (2003) multiple-year study of an online graduate certificate program indicated that "(a) higher levels of affect, cohesion, and interaction equate to higher levels of social presence; and (b) more research is needed regarding social presence" (p. 2).

Instructor Involvement. The involvement of online instructors has been examined in several studies, which find that it is critical that instructors are involved with their students in online learning communities (Garrison & Cleveland-Innes, 2005). Instructor involvement is a necessary component for enhancing feedback for learners in the context of online interaction. Instructor-student interaction is positively correlated with teaching effectiveness in online courses (Hay et al., 2004). Instructors' presence and involvement within online learning environments is one of

three key issues related to social presence (Mandernach, Gonzales, & Garrett, 2006). The prior knowledge and experience of participants affects instructors' involvement. Whiteside (2015) discusses an example of one course's participants being more professionally similar to each other and more socially comfortable as a result. To make the stilted course seem more equally experienced and to make students' voices seem more equally valued, the instructors manipulated the questions asked as part of discussions to topics more directly related to the students' professional experience, rather than to general concepts. As the author of the SPM states, "because of the difference in prior experience, the instructors adjusted the content in ways that ultimately affected the level of social presence in the course" (p. 9). When analyzing the discussion posts for instructor involvement, Whiteside (2015) found that the average number of words in each discussion post increased from 179 words in the first cohort (which has less knowledgeable and experienced participants) to 203 words in the second cohort (which has more knowledgeable and experienced participants). Responses were longer, but they also decreased students' social presence as they felt the responses were "more academic" and less related to themselves and their interests (p. 9). If the instructor is more involved, the students are more likely to post metacognitively. This is due to the metacognitive skills students were required to use in the second cohort in order to determine what the instructor wanted versus what they themselves wanted to communicate to the group. Thus, the author of this research succeeded in testing the hypotheses that instructor involvement is a component of social presence.

Instructor Knowledge and Experience. The factor of the perceived knowledge and experience is an important and critical element related to social presence. Whiteside (2015) states that "prior knowledge and experiences play an essential role in building social presence" (p. 14). From Dewey's perspective, learning is a result of collaboration and knowledge construction based on

experience. Some of the educational environments are text-based environments, where social presence needs to be enhanced to promote socialization and knowledge construction. DeSchryver et al. (2009) state that those Communities of Inquiry also increase the flow of information and construct knowledge. As a result, members in those communities participate through their unique experience in the field in which they are working. According to Dawson (2006), limited face-to-face interactions may constrain social skill development and knowledge-sharing, limiting students' ability to form and construct knowledge in online communities. Whiteside (2015) describes how prior knowledge and experience affects instructors' involvement in the online community, which impacts the level of social presence the participants feel in the online community. However, students who perceive themselves as less knowledgeable are also less likely to feel comfortable and able to fully engage in discussions, in turn affecting their interaction intensity and feelings of being part of the community. When analyzing the discussions for the knowledge and experience measure, Whiteside (2015) found that the average number of codes for each participant was approximately 316 for the first cohort, which had more knowledgeable and experienced participants. In the second cohort, which had fewer knowledgeable and experienced participants, the average number of codes for each participant was approximately 178. Thus, the author of this social presence model indicated that instructor knowledge and experience is a component of social presence.

Summary

This chapter included an introduction of distance and online learning literature, a brief history of online classes and the use of technology within educational settings, recent statistics about distance courses, the spread of MOOCs, descriptions of terms relevant to online classes as well as distance education programs, and current concerns in the field of online education. This

review demonstrated the growth both distance and online learning has experienced since the 1980s and 1990s. In addition, this chapter provided a history of presence and an overview of the Community of Inquiry framework. Most importantly, this chapter illustrated the Social Presence Model, which is the framework used in this study, as well as the five factors affecting social presence in online educational environments.

Chapter Three

Introduction

The main purpose of this study, as presented in this chapter, is to investigate and evaluate the structural relationships between the five indicators of the proposed Social Presence Model (SPM) and social presence. These five factors are theorized as influential factors that affect social presence in online learning environments. Prior to analysis, several indispensable prerequisite steps were required to investigate the full structural of the SPM. These include: 1) evaluating the measurement part of the *revised* scales of the three original indicators (affective association, interaction intensity, and community cohesion) of social presence as discussed later in detail in this chapter; 2) investigating the structural relationships of these three original indicators and social presence; and 3) developing two scales for the proposed two additional indicators (instructor involvement, and instructor knowledge and experience). After these three prerequisites steps, a final step involved inspecting the full structure of the SPM, which is the primary goal of the current research. In addition, this chapter elucidates the instrumentation process of the scales, the validity and reliability, the research methodology, the measurement and structural models, the criteria for evaluating model fit indices, the variables of the models, the research questions, the participants within the study, and the data collection. This section also provides a chapter summary.

Instrumentation

The total number of items included in the instrument was 51 items. Out of the 51 items, 43 measured the six SPM constructs (social presence, affective association, interaction intensity, community cohesion, instructor involvement, and instructor knowledge and experience), six

measured demographic items (e.g., Educational Level, Age, and Ethnicity), one item for Informed Consent, and one Inattentive Response Detection item. The social presence construct was measured utilizing eight items, the affective association was measured using six items, interaction intensity was measured through seven items, community cohesion was measured using seven items, instructor involvement was measured through eight items, and the instructor knowledge and experience was measured utilizing seven items. The 43 items were scored on a five-point Likert scale as follows: *Strongly Disagree* = 1, *Disagree* = 2, *Neither Agree nor Disagree* = 3, *Agree* = 4, and *Strongly Agree* = 5 (*See Appendix*).

Validity

A valid instrument was necessary to measure the specified six constructs. In order to achieve this goal, the researcher developed items to measure the construct of social presence using the definitions of social presence (e.g., “salience”, “projection”, etc.). Following the development of the social presence items, the items were reviewed by educational technology faculty members, then reviewed by pioneers in the social presence literature, such as Dr. Charlotte Gunawardena, one of the leading authors in the field of social presence, to ensure the validity of the scale. The final social presence scale consists of eight items to measure the perceived social presence (*See Appendix*).

Although the three original indicators (affective association, interaction intensity, and community/group cohesion) of the social presence model have already been examined in the social presence literature, both specifically and generally within the Community of Inquiry (CoI) framework literature, how these three original constructs were measured still constitutes a critical validity issue. Most studies (e.g., Arbaugh et al., 2008; Lim & Richardson, 2016; Kovanović et al., 2018; Kozan & Richardson, 2014; Seckman, 2018; Traver, Volchok, Bidjerano, & Shea,

2014) that used the social presence scale borrowed the items of the scale from the Community of Inquiry Questionnaire (CoIQ). However, the items that measure the indicators of social presence of this questionnaire may *not* seem to measure the intended constructs. Thus, the validity of the measures used in the aforementioned studies is under scrutiny.

Lowenthal and Dunlap (2014) argue that these scales do not measure the intended social presence indicators. For example, some of the items of the open/interactive communication measure (e.g., “I felt comfortable conversing through the online medium”; “I felt comfortable participating in the course discussions”; and “I felt comfortable interacting with other course participants”) focus “too much on one’s comfort level and not enough on one’s ability or one’s actual behavior online as the indicators do” (p. 24). Another example is the group cohesion factor that includes some items that seem to measure a different factor, noting that:

One problem with this question [I felt comfortable disagreeing with other course participants while still maintaining a sense of trust] is that when one looks at the indicators developed by Rourke, Anderson, Garrison, and Archer (2001), agreement was originally considered an indicator of open/interactive communication and not group cohesion (Lowenthal & Dunlap, 2014, p. 25).

They also revised and modified the CoIQ and proposed scales to measure the three original indicators. Therefore, the researcher used developed items as proposed by Lowenthal and Dunlap (2014) that evaluated the items of the social presence indicators of the COIQ items, as well as modified and proposed new items to measure these three original indicators, and the author developed one additional item for the group cohesion scale. In addition, the author developed items for the two additional factors of the proposed Social Presence Model, namely: instructor involvement, and instructor knowledge and experience based on Whiteside’s (2015) qualitative codes.

Reliability Estimates

Although almost all of the previous studies in the social presence literature used Cronbach alpha coefficients to calculate the reliability estimates of the scales, the researcher in the current study used McDonald's *omega* as the reliability coefficient to estimate the reliability of each of the six scales (McDonald, 2013; Dunn, Baguley, & Brunsten, 2014; Deng & Chan, 2017). Omega estimate is a commonly used reliability coefficient when using the structural equation modeling method (Wirth & Edwards, 2007) as there is "less risk of overestimation or underestimation of reliability" (p. 13). Thus, all reliability estimates in the following sections were calculated using omega equations to estimate the reliability coefficient of each construct scale.

Methodology

In the current study, the researcher conducted six Item Factor Analytic (IFA) models and omega calculations (Wirth & Edwards, 2007) to ensure that the scales were valid and reliable prior to investigation of the structure of the proposed Social Presence Model (SPM). This means that the model fit indices of the IFA models and omega functions for reliability estimates. Afterwards, the author conducted two different Structural Equation Modeling (SEM) models to investigate the structural relationships among the exogenous and endogenous variables. The exogenous and endogenous variables are described at the end of this chapter. The first SEM was conducted to evaluate the structural model of the three original social presence indicators (affective association, interaction intensity, and group cohesion) using only the newly revised scales, and the second SEM was conducted as the full model to examine the proposed SPM

including the five indicators (affective association, interaction intensity, community cohesion, instructor involvement, and instructor knowledge and experience) of social presence.

Measurement Model. Because of the measurement limitations of previous social presence scales and the need for robust measurement models, this study used the IFA approach to evaluate the measurement models prior to investigating the structural relationships of the proposed SPM. The evaluated scales are as follows: social presence, affective association, interaction intensity, community cohesion, instructor involvement, and instructor knowledge and experience. To account for the non-normality of the distributions of the observed variables in this measurement model, the diagonally weighted least squares (DWLS) estimation approach was used for these categorical responses within the IFA models. Each measurement model was evaluated using four fit indices, which are based on the differences between the predicted and observed models, as follows: 1) Comparative Fit Index (CFI), 2) Tucker-Lewis Index (TLI), the Root Mean-Square Error of Approximation (RMSEA), and 4) the Standardized Root Mean Square Residual (SRMR) as discussed below. In addition to these four criteria, the author also reported the ChiSquare statistics test (X^2) and the Degrees of Freedom (DF) of each model. To ensure the reliability of these six scales (social presence, affective association, interaction intensity, community cohesion, instructor involvement, and knowledge and experience), the researcher calculated omega estimates to obtain the reliability estimate for each model.

Structural Model

The goal of completing the structural models, or the path models, is to depict the relationships of dependency between the latent exogenous variables and the endogenous variable, which is usually accepted as causal between the variables (McDonald & Ho, 2002). In this research, two SEM models in R program using Lavaan package with DWLS estimator

(Rosseel, 2012) were conducted to test the empirical relationships between the indicators of social presence as exogenous variables and social presence as an endogenous variable. The first SEM was conducted to examine the three original social presence indicators (affective association, interaction intensity, and community/group cohesion) with social presence, and the second SEM was conducted to examine full SPM indicators (affective association, interaction intensity, and community/group cohesion, instructor involvement, and knowledge and experience) with social presence. The researcher also examined the directionality of significant relationships. Each structural model was evaluated using the four fit indices: CFI, TLI, RMSEA, and SRMR as discussed in the following section. In addition to these four criteria, the author also reported Chi-square statistic test (X^2) and the Degrees of Freedom (DF) of each model.

Fit Indices

The fit indices represent how a proposed model or theory fits the sample data (McDonald & Ho, 2002). By using fit indices, researchers can compare which model or theory best fits the sample data. In the current study, the researcher used four fit indices as criteria to evaluate model fit. The following fit indices were used to examine each model fitness: 1) Comparative Fit Index (CFI), 2) Tucker-Lewis Index (TLI), the Root Mean-Square Error of Approximation (RMSEA), and 4) the Standardized Root Mean Square Residual (SRMR). The acceptable CFI and TLI fit indices range from .90 to 1.00, with proximity to 1.00 indicating better fit. The acceptable RMSEA and SRMR fit indices range from 0.00 to .08, with proximity to zero indicating better fit. The model Chi-square (chisq) statistic test and the Degrees of Freedom (DF) are also reported of each model (Brown, 2015; Kline, 2015). The chi-square test statistic is also reported but not considered a fit index nor is it used here as a fit index due to its "severe limitations" in its

assumptions such as "multivariate normality" (Hooper, Coughlan, & Mullen, 2008, p. 2) and the sensitivity to the size of the sample (Bentler & Bonett, 1980; Bentler, 1990).

