THE IMPACT OF BLENDED LEARNING ON SOCIAL PRESENCE, COGNITIVE PRESENCE, TEACHING PRESENCE, AND PERCEIVED LEARNING

by

Kyleigh Blackwell Harrell

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

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ABSTRACT

The quantitative study examined how blended learning influences high school learners' social presence, cognitive presence, teacher presence, and perceived learning in comparison to online instruction. The study answered the following research questions: (a) Do differences exist among the social presence, cognitive presence, and teaching presence of high school students enrolled in a blended course as compared to those enrolled in an online course? (b) Does a difference exist between perceived learning of high school students enrolled in a blended course as compared to that of those enrolled in an online course? The researcher used a causal-comparative research design and tested the hypotheses with a multivariate analysis of covariance (MANCOVA) and an analysis of covariance (ANCOVA). Data used for analysis will be acquired from archival program effectiveness data collected from a southeastern public charter high school using the Community of Inquiry survey and the Cognitive, Affective, and Psychomotor (CAP) Perceived Learning Scale.

Keywords: blended learning, online learning, community of inquiry, perceived learning

Dedication

To my boys, Ryker and Stratton, who will always be my two greatest accomplishments.

Acknowledgments

Thank you to my Lord and Savior for giving me the strength and perseverance to finish this journey.

To my husband, Matthew, thank you for your love and support. Thank you for your service to our country as this process would have never been possible without the financial blessing that came with your sacrifices. To my children, thank you for pushing me to finish. Although too young to understand what Mommy was doing, every time I thought about quitting, I thought about you and the example I wanted to set for you. Your dreams will become reality when you work hard and persevere.

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List of Abbreviations

Analysis of covariance (ANCOVA)

Cognitive, Affective, and Psychomotor (CAP) Perceived Learning Scale

Cognitive Presence (CP)

Community of Inquiry (CoI)

Learning Management System (LMS)

Learning Presence (LP)

Multivariate analysis of covariance (MANCOVA)

Multivariate analysis of variance (MANOVA)

Social Presence (SP)

Subject matter expert (SME)

Teaching Presence (TP)

CHAPTER ONE: INTRODUCTION

Overview

As the number of online courses and individuals taking online courses grows, so does an acceptance of e-learning. In the past decade, online learning has been the fastest growing form of distance education (Archambault, DeBruler, & Freidhoff, 2014). Student enrollment in fully online schools has grown well over 100% in the past recent years (Watson, Murin, Vashaw, Gemin, & Rapp, 2012). While traditional learning is face-to-face learning that occurs in the classroom, online learning is defined as learning delivered completely by the Internet (Picciano, Seaman, Shea, & Swan, 2012). Researchers have indicated that no significant differences exist between traditional and e-learning formats (Allen & Seaman, 2014; Bernard et al., 2004; DiRienzo & Lilly, 2014). Media comparison research has shown that the instructional methods, not the delivery medium, lead to learning (Clark & Mayer, 2008). Regardless of how the instruction is delivered, when the instruction methods remain essentially the same, so does the learning (Clark & Mayer, 2008).

The advantages of online learning compared to various other forms of distance education include providing freedom from limitation of space and time, reaching students in a global context, and creating opportunities for social networking (Kidd, 2010). Although the advantages of online learning are many, limitations still exist (Todhunter, 2013). Challenges of online learning include its limited capability to engage learners and the lack of a sense of belonging or community (Lim, Morris, & Kupritz, 2007). Blended learning, the combination of online learning with traditional learning (Nowell, 2011), may help address some of these limitations as it creates a community of learners who can be both together and apart, anytime and anywhere without being bounded by time, place, or situation (Garrison & Kanuka, 2004). Thus, blended

learning is considered a promising practice (Watson, 2008) in online learning and has become the focal point of research at both the K-12 and higher education levels (Watson et al., 2012; Wold, 2013). Blended learning is considered by many to be the best of both the traditional and the online worlds as it provides the convenience of online courses while still maintaining the elements of traditional learning (Lyons & Evans, 2013).

The effectiveness of blended learning is still being investigated through comparison studies. The majority of the research has focused on the differences between traditional, face-to-face, and online learning (Stizman, Kraiger, Stewart, & Wisher, 2006; Tallent-Runnels et al., 2006); however, blended learning is now becoming a focus of research (Nowell, 2011). Most of the studies conducted on blended learning and online learning have compared different courses with different content (Rovai & Jordan, 2004). Moreover, few studies have investigated the differences between blended learning and online learning in the K-12 context (Akyol & Garrison, 2011; Borup, Graham, Drysdale, 2014).

The community of inquiry (CoI) framework is a theoretical framework that has been proven to effectively guide research on online and blended learning and consists of three overlapping elements: social presence, cognitive presence, and teaching presence (Akyol, Garrison, & Ozden, 2009). The CoI framework is a widely-recognized model for understanding interactions in blended and online environments (Boston, Ice, Diaz, Richardson, Gibson, & Swan, 2010), as it embodies a process of creating a deep and meaningful learning experience by using a collaborative, constructivist approach (Garrison & Akyol, 2013). Deep and meaningful learning is defined as the more substantial levels of understanding caused by learner-centered approaches and higher-order thinking that promotes long-term knowledge retention (DeLotell, Millam, & Reinhardt, 2010). Although the CoI is the most frequently researched model to

explain online educational experiences and is continually being developed (Akyol et al., 2009; Alavi & Taghizadeh, 2013), minimal studies have been conducted on the CoI and K-12 learning (Borup et al., 2014; Dikkers, Whiteside, & Lewis, 2013). Of the studies conducted, none have researched the CoI framework with adolescents using a quantitative method. Likewise, no studies have been conducted on perceived learning and K-12 learning. Perceived learning is a self-reported level of learning (Rovai, 2002). More research is needed in this area; thus, the present study compared online and blended learning with respect to the CoI, perceived learning for high school students attending an online, public charter high school in South Carolina.

The introductory chapter of this manuscript will provide the background, problem statement, purpose statement, and significance of the study. The background will give an overview of the most relevant literature regarding the CoI and perceived learning while providing historical, social, and theoretical contexts. The problem statement will discuss the gap in the literature while the purpose statement will give the reader an overview of the research study. The significance of the study will describe the contributions that the study will make to the educational community. In this chapter, the research questions, hypotheses, null hypotheses, and definitions will also be provided.