Participants

The target sample of this study was comprised of both male and female graduate and undergraduate students who were taking *fully* online courses in higher education institutions in the United States. Participants were of different ethnic backgrounds, including Caucasian, African American, Hispanic, Asian, Native American, and racially mixed groupings. Prior to distributing the survey link to the participants taking fully online courses, the researcher obtained an Institutional Review Board (IRB) approval to ensure that ethical and legal requirements were met to ensure the safety of all study subjects prior to conducting the described research.

Data Collection

A 51-item online instrument containing the six scales (social presence, affective association, interaction intensity, community cohesion, instructor involvement, and knowledge and experience scales), six demographic items, one Informed Consent item as well as one Inattentive Response Detection item was designed and then distributed by the end of the Fall 2018 semester and the end of the Spring 2019 academic year to students taking fully online courses through Qualtrics' platform. The researcher emailed a survey link to instructors teaching online classes for them to distribute to their students. When the data were completed online and the sample size was met to conduct the statistical requirement (i.e., > 200 participants, Barrett, 2007; Brown, 2015), the data was exported from Qualtrics and then imported for data cleaning, data coding, and data analysis using R version 1.1 (R Core Team, 2016), along with the multiple R packages described in the following chapter.

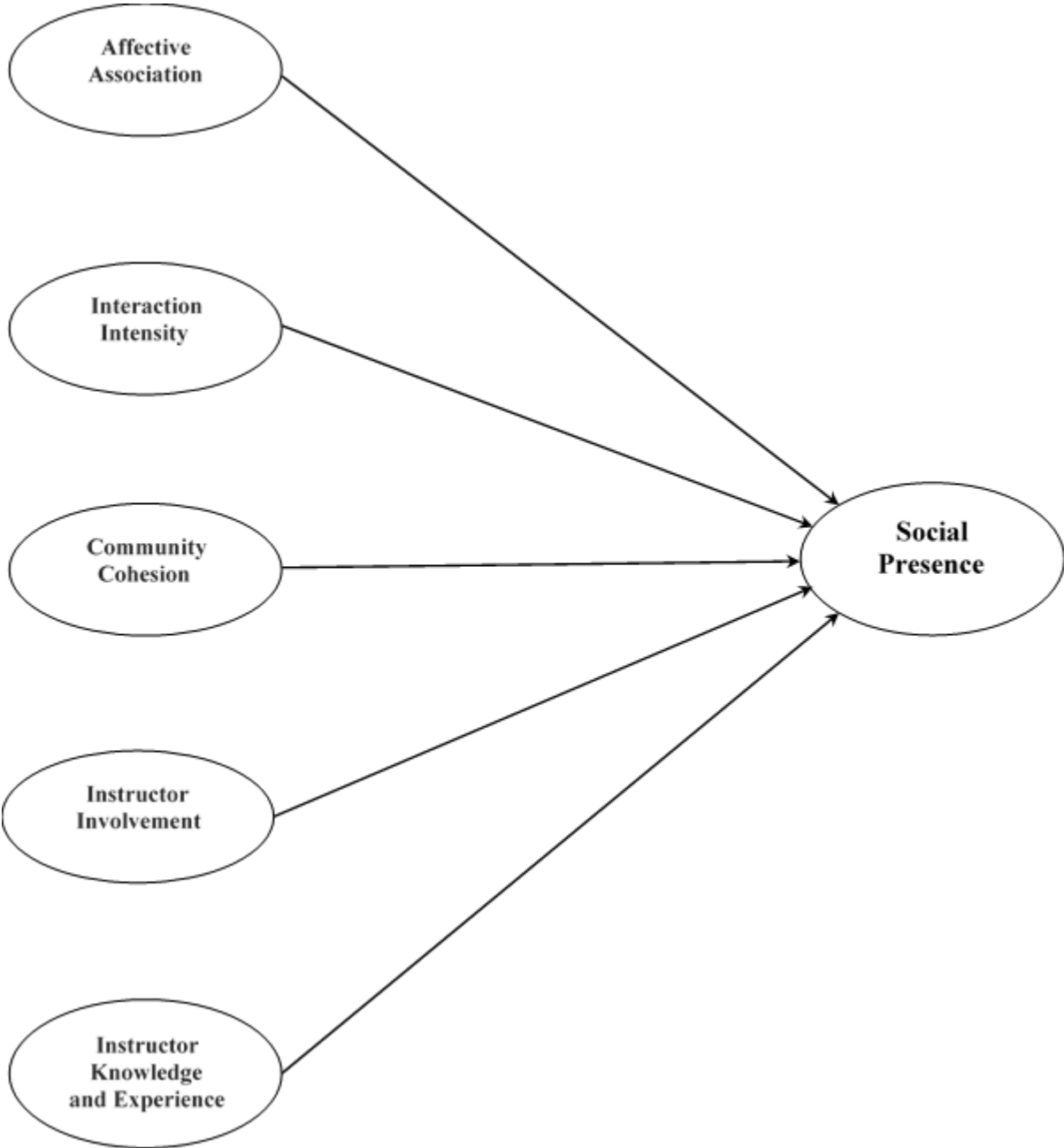
Measurement Research Question

Research Question One: To what extent do social presence, affective association, interaction intensity, community cohesion, instructor involvement, and instructor knowledge and experience influence responses on their analogous items?

Structural Research Question

Research Question Two: To what extent do affective association, interaction intensity, community cohesion, instructor involvement, and knowledge and experience predict social presence? (See Figure 2 below).

Figure 2: The Full Social Presence Model Structure



Exogenous and Endogenous Latent Variables

There were six latent factors included in the current research models, including both exogenous and endogenous variables. The definitions of the exogenous and endogenous variables are as follows:

Exogenous latent variables. The exogenous variables act like independent or predictor variables. Gefen, Straub, and Boudreau (2000) state that an exogenous variable “acts only as a predictor or ‘cause’ for other constructs in the model. In terms of a path diagram, the exogenous constructs have only causal arrows leading out of them and are not predicted by any other constructs in the model.” (p. 67). The first SEM model, which investigated the three original social presence indicators, included three exogenous variables: affective association, interaction intensity, and community cohesion. The second SEM model, which investigated the full SPM, included five exogenous variables: affective association, interaction intensity, community cohesion, instructor involvement, and instructors knowledge and experience.

Endogenous latent variable. Endogenous variables act like criterion, outcome, or dependent variables in a model. Gefen et al. (2000) define an endogenous variable as the dependent variable predicted by one or more exogenous variables. An endogenous variable has at least one or more path pointing to it. Each of the two SEM models included only one endogenous variable, namely social presence.

Summary

In this chapter, the research presented an overview of the social presence model, the instrumentation included in this research with the items and how they were developed, the validity of the six latent construct scales, the McDonalds omega reliability estimate, and the

methodology of this research, including both the measurement and the structural models as well as the fit indices for model evaluation. In addition, the participant information was included along with the data collection process, the research questions, and the definitions of the exogenous and endogenous latent variables.

Chapter Four

Introduction

This section presents the data analysis and results which answer the two primary research questions of this study. The instrumentation, data collection, data cleaning and coding, the criteria established by the researcher, and the critical steps undertaken to assure the quality of the data before conducting the measurement and statistical analysis are explained within this chapter. This section also describes the participants of the study; provides descriptive statistics for the subjects and correlation matrices for each scale; presents the development of the Social Presence Model (SPM) scales; and provides details about how the individual scales were evaluated, including the validity and reliability procedures of the scale development. First, the answers to the initial primary research question are presented, followed by a demonstration of how the question is answered by conducting six Item Factor Analytic (IFA) models. In addition, this chapter pre-analyzes the second primary research question by conducting the first SEM to investigate the three original social presence indicators. Second, this chapter mainly elucidates and presents the second primary research question and how it is answered by conducting the second SEM to investigate the structural relationships of the proposed SPM, as well as a summary of the results of this research.

Instrumentation

The final distributed instrument included a total of 51 items: 43 items to measure the social presence construct and the five indicators of the SPM, six demographic items, one Informed Consent item, and one Inattentive Response Detection item. Specifically, for the evaluation of this SPM framework, there were eight items to measure social presence, six items

to measure affective association, seven items to measure interaction intensity, seven items to measure group cohesion, eight items to measure the perceived instructor involvement, and seven items to measure the perceived knowledge and experience of the instructor.

Regarding the development of the items, the social presence items were developed from different social presence definitions (e.g., “salience”, “projection”, etc.) as described previously. In addition, items that Lowenthal and Dunlap (2014) proposed to measure the three original social presence indicators (affective association, interaction intensity, and community cohesion) were utilized within this research. For the two additional proposed factors, the author for the current study developed items based on Whiteside’s (2015) qualitative codes. Each of the 43 items used a five-point Likert scale that ranged from *Strongly Disagree* (1) to *Strongly Agree* (5). All these items are included in the *Appendix*.

Data Collection, Cleaning and Coding, and Quality Assurance

To collect data, an instrument link was distributed to graduate and undergraduate students taking *fully* online classes by the end of the Fall of 2018 and the end of the Spring 2019 academic year semesters. Once the data were collected, they were imported from Qualtrics, then cleaned and diagnosed via R software using packages such as *lavaan* (Rosseel, 2012), *ggplot2* (Wickham, 2016), *psych* (Revelle, 2018), *stats* (R Core Team, 2019), *haven* (Wickham & Miller, 2019), *pander* (Daróczy & Tsegelskyi, 2017), *dplyr* (Wickham, François, Henry, & Müller, 2019), *tidyr* (Wickham & Henry, 2019), *semPlot* (Epskamp, 2019), and *kableExtra* (Zhu, 2019). Regarding coding responses of the items, the responses were coded as follows: *Strongly Disagree* as 1, *Disagree* as 2, *Neither Agree nor Disagree* as 3, *Agree* as 4, and *Strongly Agree* as 5. Subsequently, each item was renamed as represented in the attached tables and figures as follows: *SP* indicates social presence items, *AffAsso* indicates affective association items, *IntInt*

indicates interaction intensity items, *GrCo* indicates group cohesion items, *InsInv* indicates instructor involvement items, and *KnEx* indicates the perceived instructor knowledge and experience items. To assure the quality of the data before analysis, the researcher undertook the following assurance steps during the data cleaning process:

1. any participants who selected “No” to the Informed Consent question were removed from the data before the analysis,
2. any participants who selected “No” to the Location of the Institution question were removed from the data before the analysis,
3. any participants who selected “Strongly Disagree”, “Disagree”, “Neither Agree nor Disagree”, or “Strongly Agree” to the Inattentive Response Detection item included within the instrument, were removed from the data before the analysis, and
4. any participants who typed indecipherable language responses to the Name of the Class question were removed from the data before the analysis (*See Appendix*).

Sample Description

The final sample of this study consisted of 411 participants taking *fully* online classes in higher education institutions in the United States. Out of those 411 participants, there were 276 (67.15%) undergraduates and 135 (32.85%) graduates. The average age of the participants was 25.3 years old with 8.34 Standard Deviations (SD), and the median age of the subjects was 22 years old. Regarding their gender, out of the 411 participants, there were 350 (85.16%) females and 61 (14.84%) males. In terms of their ethnicity, 236 (57.42%) identified as White/Caucasian, 68 (16.55%) as Black/African American, 26 (6.33%) as Hispanic, 31 (7.54%) as Asian/Pacific Islander, seven (1.7%) as Native American /Alaskan Native, 37 (9%) as multi-ethnic, and six (1.46%) as Other. Table 1 below presents the sample of the study.

Table 1: Sample Demographic Variables Table.