Background

High school graduation and dropout rates remain a foremost concern for educators and policy makers (Freeman, Simonsen, McCoach, Sugai, Lombardi, & Horner, 2015). The high school dropout crisis has a life-long impact on the individual student and the American society at large (Picciano et al., 2012). Students who do not finish high school encounter complications such as an increased likelihood to engage in gang or other criminal activity, increased risk for unemployment or underemployment, and depression or other mental health issues (Freeman et

al., 2015). Although the most common explanation for a student dropping out of high school is the personal characteristics of the student, the characteristics of the high school, such as course offerings, can also be to blame (Freeman et al., 2015). Online and blended learning can play an important role in improving graduation rates by meeting the diverse and special needs of students and by allowing students to take courses that would have otherwise been unavailable (Picciano et al., 2012). Despite the remarkable growth of online and blended learning opportunities for K-12 students in the past several years (Archambault et al., 2014), the quality of the online courses remains a concern for high school administrators (Picciano et al., 2012).

What constitutes quality in education has been highly debated topic by instructors, students, external groups and organizations, and others directly involved with online education (Mitchell, 2010). However, the importance of quality in education cannot be debated. With the shift towards distance education in K-12 schools, the quality of online learning and blended learning is especially important. Researchers have shown that high quality online learning and blended learning can provide benefits to students, schools, and states at the K-12 level by providing new opportunities that lead to improved student outcomes (Oliver & Stallings, 2014). If the quality is high, online schools have the potential to attract students from across large distances and therefore, work at a greater scale than a physical school (Watson et al., 2012).

The CoI framework presents the social and academic factors necessary for the development of high-quality, online education (Garrison et al., 2000) and is frequently used as a guide for online learning (Akyol et al., 2009). The three overlapping constructs of the CoI are cognitive presence, social presence, and teaching presence.

Cognitive presence is the degree to which online and blended learners can construct and validate meaning through the process of reflection, discourse, analysis, and synthesis (Garrison,

Anderson, & Archer, 2001). Social presence is the degree to which the learners feel affectively connected to each other as they insert their personal characteristics into the CoI (Rourke, Anderson, Garrison, & Archer, 2001). Teaching presence is the design, facilitation, and direction of social and cognitive developments for the purpose of meaningful and worthwhile learning outcomes (Anderson, Rourke, Garrison, & Archer, 2001). The CoI framework has been used frequently in research with graduate students (Akyol et al., 2009). However, minimal studies have been conducted with the CoI framework and high school students.

While many studies have used course grades to compare the effectiveness of online and blended learning environments (Keramidas, 2012; Larson & Sung, 2009), other researchers have argued that course grades are not the best method for measurement due to restricted ranges and discrepancies between teachers (Rovai & Barnum, 2003) because different teachers may grade assignments differently. As a result, perceived learning, a self-reported level of learning (Rovai, 2002) has become a popular and accepted method to measure learning at the undergraduate and graduate levels (Overbaugh & Nickel, 2011; Pike, 2011). Not only have researchers suggested that self-reports of learning are a valid measure of learning, but also that perceived learning may be more important than reality as decisions about learning are often based on perceptions (Rovai & Barnum, 2003). Studies that have examined perceived learning at the K-12 level have concentrated on perceived learning and variables other than the CoI such as student achievement or attitudes towards school (Forehand, 2014). This study examined how blended learning influences high school learners' social presence, cognitive presence, teacher presence, and perceived learning.

Problem Statement

Online education and blended learning in the K-12 setting have experienced record growth (Rice, 2014); therefore, more research is essential. Many of the comparison studies of online learning and blended learning have studied undergraduate and graduate students and examined non-equivalent courses (Rovai & Jordan, 2004). The increasing number of K-12 students enrolling in online and blended learning and the persistent concern of high dropout and graduation rates warrants examination of the generalizability of previous findings in higher education to the K-12 learning environment. The CoI framework is the most frequently cited model for online learning (Boston et al., 2010), as it provides guidelines for quality online and blended learning (Akyol & Garrison, 2011; Szeto, 2015). However, since the majority of research on the CoI has been conducted in higher education (Akyol & Garrison, 2011; Garrison et al., 2000), research is needed on the CoI theoretical perspective on various other populations such as high school students (Garrison, Anderson, & Archer, 2010), as the CoI will also provide insights for K-12 online learning (Murphy & Rodriquez-Manzanares, 2009). The problem is that a gap exists in the literature exploring the differences of online and blended learning from a CoI perspective (Garrison et al., 2010).

Purpose Statement

The purpose of this causal-comparative study was to examine the differences of blended learning and online learning with respect to CoI and perceived learning for high school students at a public charter school in South Carolina. The independent variable, the setting, had two levels: blended and online learning environments. Blended learning was generally defined as the combination of online learning with face-to-face learning (Nowell, 2011). Online learning was defined as learning resulting from instruction delivered completely through the Internet (Picciano

et al., 2012). The dependent variables were generally defined as the CoI and perceived learning. The CoI constructs, social presence, cognitive presence, and teaching presence, were measured using the simplified CoI survey (P. Ice, personal communication, March 23, 2015). Perceived learning was measured by the Cognitive, Affective, and Psychomotor (CAP) Perceived Learning Scale (Rovai, Wighting, Baker, and Grooms, 2009).

Significance of the Study

The current study examined archival data collected from a population of online and blended learning high school students including former dropouts, bullied teens, pregnant and parenting teenagers, full-time working students, and students with medical and/or mental health issues preventing them from being able to attend their local district public schools. The population that was studied is one that greatly benefits from the flexibility of online education (Picciano et al., 2012). Findings from the study have the potential to support the population including minorities, troubled teens, and pregnant and parenting students by aiding in increasing the quality of online and blended learning.

A need for research of the CoI constructs with high school students that can be implemented into practice or policy has been documented in educational research (Borup et al., 2014). As aforementioned, online attrition and high school graduation rates are considered a major problem in K-12 online learning (Borup et al., 2014; Freeman et al., 2015). The results of this study, utilizing the CoI construct with high school students, could be used to aid in increasing the quality of online learning, and therefore, increasing retention and reducing dropouts (Picciano et al., 2012). Thus, this study is significant. More specifically, no research exists that uses the CoI survey with high school students; therefore, quantitative research on this

population with this instrument is lacking. The results of this study will aid in filling the current gap in literature by testing the theories of the CoI framework and perceived learning.

Research Questions

RQ1: Do differences exist among the social presence, cognitive presence, and teacher presence of high school students enrolled in blended courses as compared to those enrolled in online courses?

RQ2: Does a difference exist between perceived learning of high school students enrolled in blended courses as compared to that of those enrolled in online courses?

Definitions

1. *Blended learning* - Blending learning is the combination of online learning with traditional face-to-face learning (Nowell, 2011).
2. *Online learning* - Online learning is learning delivered completely through the Internet (Picciano et al., 2012).
3. *Community of inquiry (CoI) framework* - CoI framework consists of three overlapping elements: social presence, cognitive presence, and teaching presence and is a theoretical framework that has been proven to effectively guide research on blended and online learning (Akyol et al., 2009).
4. *Cognitive presence* - Cognitive presence is the degree to which online and blended learners can construct and validate meaning through the process of reflection, discourse, analysis, and synthesis (Garrison, Anderson, & Archer, 2001). Cognitive presence is operationally defined as a triggering event, exploration, integration, and resolution (Akyol & Garrison, 2008).

5. *Social presence* - Social presence is the ability of learners to present themselves as real people by projecting their personal characteristics into the CoI (Rourke et al., 2001). Social presence is operationally defined as open communication, group cohesion, and affective expression (Akyol & Garrison, 2008).

6. *Teaching presence* - Teaching presence is the design, facilitation, and direction of social and cognitive developments for the purpose of meaningful and worthwhile learning outcomes (Anderson et al., 2001). Teaching presence is operationally defined as design and organization, facilitating discourse, and direct instruction (Akyol & Garrison, 2008).

7. *Perceived learning* - Perceived learning is a self-reported level of learning (Rovai, 2002).

8. *Facilitating discourse* - Facilitating discourse is a component of teaching presence in which learners engage, interact, and build on the instructional material provided (Garrison & Arbaugh, 2007).

9. *Direct instruction* - Direct instruction is a component of teaching presence of providing intellectual and scholarly leadership from a subject matter expert (Anderson et al., 2001) in order to analyze comments for correct understanding, inject sources of information, direct useful discussions, and scaffold learner knowledge to a higher level (Swan et al., 2008).

10. *Instructional design and organization* - Instructional design and organization is a component of teaching presence that begins prior to the beginning of the course as the teacher plans and prepares the design, process, interaction, and evaluation components of the online or blended course (Garrison & Arbaugh, 2007).

11. *Triggering event* - A triggering event is the first phase of cognitive presence, an event in the form of a problem, issue, or dilemma that needs resolution (Garrison et al., 2000).

12. *Practical inquiry model* - The practical inquiry model operationalises cogntive presence as a holistic multi-phased process (Garrison et al., 2000).

13. *Exploration* - Exploration is the second phase of cogntive presence in which the learner searches for information to provide insight into the challenge (Garrison et al., 2000).

14. *Integration* - Integration is the third phase of cogntive presence in which connections are made and ideas are developed (Garrison et al., 2000).

15. *Resolution* - Resolution is the final phase of teaching presence that consists of testing solutions (Garrison et al., 2000).

16. *Deep and meaningful learning* - Deep and meaningful learning is more significant levels of learning caused by learner-centered approaches and higher order thinking that promotes long-term knowledge retention (DeLotell et al., 2010).

17. *Emotional expression* - Emotional expression is interpersonal communication, a component of social presence (Garrison et al., 2000).

18. *Open communication* - Open communication is mutual and polite communication, a component of social presence (Garrison et al., 2000).

19. *Group cohesion* - Group cohesion is creating and maintaining a sense of community through a feeling of belongingness (Garrison et al., 2000).

CHAPTER TWO: LITERATURE REVIEW

Overview

School districts across the United States have been involved in an effort to increase online learning opportunities while also ensuring that students feel connected and a sense of community (Dikkers et al., 2013). Elements of sense of community include mutual interdependence among members, trust, interactivity, connectedness, and shared values and goals (Rovai, 2002). Research has indicated that positive relationships exist between sense of community and learner engagement, perceived learning gains, and satisfaction (Liu, Magjuka, Bonk, & Lee, 2007). The community of inquiry (CoI) framework presents the social and academic factors necessary for a sense of community and the development of high-quality online education (Garrison et al., 2000) and is frequently used as a guide for online learning (Akyol et al., 2009). The foundation of the framework is that deep and meaningful, higher-order learning is provided by a collaborative, constructivist learning environment that takes place in a community through the interaction of three essential elements: cognitive presence, social presence, and teaching presence (Garrison et al., 2000; Garrison, Cleveland-Innes, & Fung, 2010).

Since knowledge is ultimately developed by active participation in a collaborative and well-functioning community (Shea, Li, & Pickett, 2006), the CoI focuses on the intentional development of an online or blended learning community (Shea & Bidjerno, 2009). In the CoI model, specific behaviors and processes are required to develop knowledge construction through the refinement of cognitive, social, and teaching presences. For both online and blended learning experiences, the CoI is one of the most frequently cited theoretical models used to guide educational experiences (Alavi & Taghizadeh, 2013).

This chapter provides an overview of current literature regarding online learning, blended learning, and the CoI framework. The definitions of online and blended learning are discussed followed by a discussion of the theoretical framework, the CoI framework. The literature on each of the constructs of the CoI framework—cognitive presence, social presence, and teaching presence—is then reviewed. Then, perceived learning is discussed. Finally, the current gap in the literature is summarized and the significance of the current study is provided.

Online Learning

Both online learning and distance education have varying definitions. Although Twigg (2001) stated that distance education and online learning are used interchangeably, online learning and distance education are not synonymous terms (Guri-Rosenbuilt & Gros, 2011). Todhunter (2013) described distance education as off-campus learning, the antonym of on-campus learning. Caruth and Caruth (2013) called online learning the descendent of distance education. Keegan's (1980) definition of distance education is the one most commonly cited. Keegan distinguished distance education from traditional education in terms of six characteristics: (a) separation of teacher and learner, (b) educational organization influence in planning and student support, (c) use of media, (d) provision of two-way communication, (e) participation in an industrialized form of education, and (f) learner as individual or privatization of learning (Keegan, 1980).

The growth of distance education has evolved over four generations of technology: (a) printed instruction, (b) early technology in broadcasting systems, (c) online instruction, and (d) web-based teleconferencing (Caruth & Caruth, 2013). Online education has opened a new era in distance education because of the ability to facilitate and strengthen two-way communication, reduce the isolation of students, and provide students easy access to a broad range information

(Anderson & Dron, 2011; Caruth & Caruth 2013). As aforementioned, researchers comparing traditional face-to-face learning and distance education have concluded that no significant differences exist (Bernard et al, 2004; Cavanaugh, 2001). However, Zhao, Lei, Yan, Lai, and Tan (2005) found that an increasing number of studies conducted after 1998 revealed advantages for the online format. The researchers concluded that their findings indicated that the two-way interaction provided by the Internet allowed advantages that previous distance education technology did not (Zhao et al., 2005). It is important to understand, however, that distance education can exist without online learning (Bates, 2005) as other modes of technology, such as postal correspondence or mass media of television (Todhunter, 2013), can be used.