Variables	Category	N	Percentage
Education Levels	Undergraduates	135	32.85%
	Graduates	276	67.15%
Gender	Females	350	85.16%
	Males	61	14.84%
Ethnicity	White/Caucasian	236	57.42%
	Black/African American	68	16.55%
	Hispanic	26	6.33%
	Asian/Pacific Island	31	7.54%
	Native American/Alaskan	7	1.7%
	Native		
	Multi-ethnic	37	9%
	Others	6	1.46%

Descriptive Statistics for Gender and Education Level Variables

This section presents the means and standard deviations of the six variables (social presence, affective association, interaction intensity, community cohesion, instructor involvement, and instructor knowledge and experience) of each category of the two demographic variables (gender and education level). For gender, although there was not significant variance among mean scores, males indicated higher mean scores on instructor involvement and instructor knowledge and experience, while females indicated higher mean scores on social presence, affective association, and interaction intensity. Both males and females scored equivalently on group cohesion as well as social presence. However, males had more variability on affective association only, while females had more variability on interaction intensity, group cohesion, instructor involvement, and instructor knowledge and experience.

For education level, although mean scores again did not vary widely, graduates indicated higher mean scores on social presence, affective association, interaction intensity, and group cohesion while undergraduates indicated higher mean scores on instructor involvement. Both graduates and undergraduates scored equivalently on instructor knowledge and experience.

Regarding the variation of the education level categories, graduates had more variability on instructor involvement and instructor knowledge and experience, while undergraduates had more variability on social presence, affective association, interaction intensity, and group cohesion.

Table 2 below represents the mean scores as well as the standard deviations in parentheses.

Table 2: Mean and Standard Deviation Table.

Factors	Gender		Education Level	
	<u>Males</u>	<u>Females</u>	<u>Graduates</u>	<u>Undergraduates</u>
Social Presence	3.3 (.88)	3.5 (.88)	3.7 (.81)	3.3 (.90)
Affective Association	3.1 (.94)	3.3 (.92)	3.6 (.79)	3.1 (.95)
Interaction Intensity	3.6 (.77)	3.8 (.81)	3.9 (.72)	3.6 (.83)
Group Cohesion	3.6 (.78)	3.6 (.88)	3.8 (.69)	3.5 (.92)
Instructor Involvement	3.8 (.66)	3.6 (.95)	3.6 (1.04)	3.7 (.85)
Instructor Knowledge and Experience	3.9 (.64)	3.8 (.89)	3.8 (.97)	3.8 (.79)

Research Question One:

The first research question was answered through conducting six Item Factor Analytic models. Research Question One:

- To what extent do social presence, affective association, interaction intensity, community cohesion, instructor involvement, and instructor knowledge and experience influence responses on their respective items?

Item Factor Analytic (IFAs) Models

To assure that the individual items of each scale fit well in the local fit (within each scale), the researcher conducted six IFA models with the Diagonally Weighted Least Squares (DWLS) estimator to investigate the fitness of each model. The researcher used the following fit indices to examine each model fitness: Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square

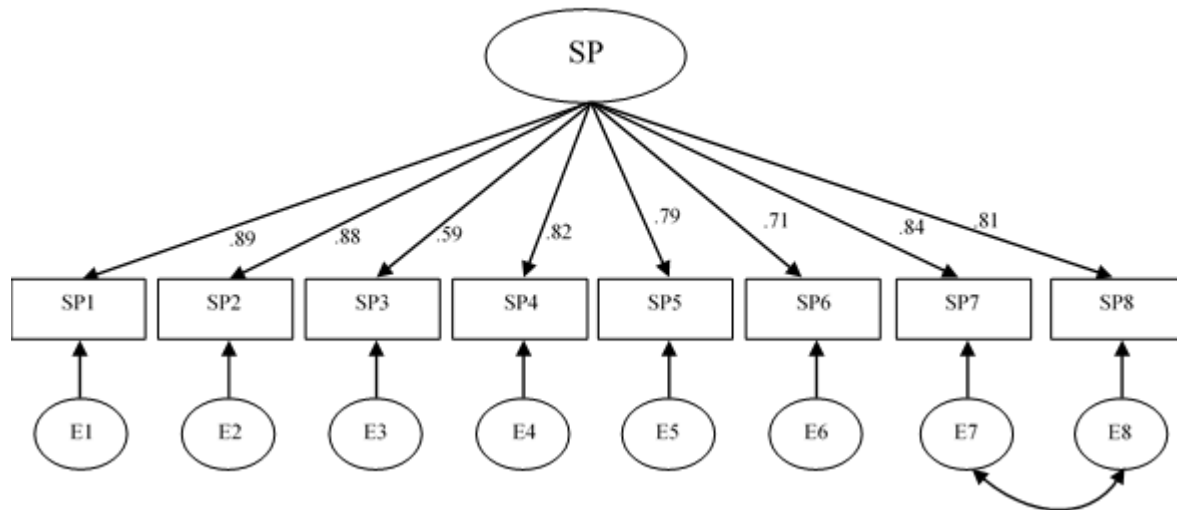
Residual (SRMR) (Brown, 2015; Kline, 2015). In addition, the model Chi-square (chisq) statistic test and the Degrees of Freedom (DF) are also reported but not used as criteria for model fitness. The acceptable fit indices are as follows: for CFI and TLI, from .90 to 1.00, with closeness to 1 indicating better fit; for RMSEA and SRMR, from 0.00 to .08, with closeness to zero indicating better fit (Brown, 2015; Kline, 2015; Maydeu-Olivares & Joe, 2014). Hu and Bentler (1999) and Hooper et al. (2008) indicate that values as high as .08 are acceptable for SRMR. The author conducted and evaluated all measurement models constraining the factor mean to zero and each factor variance equal to one (Kline, 2015).

Social Presence Scale. To assure that the individual items of the social presence scale worked well in the local fit, the researcher conducted IFA with DWLS estimator to investigate the fit indices of the social presence scale. When looking at items SP7 ("*I could easily project the participants' personal characteristics into the online course.*") and SP8 ("*I was able to project course participants effectively into the online course.*"), one can see that the two items question the "projection" of the participants in OLEs; thus, a residual covariance between SP7 and SP78 was specified. The final fit indices of the final social presence scale were as follows: CFI = .998, TLI = .997, RMSEA = .068, SRMR = .036, and $X^2(19) = 54.815$, which indicated good model fit. The standardized item loadings of the social presence factor range from .59 to .89 (See the complete table in the *Appendix*). Omega reliability estimate of the social presence scale was .92. Table 3 below shows the correlation coefficients between each pair of the items:

Table 3: Social Presence Correlation Table.

	SP1	SP2	SP3	SP4	SP5	SP6	SP7	SP8
SP1	1	0.762	0.425	0.615	0.565	0.506	0.710	0.666
SP2	0.762	1	0.458	0.636	0.572	0.557	0.691	0.601
SP3	0.425	0.458	1	0.467	0.463	0.430	0.381	0.434
SP4	0.615	0.636	0.467	1	0.663	0.571	0.611	0.614
SP5	0.565	0.572	0.463	0.663	1	0.537	0.573	0.621
SP6	0.506	0.557	0.430	0.571	0.537	1	0.571	0.551
SP7	0.710	0.691	0.381	0.611	0.573	0.571	1	0.761
SP8	0.666	0.601	0.434	0.614	0.621	0.551	0.761	1

Figure 3: Social Presence IFA model



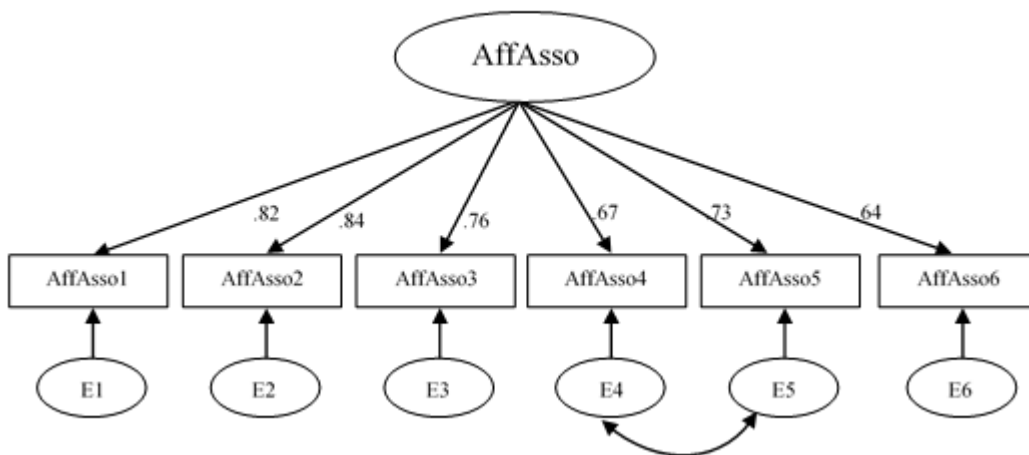
Affective Association scale. For the affective association model, the researcher conducted another IFA to ensure that the scale was evaluated. When looking at the items AffAsso4 ("I self-disclosed personal information about life outside of class.") and AffAsso5 ("Others self-disclosed personal information in the course."), one can see that both items similarly ask about the self-disclosure of personal information. Thus, a residual covariance between AffAsso4 and AffAsso5 was specified. The final fit indices of the affective association are as follows: CFI = .998, TLI = .996, RMSEA = .070, SRMR = .034, and $X^2(8) = 23.887$. The standardized factor loadings of the affective association scale range from .64 to .84 (see the complete table in the

Appendix). Omega reliability estimate of the affective association scale was .86. The table below shows the correlation coefficients between the items:

Table 4: Affective Association Correlation Table.

	AffAsso1	AffAsso2	AffAsso3	AffAsso4	AffAsso5	AffAsso6
AffAsso1	1	0.674	0.500	0.426	0.517	0.483
AffAsso2	0.674	1	0.562	0.458	0.509	0.441
AffAsso3	0.500	0.562	1	0.512	0.513	0.402
AffAsso4	0.426	0.458	0.512	1	0.751	0.394
AffAsso5	0.517	0.509	0.513	0.751	1	0.473
AffAsso6	0.483	0.441	0.402	0.394	0.473	1

Figure 4: Affective Association IFA Model



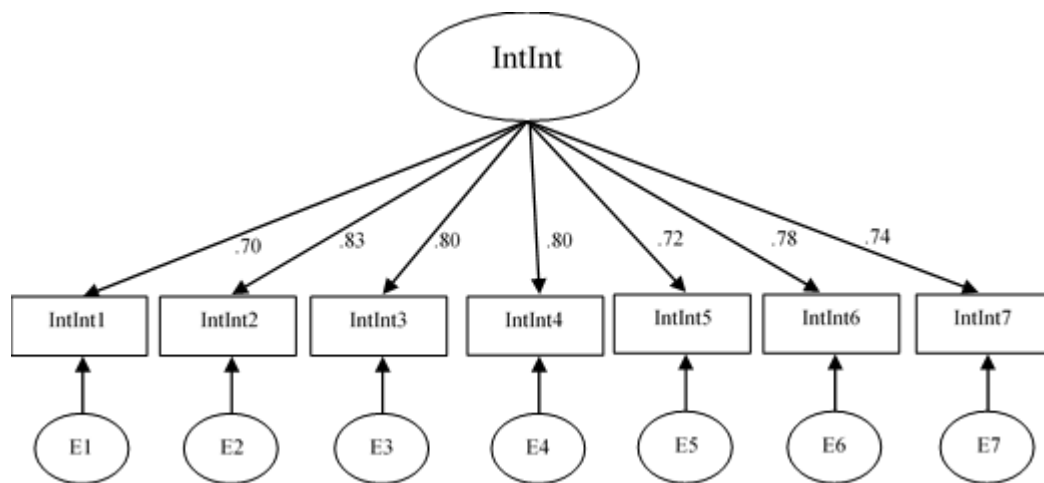
Interaction intensity scale. For the interaction intensity model, the researcher conducted another IFA to assure that the scale is valid. The final fit indices of the interaction intensity are as follows: CFI = .997, TLI = .995, RMSEA = .073, SRMR = .041, and $X^2(13) = 41.653$. The residual of Items IntInt3 ("I felt comfortable participating in online threaded discussions.") and IntInt4 ("I felt comfortable interacting with others.") was correlated due to similarities in measuring "comfort" in OLEs. The standardized factor loadings of the interaction intensity scale range from .70 to .83 (see the complete table in the *Appendix*). Omega reliability estimate of the

interaction intensity scale was .89. Table 5 below shows the correlation coefficients between each pair of the items:

Table 5: Interaction Intensity Correlation Table.