According to Picciano et al. (2012), the definition of online learning is learning that takes place completely on the Internet. The distinction between online learning and blended learning is important because online learning is only one variation of distance learning. While online learners do not have any face-to-face contact with teachers, blended learning students do. Online learning in K-12 schools began in simple applications to serve students in circumstances where no alternative existed for learning such as advanced or remedial courses in schools that could not offer a broad range of courses (Horn & Staker, 2015). Whereas online learning for K-12 students once had the reputation of being a substandard, second option to a face-to-face classroom (Horn & Staker, 2015), online learning has improved steadily and now even replaces traditional face-to-face instruction in some cases. It is important to understand that students in an online group are working without the explicit supervision and face-to-face mentoring of an adult (Horn & Staker, 2015). Hence, quality education guided by the CoI framework and increasing levels of cognitive presence, social presence, and teaching presence is essential (Kozan & Richardson, 2014).

Blended Learning

Just as definitions of distance education and online learning vary, so do the definitions of blended learning (Wold, 2013). Some have stated that blended learning is classroom instruction and online instruction occurring at different locations and different times while others have defined blended learning as classroom instruction and online instruction occurring in the same location and at the same time (Gebara, 2010). Others simply have stated that blended learning is the combination of online learning with traditional face-to-face learning (Nowell, 2011). The Sloan Consortium was more specific in their definition, describing blended learning as a combination of online and face-to-face delivery, with 30% to 79% of the content delivered online (Allen & Seaman, 2014). According to Rose and Ray (2011), three elements are always implicitly or explicitly present in even the broadest of definitions of blended learning: (a) some face-to-face contact with an instructor, (b) some use of electronically delivered instruction, and (c) a deliberately designed effort to combine both to achieve defined learning objectives.

Thousands of school districts across America are making the change to blended learning for K-12 students because of the desire for personalization and access and to control costs (Horn & Staker, 2015). Rovai and Jordan (2004) stated that blended learning is a more robust educational experience than traditional or online learning due to the flexible approach to course design, offering the conveniences of fully online courses without the complete loss of face-to-face contact. It is important to note, however, that the online component of blended learning should be a natural extension of traditional classroom learning (Colis & Moonen, 2001). Blended learning does not simply add on to the existing face-to-face instruction and is not a fully Internet-based learning experience; however, how little or how much online learning is inherent to blended learning is not clear (Garrison & Kanuka, 2004).

Research has indicated that using the method of blending both online learning and traditional face-to-face learning is more effective than solely online or solely face-to-face learning (Akyol et al., 2009; Scida & Saury, 2006; Sethy, 2008; Wold, 2013). In higher education, students enrolled in blended learning courses have decreased dropout rates and higher grades (Lopez-Perez, Perez-Lopez, & Rodriguez-Ariza, 2011) compared to students in traditional face-to-face courses. Blended learning effectively facilitates a CoI by adding numerous forms of communication, which contribute to an important reflective component (Akyol & Garrison, 2011). Studies have shown increased academic achievement for high school students in a blended learning setting as compared to a traditional learning environment (Kazu & Demirkol, 2014). In addition to the benefits already stated, K-12 students and their parents need school to be more than purely online as children need a safe place to be during the day outside of the home. Blended learning provides a physical place for high school students and a place to receive help from teachers while also weaving in online learning (Horn & Staker, 2015). In K-12 education, four models of blended learning are most common: rotation, flex, a la carte, and enriched virtual (Horn & Staker, 2015). In the rotation model, students rotate among learning modalities, and one modality is online learning. A common example of rotation is students rotating, either at the teacher's discretion or a fixed schedule, between small-group instruction, pencil-and-paper assignments, and online learning. In the flex model, the online learning for the courses is the backbone of student learning while students are at a brick-and-mortar campus. The key difference in a rotation school and a flex school is that a rotation school adds online learning to a traditional school, whereas a flex school begins with online learning and adds face-to-face supports where needed (Horn & Staker, 2015). The a la carte model, the most common form of blended learning at the high school level, includes any course that a student takes

entirely online while attending a brick and mortar school (Horn & Staker, 2015). The biggest difference between the a la carte model and the flex model is the teacher of record. The teacher of record is the online teacher with an a la carte course, whereas with a flex course, the face-to-face teacher is the teacher of record. In an enriched virtual model, courses offer required face-to face learning sessions but allow students to do the remainder of the work online wherever they prefer.

This study examined how blended learning influences high school learners. To add to the research on high school students and blended learning, this study determined if a difference exists between cognitive presence, social presence, teaching presence, and perceived learning in high school students who are enrolled in a blended learning course as compared to those enrolled in an online course. Because blended learning merges the best elements of in-class teaching with the best elements of online learning (Oliver & Stallings, 2014), the advantages such as decreased dropout rates (Lopez-Perez et al., 2011) and increased effectiveness in students' learning (Lieser & Taff, 2013) are vast for institutions, faculty, and students (Rose & Ray, 2011). Because high school graduation and dropout rates are a leading concern for educators and policy makers (Freeman et al., 2015), research on blended learning is crucial for change. Understanding the definitions and benefits of blended learning is important in order to understand and identify how the two delivery formats, online learning and blended learning, are different in their effectiveness in students' learning (Lim et al., 2007). Additionally, studying high school students' perceptions of the CoI presences will be useful in determining whether a blended course is a good fit for students' learning needs (Wicks, Craft, Mason, Gritter, & Bolding, 2015).

Theoretical Framework

The CoI framework is based on critical thinking and practical inquiry (Shea, Vickers, & Hayes, 2010) and has been a model for effective online learning since 2000 (Garrison et al., 2000; Garrison & Arbaugh, 2007). Garrison et al. (2000) were motivated by Henri's (1991) work on cognitive presence to develop a framework that consisted of three elements: cognitive presence, social presence, and teaching presence. Cognitive presence describes the phases of practical inquiry leading to resolution of a dilemma, social presence reflects the interpersonal relationships of the community and the development of climate, and teaching presence provides leadership (Akyol & Garrison, 2011). Although the CoI framework emerged in the specific context of the asynchronous, text-based group discussion of computer conferencing in higher education, the focus shifted to a broader perspective on online learning after the publications of pivotal articles on each of the elements, framework, and methodology (Garrison et al., 2010).

The CoI framework is grounded in the philosophical fundamentals of collaborative constructivism. At the core of Dewey's (1959) educational philosophy and practice were community and inquiry, as Dewey believed that individual development and inquiry was a social activity, dependent upon community. According to Dewey (1959), when collaboration occurred, students would be responsible learners that actively constructed and confirmed meaning. The CoI framework was developed to further explore a collaborative constructivist approach in online learning (Swan, Garrison, & Richardson, 2009). The foundation of the CoI framework is that a community of learners engaged in critical reflection and discourse supports higher-order learning (Garrison et al., 2010). The intersection of the teaching, social, and cognitive presences conceptualizes the quality of the education experience (Szeto, 2015). The community of inquiry's well-structured model and set of guidelines is not only a framework for effective online

learning environments but also for effective blended learning environments, both asynchronous and synchronous (Akyol & Garrison, 2011; Akyol et al., 2009; Szeto, 2015). Synchronous learning involves real-time communication between students and instructors, whereas asynchronous learning occurs in delayed time and does not depend on simultaneous contact for educational outcomes (Oztok, Zingaro, Brett, & Hewitt, 2013).

Deep and meaningful learning, first pioneered by Marton and Saljo (1976) using phenomenographic research, is at the core of the CoI (Akyol & Garrison, 2011). Phenomenographic research is a qualitative method for researching the different ways in which people conceptualize the world around them (Gall, Gall, & Borg, 2007). Marton and Saljo (1976) discovered differences between students in how they approached a certain task. Students either made use of a deep learning process associated with an intention to understand or they made use of a surface-learning process in order to reproduce the learning materials (Baeten, Kyndt, Struyven, & Dochy, 2010; Marton & Saljo, 1976). The emphasis of using a collaborative constructivist approach for designing and providing deep and meaningful learning experiences is a strength of the CoI (Akyol & Garrison, 2011). The deep learning process is important to the current study because deep learning positively influences student retention rates (DeLotell et al., 2010).

Expectations and interactions have a considerable effect on students' approaches to learning (Aykol & Garrison, 2011, Marton & Saljo, 1976). Garrison and Cleveland-Innes (2005) researched deep learning in an online collaborative environment and further concluded that interaction alone is not adequate but "that the quality of interaction (i.e. critical discourse) must be a specific design goal and interaction facilitated and directed in a sustained manner if deep approaches to learning are to be achieved" (p. 142). Quality of outcomes are of a higher order

when a student approaches learning in a deep manner because learning outcomes are both quantitatively and qualitatively enhanced (Baeten et al., 2010; Marton & Saljo, 1976). The CoI framework is important to deep and meaningful learning because the constructs of cognitive presence, social presence, and teaching presence are essential to the development of community and the pursuit of inquiry, which are required for higher order thinking (Akyol & Garrison, 2011; Swan et al., 2009).

Related Literature

Since the origin of the CoI, overlapping relationships among teaching presence, social presence, and cognitive presence have been documented by researchers (Arbaugh et al., 2008; Garrison et al., 2000; Garrison et al., 2010). These overlapping relationships of the core elements of the CoI framework are important because the interdependences of the presences create the dynamics of an online or blended educational experience in setting climate, supporting discourse, and selecting content (Garrison et al., 2010). The interrelationships of the three presences are needed to create a "meaningful, collaborative and constructivist discourse that is necessary for high-level learning" (Shea et al., 2014, p. 10).

As seen in Figure 1, social presence and cognitive presence overlap in supporting discourse, cognitive presence and teaching presence overlap in selecting content, and teaching presence and social presence overlap in setting climate (Garrison et al., 2000). However, past research has focused on the individual elements of the framework rather than on the causal relationships among all three of the CoI constructs. Understanding how the presences relate to each other is important (Kozan & Richardson, 2014) because learning happens at the intersection of the presences (Arbaugh et al., 2008). Cognitive presence has been researched with a focus on

topics such as learning outcomes and deep approaches to learning (Akyol & Garrison, 2011) and online learner engagment (Shea & Bidjerano, 2009).

Figure 1. The community of inquiry framework. Adapted from "Critical inquiry in a text-based environment: Computer conferencing in higher education" by D.R. Garrison, T. Anderson, and W. Archer (2000) *The Internet and Higher Education, 2*(1), p. 88. Reprinted with permission.

Social presence has been studied independently to explore its effects on digital storytelling (Lowenthal & Dunlap, 2010) and social identity (Rogers & Lea, 2005). Likewise, teaching presence has been studied in isolation with a focus on aspects such as on-site coaches in blended learning environments (De la Varre, Keane, & Irvin, 2011) and online instructional efforts (Shea et al., 2010). Limited research exits on the overlapping relationships of cognitive

presence, social presence, and teaching presence (Garrison et al., 2010; Kozan & Richardson, 2014).

Ke (2010) used both quantitative and qualitative methods with adult students and instructors of ten online courses at a research university in the United States to study how the presences were related to each other. Using interviewing, content analysis of online discussion transcripts, artifact analysis of course sites, and a learning experience survey, Ke determined that a positive, significant relationship existed between cognitive presence and social presence. Adult students who reported a lower level of surface learning and performed more knowledge-constructive interactions also performed more social interactions and reported a stronger sense of community (Ke, 2010). The study also determined that teaching presence had a significant role in encouraging social presence and cognitive presence. Both the qualitative and quantitative results suggested that teaching presence should be the initiator in the community development process. The interviews and online observations indicated that adult students will adapt their social and cognitive performances based on the design, instruction, and facilitation components of an online course. Survey results indicated that online discussion design significantly predicted self-reported and observed social and cognitive presence (Ke, 2010).

Archibald (2010) used quantitative data collected using the CoI survey (Arbaugh et al., 2008), the Learner Preference Assessment (Guglielmino & Guglielmino, 1991), and a demographic survey to determine whether engaging in online discussion and using an online learning resource fostered learners' knowledge and facilitated critical thinking about educational research and design. Standard multiple regression analysis was used to predict the effects of teaching and social presences on the development of cognitive presence. Qualitative data were also collected from the ten higher education research methods courses to support the quantitative

findings (Archibald, 2010). The results indicated that teaching presence and social presence predicted cognitive presence and that social presence made a larger, significant contribution to cognitive presence than teaching presence did (Archibald, 2010). Conversely, research has also shown that teaching presence significantly predicts cognitive presence while social presence has a mediating role between the two (Garrison et al., 2010; Shea & Bidjerano, 2009).

Garrison et al. (2010) also used the CoI survey (Arbaugh et al., 2008) to collect data from higher education students to explore the causal relationship between the three presences. Findings, based in structural equation modeling, indicated that teaching presence was the core of establishing and maintaining cognitive and social presence. Student perceptions of teaching presence were found to directly influence the perception of cognitive and social presence. Likewise, the perceptions of social presence significantly predicted cognitive presence and therefore must be seen as a mediating variable between teaching presence and cognitive presence (Garrison et al., 2010). Garrison et al.'s (2010) research and the evidence that the three presences are interconnected and influence each other was consistent with the framework and previous research (Garrison et al., 2000). The results were consistent with the findings of Shea and Bidjerano's (2009) similar study that reported a good fitting model using a sample size greater than 2000.