	IntInt1	IntInt2	IntInt3	IntInt4	IntInt5	IntInt6	IntInt7
IntInt1	1	0.578	0.481	0.446	0.351	0.494	0.461
IntInt2	0.578	1	0.604	0.584	0.465	0.586	0.501
IntInt3	0.481	0.604	1	0.778	0.534	0.521	0.553
IntInt4	0.446	0.584	0.778	1	0.589	0.537	0.505
IntInt5	0.351	0.465	0.534	0.589	1	0.505	0.522
IntInt6	0.494	0.586	0.521	0.537	0.505	1	0.585
IntInt7	0.461	0.501	0.553	0.505	0.522	0.585	1

Figure 5: Interaction Intensity IFA Model



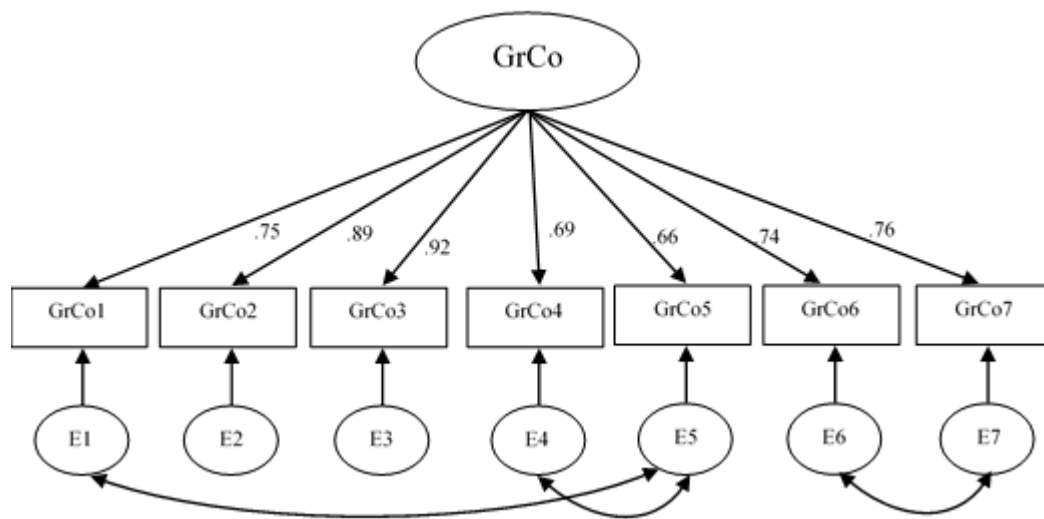
Group Cohesion scale. For the group cohesion model, another IFA was conducted to ensure that the scale was valid. Items GrCo6 and GrCo7 of the group cohesion items ("I referred to other participants by their first name." and "Others addressed me by my first name.") were correlated as they both asked about similar content: the use of participants' first names. In addition, items GrCo1 and GrCo5, and GrCo4 and GrCo5 residual covariance were also correlated. The final fit indices of the group cohesion were as follows: CFI = .999, TLI = .998, RMSEA = .061, SRMR = .030, and $X^2(11) = 27.793$. The standardized factor loadings of the group cohesion scale range

from .66 to .92 (see the complete table in the *Appendix*). Omega reliability estimate of the group cohesion scale was .90. The table below shows the correlation coefficients between the items:

Table 6. Community Cohesion Correlation Table.

	GrCo1	GrCo2	GrCo3	GrCo4	GrCo5	GrCo6	GrCo7
GrCo1	1	0.532	0.575	0.542	0.681	0.495	0.509
GrCo2	0.532	1	0.772	0.513	0.489	0.589	0.600
GrCo3	0.575	0.772	1	0.535	0.536	0.587	0.617
GrCo4	0.542	0.513	0.535	1	0.588	0.452	0.421
GrCo5	0.681	0.489	0.536	0.588	1	0.427	0.492
GrCo6	0.495	0.589	0.587	0.452	0.427	1	0.762
GrCo7	0.509	0.600	0.617	0.421	0.492	0.762	1

Figure 6: Group Cohesion IFA Model



Instructor Involvement scale. For the perceived instructor involvement model, another IFA was conducted to assure that the scale was valid. Two pairs of the instructor involvement scale items were correlated. The first pair (item InsInv4 "The instructor facilitated student engagement in the discussions." and item InsInv7 "The instructor enhanced student engagement in the discussions.") was correlated as they both asked about engagement. In addition, items InsInv5 ("The instructor provided high quality feedback.") and InsInv6 ("The instructor provided useful

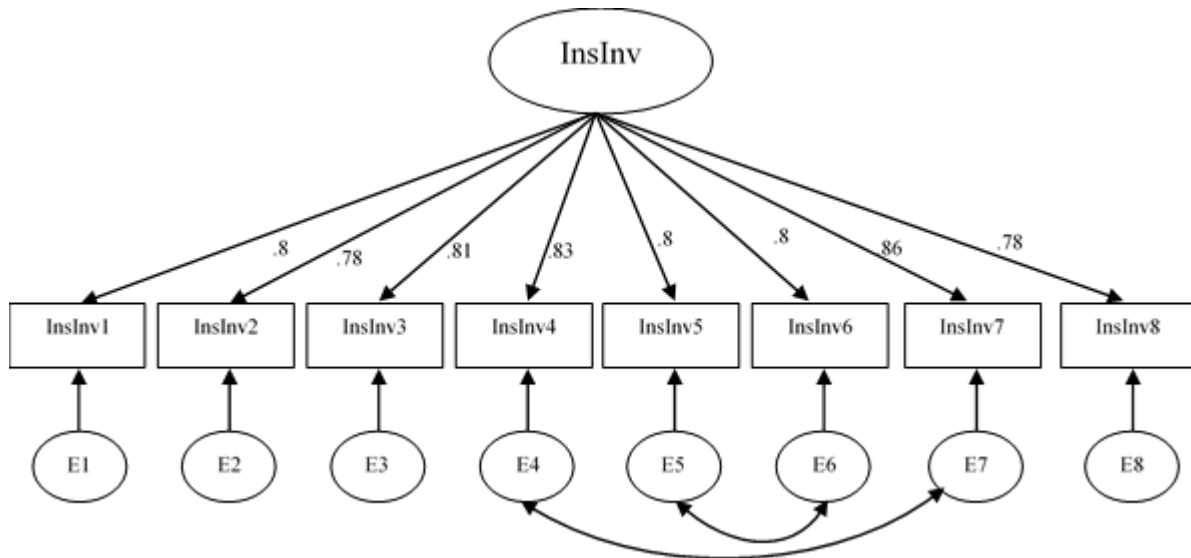
feedback regularly.") were also correlated as they both asked about a similar concept, instructors' feedback. The final fit indices of the perceived instructor involvement are as follows: CFI = .997, TLI = .996, RMSEA = .080, SRMR = .041, and $X^2(18) = 70.185$. The standardized factor loadings of the perceived instructor involvement scale range from .78 to .86 (see the complete table in the *Appendix*). Omega reliability estimate of the instructor involvement scale was .92.

The table below shows the correlation coefficients between the items:

Table 7: Instructor Involvement Correlation Table.

	InsInv1	InsInv2	InsInv3	InsInv4	InsInv5	InsInv6	InsInv7	InsInv8
InsInv1	1	0.672	0.555	0.598	0.584	0.612	0.580	0.454
InsInv2	0.672	1	0.525	0.563	0.620	0.575	0.552	0.493
InsInv3	0.555	0.525	1	0.620	0.579	0.591	0.630	0.618
InsInv4	0.598	0.563	0.620	1	0.628	0.627	0.784	0.620
InsInv5	0.584	0.620	0.579	0.628	1	0.758	0.631	0.526
InsInv6	0.612	0.575	0.591	0.627	0.758	1	0.642	0.498
InsInv7	0.580	0.552	0.630	0.784	0.631	0.642	1	0.662
InsInv8	0.454	0.493	0.618	0.620	0.526	0.498	0.662	1

Figure 7: Instructor Involvement IFA Model



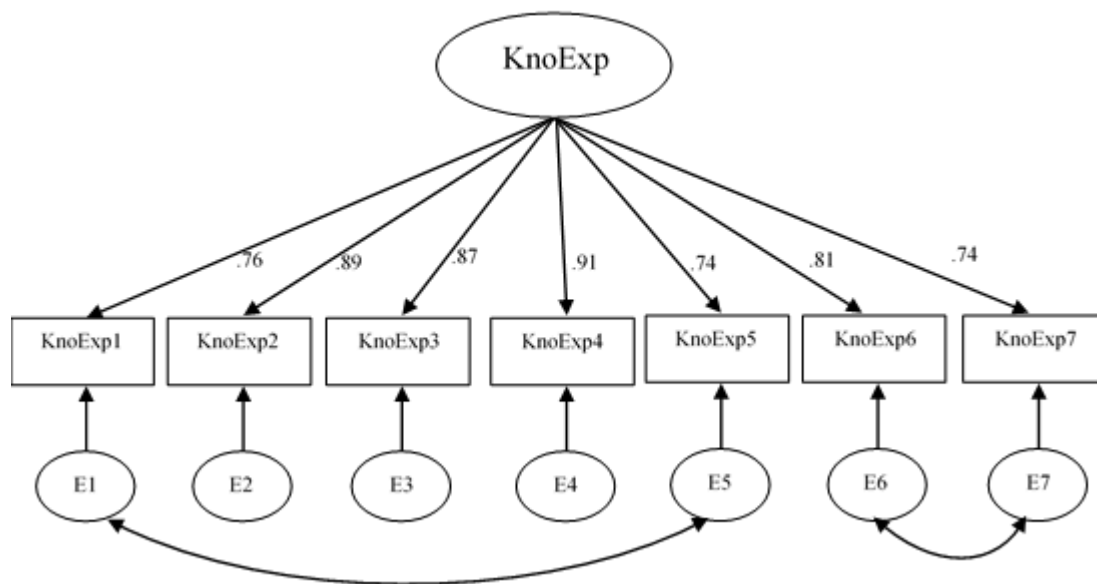
Instructors' perceived knowledge and experience scale. Finally, for the perceived knowledge and experience model, another IFA was conducted to assure that the scale was evaluated. Items

KnEx1 and KnEx5 as well as items KnEx6 and KnEx7 have similar wordings (“*sharing*” and “*teaching experience*”), thus the residuals covariances were correlated due to similarities in the measurement. The final fit indices of the perceived knowledge and experience are as follows: CFI = .999, TLI = .998, RMSEA = .059, SRMR = .027, and $X^2(12) = 29.237$. The standardized factor loadings of the perceived knowledge and experience scale range from .74 to .91 (see the complete table in the *Appendix*). Omega reliability estimate of the perceived knowledge and experience scale was .92. The table below shows the correlation coefficients between the items:

Table 8. Knowledge and Experience Correlation Table.

	KnEx1	KnEx2	KnEx3	KnEx4	KnEx5	KnEx6	KnEx7
KnEx1	1	0.583	0.660	0.619	0.642	0.522	0.446
KnEx2	0.583	1	0.665	0.773	0.571	0.670	0.565
KnEx3	0.660	0.665	1	0.728	0.654	0.621	0.573
KnEx4	0.619	0.773	0.728	1	0.557	0.678	0.595
KnEx5	0.642	0.571	0.654	0.557	1	0.495	0.519
KnEx6	0.522	0.670	0.621	0.678	0.495	1	0.672
KnEx7	0.446	0.565	0.573	0.595	0.519	0.672	1

Figure 8: Knowledge and Experience IFA Model



Latent Construct Correlation Coefficients

A full measurement model was conducted to investigate the relationships between the six latent constructs. Overall, the model fit well according to the fit indices: CFI = .991, TLI = .990, RMSEA = .069, SRMR = .061, and $X^2(833) = 2469.472$. The results indicate moderate to high correlation coefficients among the six constructs ranging from .47 to .84 correlation coefficients. Overall, the three original indicators (i.e., affective association, interaction intensity, community cohesion) correlate highly with the social presence construct. The two additional constructs (i.e., instructor involvement, instructor knowledge and experience) correlate moderately with social presence. Although the two additional constructs correlate lower than the three original indicators with social presence, they correlate highly with one another.