More recent research has further explored these interrelationships among social, teaching, and cognitive presence using both bivariate and partial correlation analyses (Kozan & Richardson, 2014). Using the CoI survey (Arbaugh et al., 2008), Kozan and Richardson (2014) surveyed graduate students of 17 sections of six online courses taught by 11 teachers. Results showed a large, positive correlation between teaching presence and social presence; increases in teaching presence were highly associated with increases in social presence and vice versa. A

strong, positive correlation was found between teaching presence and cognitive presence and also between cognitive presence and social presence. Cognitive presence was shown to significantly affect the relationship between teaching presence and social presence. Kozan and Richardson (2014) also determined that the interdependence of the presences may have changed depending on the learner profile and learning context, hence the divergent findings earlier reported. Although these correlational studies and studies focusing on causal relations have contradicting results, all of the studies suggested close interrelationships between and among the presences. With the direction of a knowledgeable teacher in an environment that is academically and socially supportive, students will participate in meaningful discourse that will cultivate personal and lifelong understandings of topics taught; this is the core thesis of the CoI (Rourke & Kanuka, 2009).

As aforementioned, the CoI framework is continually being researched and developed (Alavi & Taghizadeh, 2013). Researchers have also identified an additional construct–learning presence (Kang, Liew, Kim, & Park, 2014; Shea et al., 2012). Shea and Bidjerano (2010) proposed that documenting all instances of cognitive, social, and teaching presences has resulted in identification of learner discourse that could not be reliably coded as indicators of the original presences and therefore, did not fit in the model. Shea et al. (2010) concluded that learners participated in discourse such as collaborative attempts to understand instructions, dividing up tasks, managing time, and setting goals to successfully complete group projects. These activities seemed to be indicators of online learner self- and co-regulation and therefore indicated a need for refining and enhancing the CoI model given the social, electronic, and self-directed nature of online learning (Shea & Bidjerano, 2010). Self-regulated learning is the degree to which students in collaborative online educational environments are motivationally, behaviorally, and

metacognitively active participants in the learning process (Winters & Azevedo, 2005). Shea and Bidjerano (2010) suggested that the behaviors and traits of learner self-regulation are elements of the construct learning presence.

Recent research has been conducted on learning presence of graduate students (Shea et al., 2012). Using two archived higher education courses, Shea et al. (2012) determined that learning presence is correlated with social presence. Shea et al. (2012) built on the aforementioned work of Shea et al. (2010), which claimed student discourse that occurred in collaborative activities could not be reliably coded as cognitive, social, or teaching presence. These researchers believed that, since they were core to the learner-centered approaches to online learning, integrating these activities into the CoI framework was essential (Shea et al., 2012). Searching for patterns of self- and co-regulation within areas of discourse such as student small-group debates and full-class discussions led to an exploratory analysis that resulted in a coding scheme that represented learning presence (Shea et al., 2012). Additionally, Shea et al. (2012) examined correlations between cognitive presence, social presence, teaching presence, learning presence, and course grades in order to understand the relationship between learning presence and the other elements of the CoI framework and learning outcomes. They also concluded that learning presence had the strongest correlation with course grades and was a better predictor of course grades than cognitive presence, social presence, or teaching presence.

Although Shea et al. (2012) called for future exploration and studies of learning presence, this study will not include learning presence as a construct of the CoI framework. Akyol and Garrison (2011) critiqued the addition of learning presence to the CoI framework by questioning if the addition of a new construct challenged the integrity of the CoI framework. Akyol and Garrison (2011) stated that learning presence separated the roles of the learner and the teacher, a

process that undermined the collaborative focus of the CoI model since all participants assume learner and teacher responsibilities and roles to varying degrees. Garrison and Akyol (2013) disagreed with Shea et al.'s (2012) suggestion that learning presence would enhance the CoI framework. Garrison and Akyol (2013) stated:

> Considering the theoretical premise of a collaborative community of learners, it is difficult to understand the rationale for creating a construct that does not explicitly recognize the importance of co-regulation or reflect the collaborative nature of a community of inquiry. We argue that this proposed "enhancement" is without commensurate theoretical considerations of the CoI framework (violates fundamental assumptions of the CoI framework) and it also fails to move us forward with regard to the inherent co-regulated environment of an educational community of inquiry. (p. 85)

In an attempt to respect the collaborative nature and fundamental assumptions of the CoI framework, this study will only research cognitive presence, social presence, and teaching presence and will not study learning presence.

Cognitive Presence

Researchers are intent on determining if higher order learning can be achieved in an online or blended learning environment. Most of the research on cognitive presence has been collected using the perceptions of participants, such as student satisfaction and perceived learning in higher education students (Richardson & Swan, 2003; Shea et al., 2006). Akyol and Garrison (2011) called for an emphasis on measuring actual learning outcomes in order to connect collaborative and engaging approaches of blended and online learning to depth of learning. They stated that linking processes and outcomes is critical in order to understand how

to support cognitive presence in blended and online learning environments (Akyol & Garrison, 2011).

Garrison et al. (2001) described cognitive presence as the extent to which online learners can construct and validate meaning through the process of reflection, discourse, analysis, and synthesis. Cognitive presence is grounded in critical thinking literature (Garrison et al., 2001). Critical thinking is a necessary condition of learning (Garrison, 1991) and therefore is a process and outcome frequently presented in higher education (Garrison et al., 2000). When learners possess critical thinking and inquiry, they have the ability to understand and confirm meaning and their knowledge construction (Akyol & Garrison, 2011; Shea & Bidjerano, 2009). Because cognitive presence is a vital element in critical thinking (Garrison et al., 2000), cognitive presence is considered to be the most basic element to success in higher education (Garrison et al., 2000). Critical thinking is also the desired outcome of the educational pursuit of high school students (Jeremiah, 2012).

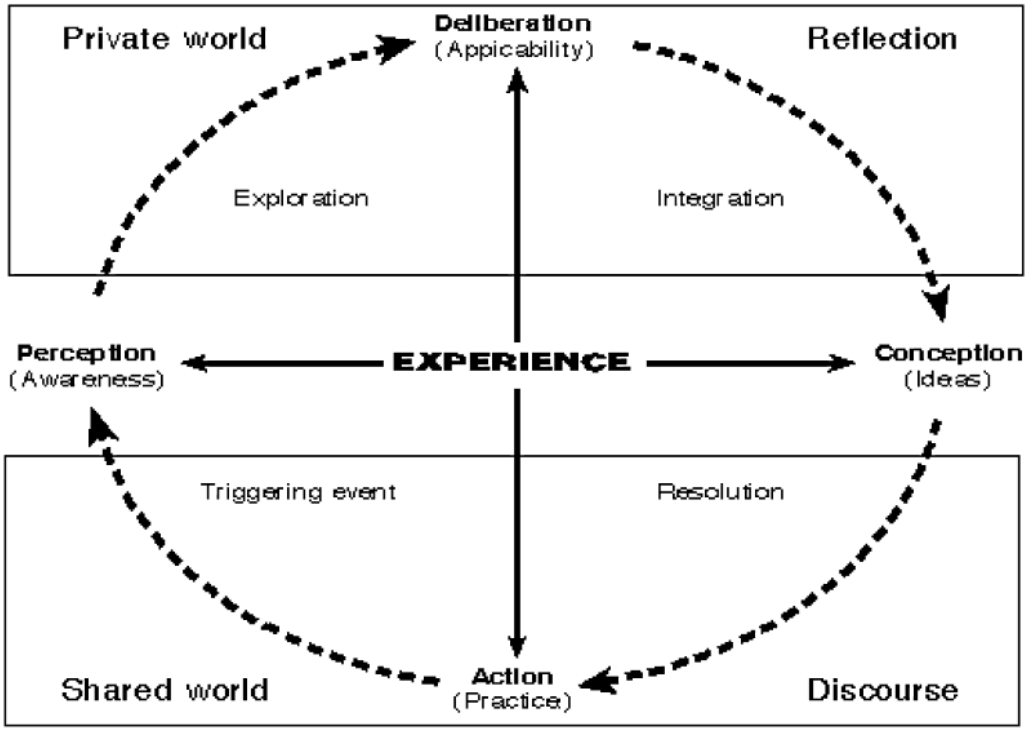


Figure 2. The practical inquiry model. Adapted from "Researching the community of inquiry framework: Review, issues, and future directions" by D.R. Garrison and J.B. Arbaugh (2007) *The Internet and Higher Education*, 10(1), p. 161 Reprinted with permission.

In their pivotal paper on the CoI, Garrison et al. (2000) proposed that cognitive presence could best be understood by a general model of critical thinking, the practical inquiry model (see Figure 2), and therefore, cognitive presence has been operationalized by this model. The model is founded on the ideas of Dewey (1933) and his conception of practical inquiry. Swan et al. (2009) wrote, "Dewey's generalization of the scientific method in the form of reflective thinking provided the foundation for the critical thinking movement that is the hallmark of higher education" (p. 6). According to Dewey (1933), reflective activity begins with a prereflective state which starts with a problem, is followed by five phases of reflective thought, and ends with a satisfactory resolution. Because reflective inquiry has a practical value in providing meaning to experience, Dewey (1933) believed a practical method of inquiry was also needed for an educational experience. Dewey's (1933) method of practical inquiry is based upon experience,

emerges through practice, and produces knowledge and a resolution of the problem (Garrison et al., 2000). It was also the genesis for the practical inquiry model operationally defining cognitive presence in the CoI framework (Swan et al., 2009).

The practical inquiry model operationalizes cogntive presence as a holistic multi-phased process (Garrison et al., 2000) using four phases: triggering event, exploration, integration, and resolution. The approach to learning is one that is domain-specific and context-dependent; "learning how to think is embedded in what to think" (Garrison et al., 2000, p. 98). The practical inquiry model assumes a repetitive and shared relationship and interaction between the personal and shared worlds, between reflection and communicative action as opposed to critical thinking and inquiry as solely a thought process (Garrison et al., 2000). The vertical axis of the practical inqiry model portrays critical thinking as the integration of deliberation (applicablity) and action (practice), while the horizontal axis is the integration of conception (ideas) and perception (awareness) (Garrison et al., 2000).

The first phase of the practical inquiry model is the triggering event which begins the inquiry process with an activity to guarantee full buy-in and engagement from the students. Exploration focuses on understanding the problem and then finding a possible explaination (Aykol & Garrison, 2011). The third phase is integration, moving towards a more structured phase of constructing meaning by integration of ideas. Finally, resolution is the confirmation or testing phase that resolves the dilemma or problem by discovering a definite solution or constructing a signficant framework (Aykol & Garrison, 2011). Without the four phases, cognitive presence does not exist (Alavi & Taghizadeh, 2013). Although cognitive presence is considered the element that is central to successful learning experiences (Kanuka & Garrison, 2004), cognitive presence alone is not adequate. Although the development of meaning may

come from an individual's crtitical reflction, the ideas are created and knowledge is constucted by the collaboration and discourse of a community of learners (Garrison et al. , 2000).

Social Presence

Because learners must feel comfortable in relating to each other, cognitive presence alone is not sufficient to sustain a critical community of learners (Garrison et al., 2000). Since the inception of online learning, social presence has been a focus (Garrison et al., 2010). Social presence is theorized partly as a "quality of the medium through which immediacy behaviors are represented so, in their view, media vary in the degree of social presence they can convey" (Schutt, Allen, & Laumakis, 2009, p. 137). Many researchers (Oztok & Brett, 2011) viewed Mehrabian's (1969) work as the first social presence study, although Mehrabian did not use the term social presence but rather used the term immediacy. Mehrabian (1969) defined immediacy "as the extent to which communication behaviors enhance closeness to and nonverbal interaction with another" (p. 203). Mehrabian's research suggested that nonverbal cues such as facial expressions, body movements, and eye contact increase the sensory stimulation of interlocutors, which would lead to more intense, more affective, and more immediate interactions. The work of Mehrabian is important because teachers' verbal and nonverbal immediacy behaviors are positively correlated with learners' perceptions of social presence (Gunawerdana & Zittle, 1997; Oztok & Brett, 2011).

Early on, social presence was described as the ability of learners to project themselves socially and emotionally to been seen as real people in mediated communication (Gunawardena & Zittle, 1997; Short, Williams, & Christie, 1976). The definition has changed very little, as social presence is now defined as the ability of learners to present themselves as real people by projecting their personal characteristics into the CoI (Rourke et al., 2001). Social presence in

online and blended settings has been studied extensively to answer the question of whether a community of learners could be established without the visual cues that accompanied face-to-face communication (Garrison et al., 2010). Researchers have indicated that social presence can and should be present in online and blended learning communities (Armellini & De Stefani, 2015; Oztok & Brett, 2011; Rogers & Lea, 2005; Wicks et al., 2015).