Specifically, social presence correlates positively with affective association ($r = .83, p < .001$), with interaction intensity ($r = .76, p < .001$), with group cohesion ($r = .77, p < .001$), with the perceived instructor involvement ($r = .61, p < .001$), and with the perceived knowledge and experience ($r = .55, p < .001$). Affective association correlates positively with interaction intensity ($r = .80, p < .001$), with group cohesion ($r = .80, p < .001$), with instructor involvement ($r = .56, p < .001$), and with knowledge and experience ($r = .47, p < .001$). Interaction intensity correlates positively with group cohesion ($r = .81, p < .001$), with instructor involvement ($r = .56, p < .001$), and with instructor knowledge and experience ($r = .49, p < .001$). Group cohesion correlates positively with instructor involvement ($r = .56, p < .001$), and with knowledge and experience ($r = .50, p < .001$). Finally, instructor involvement correlates positively with instructor knowledge and experience ($r = .84, p < .001$). See the correlation table 9 below.

Table 9: Constructs' Correlation Table.

	SP	AffAsso	IntInt	GrCo	InsInv	KnEx
SP	1	0.83	0.80	0.77	0.61	0.55
AffAsso	0.83	1	0.80	0.80	0.56	0.47
IntInt	0.80	0.80	1	0.81	0.56	0.49
GrCo	0.77	0.80	0.81	1	0.56	0.50
InsInv	0.61	0.56	0.56	0.56	1	0.84
KnEx	0.55	0.47	0.49	0.50	0.84	1

SEM Results of Three Original Indicators Model.

Before examining the fully proposed Social Presence Model (SPM), it was necessary to investigate 1) the correlation between these three original indicators within one model, and 2) the structural relationships of the original social presence model (Rourke et al., 2001) using the newly developed scales (Lowenthal & Dunlap, 2014). The results indicate that when the three original indicators were included as latent constructs, the three factors correlate highly with one another. Affective association correlates with interaction intensity ($r = .800, p < .001$) and with group cohesion ($r = .803, p < .001$). Interaction intensity correlates with group cohesion ($r = .816, p < .001$). This is a confirmation of the literature that the newly developed scales fit well for measuring the three original factors of social presence.

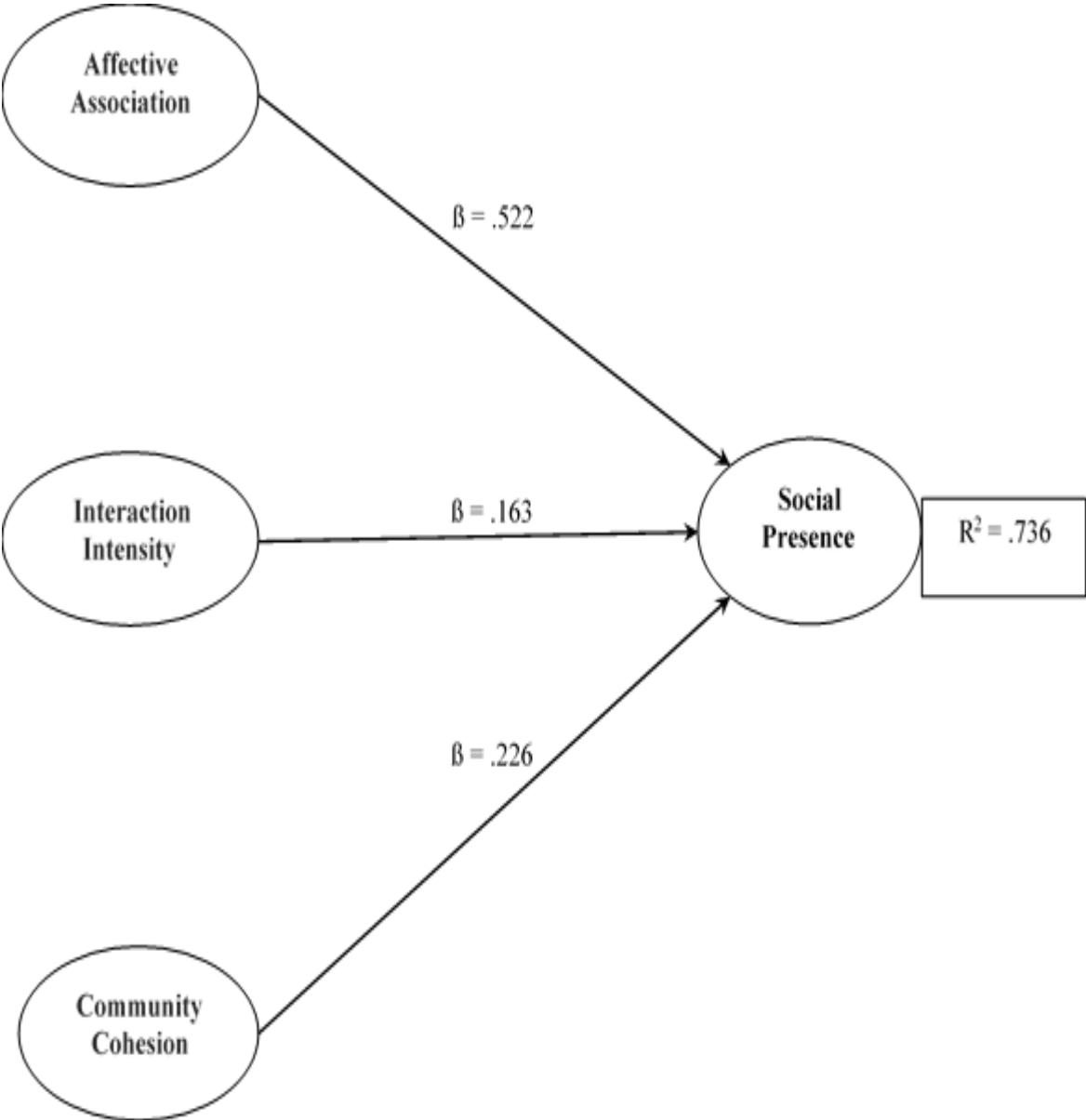
In addition, a Structural Equation Model (SEM) with WLSMV estimator in R software using lavaan package (Rosseel, 2012) was conducted to investigate the structural relationships of the three original indicators of social presence, namely: affective association, interaction intensity, and group cohesion. The results of the three original indicators indicate that all three indicators fit well into one model jointly predicting social presence. The fit indices are as follows: CFI = .996, TLI = .996, RMSEA = .053, SRMR = .045, and $X^2(336) = 729.949$. Regarding the standardized structural regressions, the coefficient of affective association is .522 with $p < .001$, the coefficient of interaction intensity is .163 with $p = .027$, and the coefficient of group cohesion

is .226 with $p = .001$ (see Table 10 and Figure 9 below). This is also a confirmation of the social presence three-factors' literature. Regarding the variability explained by these three original factors, the explained variability of the social presence by the three factors is $R^2 = .736$, indicating a high amount of explained variability by the original three social presence indicators. All the effects are direct effects.

Table 10: Results of the Three Original Social Presence Indicators Table.

Presence Constructs	p-value	Standardized Slope
Affective Association → Social Presence	0.000	0.522
Interaction Intensity → Social Presence	0.027	0.163
Community Cohesion → Social Presence	0.001	0.226

Figure 9: The Three Original Social Presence Indicators Model



Research Question Two:

The second research question was answered through conducting another SEM model.

Research Question Two:

- To what extent can affective association, interaction intensity, community cohesion, instructor involvement, and instructor knowledge and experience predict social presence?

SEM Results of the full Social Presence Model

To investigate the full Social Presence Model (SPM) to answer the primary research question, a Structural Equation Model (SEM) using lavaan package with WLSMV estimator was conducted to investigate the full structural relationships between the social presence latent factor and the social presence model latent indicators, namely: affective association, interaction intensity, group cohesion, instructor involvement, and instructor knowledge and experience. The results of the full SEM indicate that the model fits well according to the four criteria: CFI = .991, TLI = .990, RMSEA = .069, and SRMR = .061, and the $X^2(833) = 2469.472$. The results of the model indicate that affective association was found to be a significant predictor of social presence ($\beta = .507, p < .001$); interaction intensity was *not* found to be a significant predictor of social presence ($\beta = .120, p = .080$); group cohesion was found to be a significant predictor of social presence ($\beta = .173, p = .009$); instructor involvement was *not* found to be a significant predictor of social presence ($\beta = .092, p = .120$); and, finally, instructor knowledge and experience was *not* found to be a significant predictor of social presence ($\beta = .085, p = .098$). These results indicated that when the factors of the perceived instructor involvement and the perceived instructor knowledge and experience were included in the full SEM model, the effects of all three original significant predictors from the original model were reduced. In fact, the effect of interaction intensity was diminished to the point of non-significance when these two

factors were included in the model. Furthermore, these two additional factors were insignificant predictors of social presence, as they also have very small effects. Finally, the explained variability of social presence as the endogenous variable by the five exogenous predictors is $R^2 = .751$, which is a very small increase from the model without these two additional factors ($R^2 = .736$). This suggests that the inclusion of the two additional factors, instructors' perceived involvement and instructors' perceived knowledge and experience diminished the relationship between interaction intensity with social presence, while not providing meaningful contributions toward explaining the variability of social presence. Thus, the importance of learners' perception of instructors is highlighted.

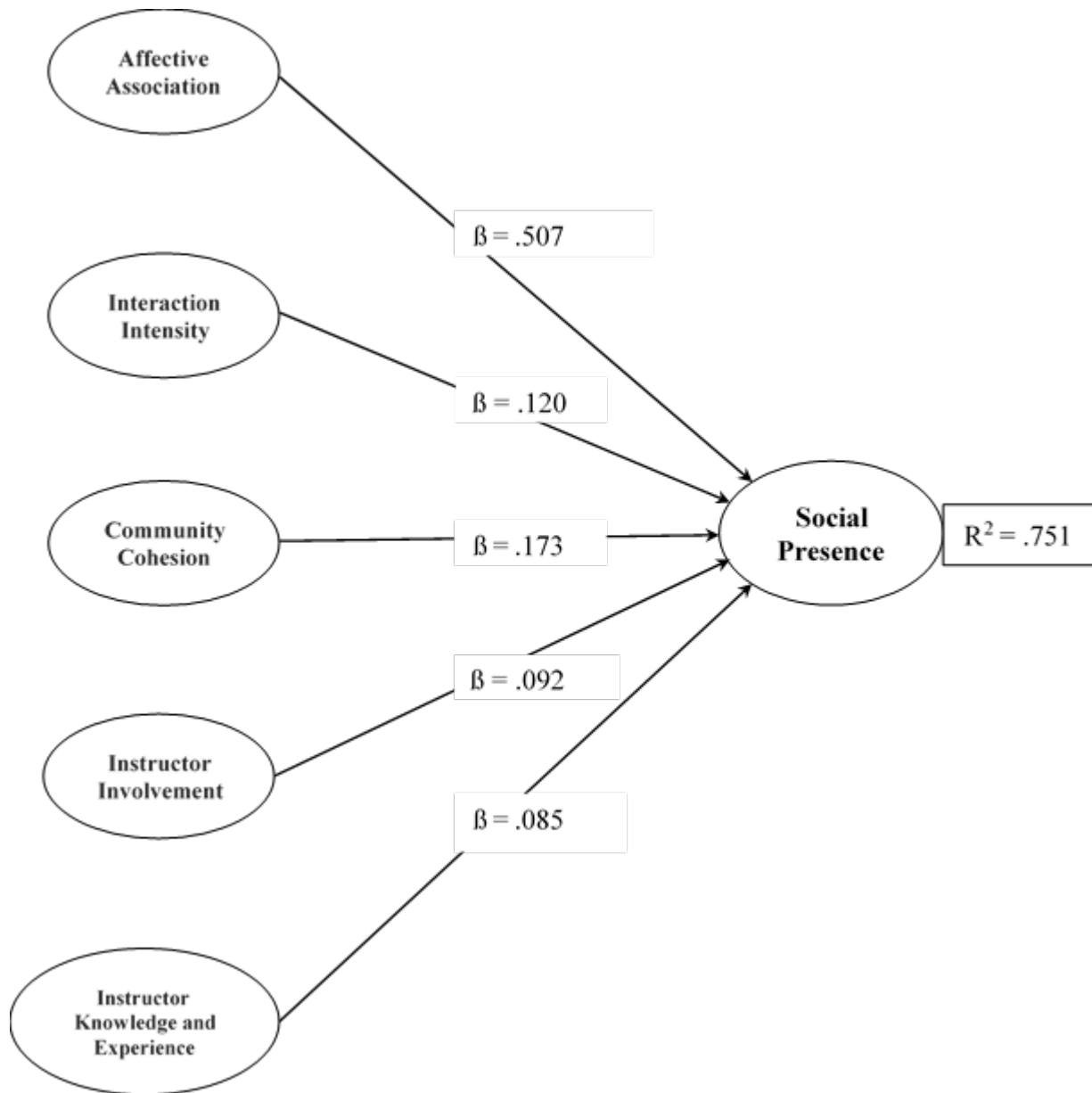
In addition, when looking at the latent correlation coefficients of the measurement model, one can see that affective association, interaction intensity, and group cohesion are highly correlated with one another, yet the perceived instructor involvement and instructor knowledge and experience are highly correlated with one another. However, the correlations are smaller between the three original social presence factors (affective association, interaction intensity, and group cohesion) with the two additional (instructor involvement and knowledge and experience) social presence factors. The diminished prediction between the three original predictors on social presence, from the inclusion of instructor involvement and knowledge and experience, as well as the lower latent correlations, suggest that instructor involvement and knowledge and experience in part measure similar information to that of the three original predictors' interaction intensity. Furthermore, when looking at the explained variability of the three original factors (affective association, interaction intensity, and community cohesion) of the first SEM, and looking at the full five SPM indicators (affective association, interaction intensity, group cohesion, instructor involvement, and instructor knowledge and experience), it can be seen that, again, the addition of

the two predictors does not explain a meaningful amount of variability in social presence between the two models, $R^2 = .736$ and $R^2 = .751$, respectively. All the effects are direct.

Table 11: Second (Full social presence model) Structural Equation Model Results Table.

Presence Constructs	P-value	Standardized Slope
Affective Association → Social Presence	0.000	0.507
Interaction Intensity → Social Presence	0.080	0.120
Community Cohesion → Social Presence	0.009	0.173
Instructor Involvement → Social Presence	0.120	0.092
Knowledge and Experience → Social Presence	0.098	0.085

Figure 10: The Five-full Social Presence Indicators Model



Summary

This chapter presented the participants of the study; the instrumentation, validity and reliability estimates of the scales; the evaluation of each scale as well as the included and excluded items; the correlation of each scale's items and the correlations of latent constructs; the six Item Factor Analytic models and the two Structural Equation Modeling models; and the fit indices criteria. The results of the analyses indicate that the three original factors (affective association, interaction intensity, and community cohesion) are highly correlated with one another as well as with social presence. The results also showed that the two additional factors (perceived instructor involvement and the perceived instructor knowledge and experience) have lower correlation coefficients with social presence. Finally, social presence was found to be most affected by affective association, group cohesion, interaction intensity, while also having similarly small effects and non-significance of instructor involvement and perceived instructor knowledge and experience in the field.

Chapter Five

Introduction

The purpose of this research is to provide a better understanding of the indicators that affect the level of social presence in online educational environments. This project evaluated three scales designed to measure the three original indicators of social presence (i.e. affective association, interaction intensity, and community cohesion) as well as developed two more scales to measure the two additional indicators of social presence (i.e. instructor involvement as well as instructor knowledge and experience). The author also developed a sixth scale to measure the latent construct social presence and examined these scales through six Item Factor Analytic (IFA) models measuring the fully proposed Social Presence Model (SPM). As an indispensable prerequisite to investigate the validity of these five indicators, the author conducted Structural Equation Modeling (SEM) to evaluate the relationships of the three original indicators as exogenous predictors. Social presence served as an endogenous criterion, while the author excluded the two additional indicators (i.e. the perceived instructor involvement and the instructor's perceived knowledge and experience in the field) in the first SEM. Following this, the author evaluated each structural relationship in its entirety, including the five indicators of the SPM and social presence, by conducting yet another SEM model.

Discussions of the Findings

Discussion of the Measurement Models. The main purpose of the first research question was to evaluate the measurement models of the SPM framework as well as provide evaluated individual scales of SPM indicators and of the construct of social presence itself. Due to the lack of measurement of the social presence scales, particularly in terms of validating the constructs, the

researcher included only items pertaining to the definitions of the underlying constructs. To answer this research question, the researcher developed six different scales: five scales to measure the five indicators of the SPM constructs and a sixth scale to measure the social presence construct. For the evaluation criteria, the researcher used as benchmarks four model fitness criteria sets developed by pioneering psychometrics researchers (e.g., Brown, 2015; Hu & Bentler, 1999; Kline, 2015; Maydeu-Olivares & Joe, 2014).

Regarding the correlation of the items in each scale, each scale's items fit well, and all were positively correlated with one another. None of the items were negatively worded. The correlation coefficients of each pair of items in each scale were discussed earlier in the fourth chapter. In addition, the correlation values indicate that the items were not very highly correlated, which means that the items measure the same concept. Rather, the items were moderately correlated in most cases. In addition, the items were not *uncorrelated*, meaning that they measured very different separate concepts of the constructs. Because each set of items was supposed to measure a targeted construct, it had to have an adequate level of correlation (e.g., from .64 to .82 for affective association scale items). Furthermore, in the IFA models, items were not allowed to have cross-loadings, meaning that each item measured its respective construct. In other words, each item loaded on only one unique factor.

The items of the social presence scale were derived from social presence definitions. The results of the social presence IFA model indicated that items which measured the social presence construct fit well together according to the fit indices. These items that measure social presence included key words from the social presence definitions such as "*presence*," "*real*," and "*salience*," as well as references to the ability of course participants to "*project*" within online environments. Thus, the researcher developed the scale and calculated the reliability estimate to

ensure the consistency of the scale scores. For the three original social presence indicators, the researcher used items developed and proposed, but not yet tested, by earlier researchers (Lowenthal & Dunlap, 2014). For the two additional indicators of social presence, the researcher used the qualitative codes provided by Whiteside's (2015) research in order to develop items to measure these two scales. The results of the evaluations of these six scales indicate good fit between the hypothesized models and the empirical models. After evaluating the six scales, the reliability estimate was calculated for each scale independently. Finally, the items of the six evaluated scales, the reliability estimates of the scales, as well as the item loadings are in the *Appendix*.

Discussion of the Correlation Among the Latent Factors

It was necessary to look closely at the correlation between the latent factors of the full Social Presence Model (SPM) elements as well as social presence itself. When looking at the correlation coefficients, one can see that the three original latent factors correlate very highly with social presence and with one another. However, the other two additional latent factors correlate moderately with social presence, yet they correlate very highly with one another. Specifically, social presence has a high positive correlation with affective association ($r = .83, p < .001$), with interaction intensity ($r = .76, p < .001$), with group cohesion ($r = .77, p < .001$), with the perceived instructor involvement ($r = .61, p < .001$), and with the perceived instructor knowledge and experience ($r = .55, p < .001$). Affective association has a high positive correlation with interaction intensity ($r = .80, p < .001$), a high positive correlation with group cohesion ($r = .80, p < .001$), a moderate positive correlation with instructor involvement ($r = .56, p < .001$), and a lower positive correlation with knowledge and experience ($r = .47, p < .001$).

In addition, interaction intensity has a high positive correlation with group cohesion ($r = .81, p < .001$), a moderate positive correlation with instructor involvement ($r = .56, p < .001$), and a low-moderate positive correlation with instructor knowledge and experience ($r = .49, p < .001$). Group cohesion has a moderate positive correlation with instructor involvement ($r = .56, p < .001$) and with instructor knowledge and experience ($r = .50, p < .001$). Finally, instructor involvement has a very high positive correlation with instructor knowledge and experience ($r = .84, p < .001$) as indicated by the correlation rule of thumb (Mukaka, 2012). The results of these latent correlation coefficients showed that the three original indicators of social presence, as proposed earlier by Garrison et al. (2000) and Rourke et al. (2001), have a much higher correlation with social presence than with the other two additional indicators. This is bearing in mind that the two additional factors also correlate moderately with social presence. At a closer glance, the three original indicators are highly correlated with one another, while the two additional indicators are very highly correlated with one another, $r = .84$. See the correlation table below.

Table 12: Correlation Coefficients between each Latent Constructs Table.

	SP	AffAsso	IntInt	GrCo	InsInv	KnEx
SP	1	0.83	0.80	0.77	0.61	0.55
AffAsso	0.83	1	0.80	0.80	0.56	0.47
IntInt	0.80	0.80	1	0.81	0.56	0.49
GrCo	0.77	0.80	0.81	1	0.56	0.50
InsInv	0.61	0.56	0.56	0.56	1	0.84
KnEx	0.55	0.47	0.49	0.50	0.84	1

Discussion of Pre-analyzing the Three Original Indicators Model

To ensure that the three scales developed by previous researchers measure social presence, the author conducted an SEM to investigate the structural relationships of the three

original indicators (affective association, interaction intensity, and community cohesion) and of social presence. The results of these three-indicator model showed that all the indicators fit quite well into one structural model jointly predicting social presence. The fit indices are as follows: CFI = .996, TLI = .996, RMSEA = .053, SRMR = .045, and $X^2(336) = 729.949$. According to Brown (2015) and Kline (2015), the model fits well in comparison to the theorized model. This is a confirmation of extensive documentation published by previous researchers that these are essential elements of social presence.

Regarding the individual indicators, the results of the three original SEM model indicate that affective association is the most influential predictor that positively affects social presence ($\beta = .522, p < .001$). This finding means that for a one-unit standard deviation increase in the affective association indicator, social presence would increase by .522 standard deviations, which is considered a relatively sizable effect. In addition, the second predictor of the model is interaction intensity. This predictor was also found to be a significant factor of social presence ($\beta = .163, p = .027$). For the interpretation of this regression coefficient, we can expect a .163 standard deviations increase in social presence when the interaction intensity indicator increases by one unit of standard deviation, a rather low effect. We can conclude that the more interactive the online community is, the higher social presence participants may feel. Finally, the third indicator in the original model is the community cohesion. This predictor was also found to be a significant predictor of social presence ($\beta = .227, p < .001$). This indicates a moderate effect of social presence, meaning that when the community cohesion increases by one unit, the social presence is expected to increase by .227 standard deviations. All three original factors are influential predictors that positively affect social presence in online learning environments. To

summarize, the level of social presence in online educational courses is primarily affected by the affective association, interaction intensity in the course ², and community cohesion.

Discussion of the Full SEM investigation

To answer the second primary research question of this study, the researcher conducted a Structural Equation Modeling (SEM) to investigate the full structure of the Social Presence Model (SPM). This included all five indicators within the model, as proposed previously. The results of the full SEM indicated that the five factors fit well into one single model. The fit indices were as follows: CFI = .991, TLI = .990, RMSEA = .069, and SRMR = .061, and $\chi^2(833) = 2469.472$. According to the fit criteria (Kline, 2015), the model fits well when including the five indicators of social presence. The results of the full SEM indicate that social presence is mostly affected by the affective association, community cohesion, interaction intensity, instructor involvement, and the perceived instructor knowledge and experience.

The full SEM looked at affective association, interaction intensity, and community cohesion which comprised the three original indicators. The results of the full SEM indicate that the affective association indicator (one of the three *original* indicators) is the most influential predictor that positively affects social presence ($\beta = .507, p < .001$). This finding means that for one unit of standard deviation increase in the affective association indicator, social presence would increase by .507 SDs, which is a significant effect. In addition, the second indicator (also one of the three *original* indicators) of the full model is interaction intensity. This factor was *not* found to be a significant predictor of social presence ($\beta = .120, p = .080$). For the interpretation of this coefficient, a .120 SD increase in social presence can be expected when the interaction

² See figure 9 in chapter four.

intensity indicator increases by one unit of standard deviation. This is considered a low effect. Next, the third indicator (again, one of the three *original* indicators) in the full model is the community cohesion. This was found to be a significant indicator of social presence ($\beta = .173$, $p = .009$). This also indicates a low effect on social presence, meaning that when the community cohesion increases by one unit, we could expect the social presence to increase by .173 standard deviations.

The fourth indicator (one of the two *additional* indicators) of the social presence model is the instructor involvement. This indicator was *not* found to be a significant predictor of social presence ($\beta = .092$, $p = .120$). Finally, the fifth indicator (the other of the two *additional* indicators) of the full SPM is the perceived instructor knowledge and experience in the field. This indicator was also *not* found to be a significant predictor of social presence ($\beta = .085$, $p = .098$). According to the results of this full *social presence model*, social presence is mostly affected by affective association, community cohesion, interaction intensity, instructor involvement, and the perceived instructor knowledge and experience. When the two additional predictors were included in the SEM model, the interaction intensity predictor was found to be insignificant. This insignificance of the interaction intensity occurred when the two additional indicators (instructor involvement and perceived knowledge and experience) were included in the full SEM model. In other words, the effect of interaction intensity decreased when the other two additional predictors were included in the SEM model.

Final Discussion of the Full Social Presence Model

Affective Association. In both structural models (the three original predictor model and the five-full predictor model), affective association was the most influential predictor that positively influenced social presence. When evaluating fundamental articles on how social presence was

earlier defined by pioneers, such as Garrison et al. (2000) and Rourke et al. (2001), one can see that the emotional element is inherent in the definition of social presence. For example, Rourke and his colleagues defined social presence as "the ability of learners to project themselves socially and emotionally in a community of inquiry" (2001, p. 4). When Garrison and colleagues presented the social presence factor as a Community of Inquiry framework element, the first category they presented was the "*Emotional Expression*" category and the first indicator was "*Emotions*" (2000, p. 3). Subsequent researchers (e.g., Akyol & Garrison, 2008; Argo, Dahl, & Manchanda, 2005; Ekman, Chanel, Järvelä, Kivikangas, Salminen, & Ravaja, &, 2012; Gunawardina, 2017; Nasoz, Alvarez, Lisetti, & Finkelstein, 2004; Shen, Yu, & Khalifa, 2010; Tu, 2002) emphasized the emotional aspect as an important element of the social presence construct and as an indicator of social presence, whether through discussing immediacy (e.g., Tu, 2002) or other indicators, such as intimacy, influencing social presence. Online learners are more likely to feel a high sense of social presence online when they indicate a high level of agreement when asked about forming distinct impressions of their course participants; projecting who they are in the online course; expressing emotions; self-disclosing personal information to and from others easily; and using humor in the online course. This is because these are critical indicators of the escalation of social presence levels.

In addition, Eggins and Slade (1997), Garrison et al. (2000), Rourke and colleagues (2001), and Cui (2013) cited the use of humor as a primary indicator of social presence. This factor, *affective association*, has several items that indicate the use of "humor" through expressed emotions, self-disclosing, and projection in the online courses. Humor specifically is a contributive factor to social presence and subsequently to learning. As cited by Gorham and Christophel (1990),

“it is not surprising that the use of humor in the classroom has emerged as an important aspect of teacher immediacy” (Gorham, 1988). Cosner (1959, p. 172) has pointed out that “laughter and humor are indeed like an invitation, be it an invitation to dinner or an invitation to start a conversation: it aims at decreasing social distance.” Bergler (1956) suggested that humor serves dual purposes of reducing conflict and enhancing human relations. Thus, the appropriate use of humor should have a positive impact on interpersonal relations and group cohesion.” (p. 47).

Rourke and his colleagues further state that "two examples of emotional expression that bring people together in a community are the expression of humor and self-disclosure" (2001, p. 14). Learners' emotional aspect in online environments is a critical factor that is highly expected to positively affect social presence. In fact, this emotional factor, or effectiveness of association, is the most critical among the social presence factors. The more online participants use humor and self-disclosure through the mediums, the higher the social presence felt. Sharing attitudes, feelings, personal experiences, and interests with one another is a highly effective way to increase social presence. The use of humor also helps to eliminate the social distance between online communicators. This can also contribute to the level of comfort online participants feel during threaded discussions. In summary, the more participants share humor, amusing stories, and personal information, the more social presence they may feel in educational settings.

Interaction Intensity. This indicator has been associated positively with the level of social presence since the 2000s, and it captured open communication and interaction with other participants through the medium. This indicator refers to the incidence of communicating agreement and disagreement, referring to the messages, feeling a sense of comfort, referring to the content another participant posted, and interacting effectively with other participants in the online courses. When conducting the three original indicators' SEM, this indicator was a significant predictor of social presence ($\beta = .163$, $p = .027$), which confirms previously documented literature as discussed earlier. However, when the two additional indicators (i.e.,

instructor involvement, instructor perceived knowledge and experience) were included in the second SEM, this factor was found to be insignificant ($\beta = .120$, $p = .080$). One of the potential reasons the impact of this predictor decreased is that the variance of this predictor decreased from .163 in the original model to .120 in the full model when the two additional predictors were included. Due to the way SEM regressions are interpreted, all other predictors are held constant. In other words, there seems to be a significant amount of shared variance between the interaction intensity predictor and the perceived instructor involvement, as well as the perceived instructor knowledge and experience predictors.

When looking at the qualitative codes in the original article (Whiteside, 2015) that introduced the Social Presence Model, one can see that the interaction intensity indicator, the instructor involvement indicator, and the instructor knowledge and experience indicator all involve communication through involvement and through the activities the instructor implements within the online course. Perhaps one of the reasons why the effect of interaction intensity was reduced when the two additional indicators were included was that these three factors (i.e. interaction intensity, instructor involvement, and knowledge and experience) focus on the communication aspect through the implemented class activities. For example, the interaction intensity scale included items about interaction such as "expressed agreement or disagreement," "complimented others or the content of their messages," "interacting with others," and the other indicators (e.g., instructor involvement) that also included items such as "responded to students' questions," "participated in the online discussions frequently," and "initiated the online discussions regularly." Thus, the indicator of interaction intensity might be a sufficient representative to measure social presence without including the two additional indicators (e.g.,

perceived instructor involvement, and perceived instructor knowledge and experience) within the social presence model.

Community Cohesion. When looking at this indicator, which refers to the cohesiveness of the online community, it is abundantly clear that this factor was a significant predictor in the three-original SEM and the full-five SEM ($\beta = .226$ and $\beta = .173$, respectively). Although the effect of the group cohesion decreased when including the two additional predictors in the model, the effect is still significant and meaningful. It seems that this indicator is a stand-alone and significant predictor and thus does not share as much of the variance as the previously discussed predictor, interaction intensity. Earlier studies (e.g., Eggins & Slade, 1997; Rourke et al., 2001) found that this indicator is linked to the affective association indicator (or affective responses, or as was originally labelled, as emotional expression). As cited by Rourke et al. (2001):

Eggins and Slade (1997) postulate a connection between humor and critical discourse, in that, the construction of group cohesion frequently involves using conversational strategies such as humorous banter, teasing, and joking. These strategies allow differences between group members to be presented not as serious challenges to the consensus and similarity of the group (p. 14).

Thus, community cohesion can be seen as encompassing the development of a sense of collaboration with peers; the use of greetings and salutations; the use of inclusive pronouns such as “we”; becoming a cohesive entity/unit, and referring to other participants by their first name. Therefore, having *cohesiveness* as a characteristic of the online community may facilitate online participants’ ability to use humor, disclose personal information, and share interesting personal stories.

Instructor Involvement. The involvement of online instructors is always key to students’ learning (Mandernach et al., 2006). Instructor engagement is one reason why students receive more attention for online task completion (Ma, Han, Yang, & Cheng, 2015). However, in this

research, the perceived involvement of the instructor was small, and it was not found to be a significant predictor of social presence in fully online courses. In addition, the effect, or the standardized structural regression of this predictor, was found to be small ($\beta = .092$, $p = .120$). Regarding the interpretations of these coefficients, we can state that when all the other indicators (the other four SPM indicators) remain constant, a .092 SD increase of social presence can be expected when the instructor involvement increases by one unit. This is still considered to be a small effect of the model. The author of this model states that “each one of the students interviewed mentioned instructors’ initial community building ‘activities’ were essential to them in establishing relationships and making social connections” (Whiteside, 2015, p. 12). Represented by the activities that make instructors connect to their students (responding to students frequently asked questions, being available, participating, providing feedback, facilitating engagement, and initiating online discussion, etc.), the involvement of the instructor did not seem to significantly impact the level of social presence in online learning environments. The items of this scale were derived from the qualitative codes provided in the introduction of the SPM article.

Instructor Knowledge and Experience. Although it is important and always helpful in online learning environments, the perceived knowledge and experience of the instructor in the field they teach was also not found to be a significant predictor of social presence ($\beta = .085$, $p = .098$). According to the results of this structural model, the effect of this predictor was small and statistically insignificant. The results of the examination of social presence indicated that the inclusion of this model did not significantly contribute to the level of social presence. Whiteside (2015) noted that the impact of the five elements on social presence is determined by the degree of adoption by students and instructors. Findings from this research project indicate that this

statement may not be entirely accurate when it comes to students' learning. In fact, the three original indicators of social presence identified by Garrison et al. (2000) and Rourke et al. (2001) might be the critical factors affecting the level of social presence. The perceived knowledge and experience indicator was highly associated with the instructor involvement indicator ($r = .84, p < .001$). These two factors (the perceived instructor involvement and the knowledge and experience) are highly associated with one another. When looking at their qualitative codes and how they were derived from qualitative interviews, one can anticipate that these two factors might be more influential indicators of teaching presence within the Community of Inquiry framework compared to social presence.

Implications

As the analysis of the three-original structural model and the five structural model revealed, the most influential factor of social presence is the affective association. This is displayed in several ways, such as through sharing humor, personal information, and self-disclosure. One of the implications of this is that educators can implement activities among students which include humor, and which also allow an appropriate level of sharing of personal information within an online course. Possibilities which might help construct social presence include the development of activities and the implementation of tasks which enhance and foster elements of humor and self-disclosure. When implementing these activities, the other original indicators (interaction intensity and group cohesion) are anticipated to be enhanced through effective course design. When the activities that include humor and self-disclosure of information also share personal information and interesting stories, then more interaction would be expected via these activities. Increasing the number of these activities with different types of tasks would be expected to make the learning environment more interesting to learners, as well

as more personalized. Thus, the group would be a more cohesive unit through the established interaction between communicators and through the sharing of information. The more deliberate interaction that happens between online participants, the more trust building happens within that educational environment.

When the social presence is enhanced within the educational environments, challenges such as those discussed earlier in chapter two (e.g., high dropout rates, low retention rates) would be eliminated or diminished. For example, as social presence is positively associated with participants' satisfaction and retention rates, we would expect learners to be more satisfied with the online course. This would subsequently increase the retention rates at higher education institutions, in turn decreasing the dropout rate from online classes. In addition, this increase of social presence would also enhance students' learning outcomes as the perceived learning is associated with the level of social presence. This is also an indicator of online persistence, as persistence is associated with the level of social presence. This implementation would also increase the level of interaction amongst online participants.

There are several activities instructors can implement. Ice-breakers, for example, are one form of introduction activity that educators can use to facilitate opportunities where students can easily share personal information and amusing stories. Educators can also set credits for students to participate and add humor appropriately within the online community. Humor can be very subjective at times, so it is best if the task facilitates the discussion of humor as a way to introduce it into the community. Asking a class to participate in an online discussion of their favorite comic actor would be one strategy. Participants would have to share not only who they believe is amusing, but also why, such as through the inclusion of video clips. Since so much of humor is based on culture, age, and background, this might lead to a discussion of what is found

amusing in some cultures. Examples of such differences include the physical humor of someone like Mr. Bean or Harold Lloyd compared to that of a more modern, verbally driven comedian, such as Jerry Seinfeld or Ellen DeGeneres. Further discussion could analyze aspects of language believed to be entertaining to try to determine what is found to be universally funny.

In addition, the use of emoticons is another strategy to express feelings through a form of text. Most learning management system platforms, such as Canvas and Blackboard, allow the addition of emoticons to comments in discussions. Even in earlier studies conducted when this technology was not as rich as it is nowadays (e.g., Gunawardena & Zittle, 1997), the use of primitive emoticons was found to contribute positively to the level of social presence as it replaced nonverbal cue Computer Mediated Communication (CMC) settings. As online educational programs are increasingly implemented throughout the U.S., hiring committees and department chairs would not need to focus as much on the prior knowledge and experience of the instructors for online courses, as the presence of the interaction would be enough to account for a higher social presence. The level of the two social presence elements might affect the hiring of administrators and stakeholders.

Limitations

This research is not without limitations. First, research on social presence is usually conducted in blended-learning classes, not in fully online classes. Second, there could be other confounding variables that this research did not account for, and such variables may affect the results of this study. For example, several recent studies have found a significant relationship between social presence and other variables, such as impression formation (Weidlich & Bastiaens, 2017), trust (Lu, Fan, & Zhou, 2016), satisfaction (Richardson et al., 2017), and engagement (Lim, Hwang, Kim, & Biocca, 2015), as well as the other two Community of

Inquiry elements (i. e., cognitive presence, teaching presence). However, none of these variables were controlled for within this research project. Third, there are also other variables that shape participants' thinking and the way they select responses for the items, such as variations in background, setting, or levels of exposure participating in research findings. Accounting for these unknown variables is impossible. However, replication of findings is a key concern of any research that is undertaken. Thus, examining these findings in different settings with participants from different backgrounds would be helpful to establish reliability for these research results. Finally, this research did not take into consideration the type of communication (i. e., synchronous vs asynchronous communication), the effect of which may be explored in future research.

Conclusion

This research examined the Social Presence Model (SPM) in fully online educational settings in the United States. The researcher developed six scales to measure using Item Factor Analytic (IFA) models for the six constructs of affective association, interaction intensity, community cohesion, instructor involvement, instructor knowledge and experience, and social presence. In addition, the researcher examined the structure of the three original social presence indicators (i.e. affective association, interaction intensity, community cohesion) in relation to social presence. The results of the three original indicator models indicate that social presence is primarily affected by affective association, community cohesion, and interaction intensity. Furthermore, the researcher investigated the structure of the full-five indicators of SPM in relation to the social presence construct. The results of the full structural social presence model indicate that social presence is significantly affected by affective association and community cohesion, and that it is insignificantly affected by interaction intensity, instructor involvement,

and knowledge and experience. Finally, the results also showed that the inclusion of the two additional social presence indicators (perceived instructor involvement and perceived knowledge and experience) do not meaningfully contribute to the explained variability of the social presence construct. In fact, the explained variability by the three predictors (affective association, interaction intensity, and community cohesion) was almost the same as the explained variability with the inclusion of the two additional predictors (perceived instructor involvement and perceived instructor knowledge and experience) in the structural model as described previously.

Future Research

This research is the first known study that examined this Social Presence Model in fully online educational environments. This research provided new insights and evaluated results of the proposed Social Presence Model. Thus, the research findings call for more investigation into the Social Presence Model, particularly because the findings of this study may conflict with other earlier qualitative research findings, such as the findings which proposed the model in online education settings. In addition, it would be equally beneficial to examine these findings within the Community of Inquiry framework.

As more research comes out of the social science fields (e.g., education), other research may produce conflicting findings, particularly about media richness (e.g., communication) and how it is related to social presence. Although mainstream researchers have switched from media richness to other factors, some studies (e.g., Kaplan & Haenlein, 2010; Gimpel, Huber, & Sarikaya, 2016; Carpentier, Van Hove, Stockman, Schollaert, Van Theemsche, & Jacobs, 2017) have once more shown a link between social presence and media richness. Thus, future research should investigate the richness of the medium used in OLEs as well as the synchronous type. The type of synchronicity of the course has been an overlooked factor that may affect social presence.

A few studies showed that the type of the course (synchronous vs asynchronous) may enhance the level of presence in OLEs. With this line of research, most of the published studies examined the Community of Inquiry framework elements in asynchronous settings. For example, cognitive presence was examined in several studies in asynchronous settings (e.g., Darabi, Arrastia, Nelson, Cornille, & Liang, 2011; Gašević, Adesope, Joksimović, & Kovanović, 2015; McKerlich, Riis, Anderson, & Eastman, 2011; Olesova, Slavin, & Lim, 2016), teaching presence was examined in several studies in asynchronous settings (e.g., Ice, Curtis, Phillips, & Wells, 2007; Skramstad, Schlosser, & Orellana, 2012), and social presence was examined in several studies in asynchronous settings (e.g., Akcaoglu & Lee, 2016; Remesal & Colomina, 2013). However, few studies (e.g., Oztok, Zingaro, Brett, & Hewitt, 2013) examined synchronous education settings. It might be particularly useful for educational strategy development and for online educators when designing online courses to examine the Community of Inquiry elements in both synchronous types to establish evidence-based research about the synchronous type, and how synchronous type can influence the presence types. This would be an example of an online course that would affect the level of presence, not only in terms of social presence, but also in terms of other types of the Community of Inquiry elements. This seems to be an extremely interesting area in which to cultivate further research.

According to other research findings presented earlier (e.g., Kaplan & Haenlein, 2010; Gimpel, Huber, & Sarikaya, 2016; Carpentier et al., 2017), it is believed that a richer medium and class type might increase social presence. There is ongoing debate in the literature as to whether the source of social presence is media richness as originally thought (Short et al., 1976) or another factor (Garrison et al., 2000; Rourke et al., 2007). Moreover, future research may also examine the invariance of the model variables. This research does not aim to examine the

invariance in sub-groups, but again, this may prove worth pursuing later as the science and definitions change in this area. Furthermore, these two additional indicators (perceived instructor involvement and perceived instructor knowledge and experience) may load on the teaching presence factor of the Community of Inquiry framework. Further research may cultivate this area of research. Additionally, within a few studies in the literature of social presence, the words “social presence” and “connectedness” are used interchangeably, and other researchers use the word “engagement” to indicate social presence. For example, a few studies (e.g., Kim, 2011; Hwang, 2007; Cui, Lockee, & Meng, 2013; Bolliger, & Inan, 2012) investigated social presence factors and dealt with connectedness, or *emotional connectedness*, as an indicator of social presence; however, does this mean that the affective emotion/association is the connectedness that these studies refer to?. Lin, Fan, and Chau (2014) report positive correlation between connectedness and social belonging. Are these latent constructs (social presence, connectedness, sense of belonging, engagement) the same or different? Only future research can determine the answers with evidence. Finally, because of the limitations of access to a more diverse population, the author recommends future research to examine other participants from different languages and cultural backgrounds. While the United States is home to representatives of every country on the planet, it would be interesting to measure which variables, if any, differ from one culture to the next so that they would be better suited to that culture’s educational system. In addition, there is a critical need to examine the social presence model variables with media richness factors to examine which factors predict higher social presence than others. The author encourages future researchers to further develop and verify the indicators and the results that have been presented within this research.

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Appendix

Item Code	Item Text	Std. all
Social Presence Scale		
SP1	I was able to feel other participants' personality in the online course.	0.89
SP2	I thought other people could feel my presence in the online course.	0.88
SP3	We felt the presence of the instructor in the online course.	0.59
SP4	I felt that other participants were present in the online course.	0.82
SP5	I perceived participants as 'real' people in online course.	0.79
SP6	The course participants were salient in the online course.	0.71
SP7	I could easily project the participants' personal characteristics into the online course.	0.84
SP8	I was able to project course participants effectively into the online course.	0.81
Affective Association Scale		
AffAsso1	I formed distinct impressions of some course participants.	0.82
AffAsso2	I projected who I am to other course participants.	0.84
AffAsso3	I expressed emotions in this course.	0.76
AffAsso4	I self-disclosed personal information about life outside of class.	0.67
AffAsso5	Others self-disclosed personal information in the course.	0.73
AffAsso6	We used humor in this course.	0.64
Interaction Intensity Scale		
IntInt1	I expressed agreement or disagreement with others or the content of others' messages.	0.7
IntInt2	I complimented others or the content of their messages.	0.83
IntInt3	I felt comfortable participating in online threaded discussions.	0.8
IntInt4	I felt comfortable interacting with others.	0.8
IntInt5	I received answers to the questions I posed.	0.72
IntInt6	I directly referred to the content of others posts.	0.78
IntInt7	Others communicated effectively using online communication tools (e.g. threaded discussions, email, and instant messaging).	0.74
Group Cohesion Scale		
GrCo1	I was able to develop a sense of collaboration with my peers.	0.75
GrCo2	I used greetings and salutations.	0.89
GrCo3	Others used greetings and salutations.	0.92
GrCo4	I addressed the group using inclusive pronouns such as "we".	0.69
GrCo5	The online community was a cohesive unit.	0.66
GrCo6	I referred to other participants by their first name.	0.74
GrCo7	Others addressed me by my first name.	0.76
Instructor Involvement Scale		

InsInv1	The instructor responded to students' questions promptly.	0.8
InsInv2	The instructor was always available.	0.78
InsInv3	The instructor participated in the online discussions frequently.	0.81
InsInv4	The instructor facilitated student engagement in the discussions.	0.83
InsInv5	The instructor provided high quality feedback	0.8
InsInv6	The instructor provided useful feedback regularly.	0.8
InsInv7	The instructor <i>enhanced</i> student engagement in the discussions.	0.86
InsInv8	The instructor initiated the online discussions regularly.	0.78
Instructor Knowledge and Experience Scale		
KnEx1	The instructor shared his/her relevant experience with the class.	0.76
KnEx2	The instructor seemed to have a lot of knowledge in the field.	0.89
KnEx3	The instructor seemed to have a lot of leadership experiences.	0.87
KnEx4	The instructor seemed to have the expertise to do his/her job.	0.91
KnEx5	The instructor shared many different perspectives.	0.74
KnEx6	The instructor had teaching experience.	0.81
KnEx7	The instructor had online teaching experience.	0.74

The Instrument

Thank you for completing the survey. This survey is anonymous and we will not be collecting any personally identifiable information. We will ask you questions about yourself and your experience in your online courses you are taking currently. This survey will take approximately 10 minutes to complete. By clicking on "*I agree*", I am indicating that I am at least 18 years old and I agree to participate in the following survey.

- I agree to participate.
- I do not agree to participate.

For further information, please contact:

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Demographic Items:

- Are you currently taking a fully online class that belongs to a higher education institution located in the U.S.?
 - Yes.
 - Please type the name of the fully online course.
_____.
 - No.
- How old are you?
 - ____
- What is your gender?
 - Male
 - Female
- Describe yourself (check all that apply):
 - White/Caucasian
 - Black/African American
 - Asian/Pacific Island
 - American Indian/Alaskan Native
 - Hispanic
 - Other: please specify.
- Are you undergraduate or graduate students?
 - Undergraduate
 - Graduate
- **Social Presence Scale (SP):**

1. I was able to feel other participants' personality in the online course.
2. I thought other people could feel my presence in the online course.
3. We felt the presence of the instructor in the online course.
4. I felt that other participants were present in the online course.
5. I perceived participants as 'real' people in online course.
6. The course participants were salient in the online course.
7. I could easily project the participants' personal characteristics into the online course.
8. I was able to project course participants effectively into the online course.

● **Affective Association Scale (AffAsso):**

1. I formed distinct impressions of some course participants.
2. I projected who I am to other course participants.
3. I expressed emotions in this course.
4. I self-disclosed personal information about life outside of class.
5. Others self-disclosed personal information in the course.
6. We used humor in this course.

● **Interaction Intensity Scale (IntInt):**

1. I expressed agreement or disagreement with others or the content of others' messages.
2. I complimented others or the content of their messages.
3. I felt comfortable participating in online threaded discussions.
4. I felt comfortable interacting with others.
5. I received answers to the questions I posed.
6. I directly referred to the content of others posts.
7. Others communicated effectively using online communication tools (e.g. threaded discussions, email, and instant messaging).

● **Group/Community Cohesion Scale (GrCo):**

1. I was able to develop a sense of collaboration with my peers.
 2. I used greetings and salutations.
 3. Others used greetings and salutations.
 4. I addressed the group using inclusive pronouns such as "we".
 5. The online community was a cohesive unit.
 6. I referred to other participants by their first name.
 7. Others addressed me by my first name.
- Please select "Agree" to this item (Inattentive Response Detection item).

● **Instructor Involvement Scale (InsInv):**

1. The instructor responded to students' questions promptly.
2. The instructor was always available.
3. The instructor participated in the online discussions frequently.
4. The instructor facilitated student engagement in the discussions.
5. The instructor provided high quality feedback.
6. The instructor provided useful feedback regularly.

7. The instructor *enhanced* student engagement in the discussions.
8. The instructor initiated the online discussions regularly.

● **Knowledge and Experience Scale (KnEx):**

1. The instructor shared his/her relevant experience with the class.
2. The instructor seemed to have a lot of knowledge in the field.
3. The instructor seemed to have a lot of leadership experiences.
4. The instructor seemed to have the expertise to do his/her job.
5. The instructor shared many different perspectives.
6. The instructor had teaching experience.
7. The instructor had online teaching experience.