Social presence is described as a continuous process of maintaining relationships, identifying with the community, and being involved in meaningful and trustful communication (Kozan & Richardson, 2014). Social presence, the extent to which participants feel affectively connected to one another, initially served as a support for cognitive presence based on the components of emotional expression, open communication, and group cohesion (Garrison et al., 2000). Emotional expression is interpersonal communication, open communication is mutual and polite communication, and group cohesion is creating and maintaining a sense of community through a feeling of belongingness (Garrison et al., 2000). These dimensions can also be described as learners' identification, communication, and development of the community and relationships (Garrison et al., 2010). Garrison and Arbaugh (2007) stated that social presence must create personal but also purposeful relationships. Social presence defines the difference between a collaborative community of inquiry and a mere act of downloading information. The difference in a true community of inquiry lies in the quality of the communication; the tone may be questioning, expressive, skeptical, and challenging, but also engaging, responsive, respectful, and supportive (Garrison et al., 2000).

Teaching Presence

Although cognitive presence and social presence are essential elements, the achievement of higher levels of learning depends on the presence of the teacher (Kanuka & Garrison, 2004).

Teaching presence is the design, facilitation, and direction of social and cognitive developments for the purpose of meaningful and worthwhile learning outcomes (Anderson et al., 2001). Teaching presence is the binding component in developing a CoI (Garrison et al., 2000) as it is the source of "online instructional orchestration" (Shea et al., 2010, p. 7). Building on the research of Berge (1995), Paulsen (1995), and Mason (1991), Anderson et al. (2001) conceptualized teaching presence as having three components: instructional design and organization, facilitating discourse, and direct instruction.

Instructional design and organization begins prior to the beginning of the course as the teacher plans and prepares the design, process, interaction, and evaluation components of the online or blended course (Garrison & Arbaugh, 2007). Activities involved in instructional design and organization include developing curriculum, designing methods, and providing guidelines on utilizing medium effectively (Anderson et al., 2001). Facilitating discourse is described as the ways in which learners engage, interact, and build on the instructional material provided (Garrison & Arbaugh, 2007). The term discourse is used rather than the term discussion to emphasize the focused and continued discussion and reflection of a knowledge-building community (Scardamalia & Bereiter, 1994). This component of teaching presence is critical to maintaining the motivation, interest, and engagement of students. Activities within this category include identifying areas of agreement/ disagreement; seeking to reach understanding; encouraging, acknowledging, and reinforcing student contributions; setting the climate for learning; drawing in participations; and prompting discussion (Anderson et al., 2001). Direct instruction is described as providing intellectual and scholarly leadership from a subject matter expert (Anderson et al., 2001) in order to analyze comments for correct understanding,

inject sources of information, direct useful discussions, and scaffold learner knowledge to a higher level (Swan et al., 2008).

In Shea et al.'s (2006) study of over 2000 undergraduate students, perceived teaching presence was clearly connected to a students' sense of learning community. More specifically, direct facilitation was found to contribute more to a sense of community than effective instructional design. However, effective instructional design should not be cast as unimportant, as research has indicated that it does still contribute to higher levels of a learning community. (Shea et al., 2006). Conversely, Kupczynksi, Ice, Wiesenmayer, and McCluskey (2010) determined that the value given to the various indicators and components of teaching presence vary and depend on the learner level. The researchers used a mixed methods approach with close to 700 students of varying degree levels: associate, bachelor's, master's, and doctoral. Associate level students' perceived instructional design and organization and direct instruction to have a greater impact on their success or lack thereof than facilitation of discourse. In contrast, the researchers concluded that undergraduate and graduate students perceived that adequate facilitation of discourse increased their likelihood of success (Kupczynksi et al., 2010). Kupczynksi et al. (2010) proposed that the findings may elucidate the emergence of higher order thought as students advance in their academic careers since at the associate level, the more objectivist elements were perceived to have the greatest impact. Research on the impact of the components of teaching presence varying and depending on the learner level is significant to the current study because the researcher surveyed high school students. These high school students will be more comparable to the associate level students rather that to undergraduate and graduate degree students and could likely place more value on instructional design and organization and

direct instruction, the more objectivist elements, than undergraduate and graduate degree students.

Shea et al.'s (2010) study on teaching presence was one of the first studies to comprehensively document productive instructional effort while also utilizing a theoretical framework, the CoI, for online learning. While pioneer research on teaching presence originated using computer conferencing and quantitative content analysis of postings in asynchronous discussion forums (Anderson et al., 2001), Shea et al. (2010) suggested that the bulk of online instructional effort occurs outside a discussion area, and therefore, restricting an analysis of teaching presence to such an area may offer too constricted of a view of an instructor's effort. Hence, Shea et al. (2010) coded and analyzed not only discussion posts, but also course announcements, e-mails, individual private folders, question-and-answer areas, syllabi, orientation materials, and module mini-lectures, assignments, and instructions of two fully online upper-level college courses in business management. Their analysis documented instances of effort but also confirmed instructional design, facilitation of discourse, and direct instruction. Shea et al.'s (2010) study also confirmed a fourth teaching presence dimension, assessment. The opportunity to see the significant effort with assessment is greatly diminished when threaded discussions are the only source analyzed (Shea et al., 2010). Feedback on assessments by instructors is valuable in a CoI (Shea et al., 2010). Kupczynski et al. (2010) determined that the feedback indicator in particular was an important factor of both success and lack of success. Shea et al.'s (2010) study also showed a significant correlation between teaching presence behaviors and learning outcomes. In doing so, the researchers took a step in closing the gap in evidence between the conceptual model of the CoI framework and the evidence of objective measures of learning in online courses which has previously been a critique of the framework

(Rourke & Kanuka, 2009). Although the current study did not include content analysis, Shea et al.'s (2010) research is integral to the review of literature, as the teachers of the current study not only used discussion boards to engage the students but also used assessment feedback, asynchronous and synchronous lectures, emails, and course announcements

Teaching presence is an indicator of online and blended learning instructional quality (Shea et al., 2010; de la Varre et al., 2011). According to Garrison and Arbaugh (2007), teaching presence is a significant determinant of perceived learning, student satisfaction, and sense of community. Teaching presence is important because of the role it plays in aligning cognitive presence and social presence in such a way that it harmonizes with learner needs, learner abilities, and learning outcomes (Kozan & Richardson, 2014). Research has indicated that for online learning communities to reach the deepest levels of reflective inquiry, teaching presence must coexist with social presence (Bangert, 2008; de la Varre et al., 2011). In a research study conducted with over 600 blended learning high school students, de la Varre et al. (2011) determined that setting the climate, the overlap between teaching presence and social presence, is a key aspect of the model for blended learning. Research has also indicated that learners will adapt their social and cognitive performance based on the components of teaching presence: design, instruction, and facilitation (Ke, 2010). As the previously mentioned studies indicated, teaching presence is a vital component of the CoI as a guideline for online and blended learning (Ke, 2010; Kozan & Richardson, 2014). Teachers are considered to be the largest factor and most important influence to student learning (Maynes & Hatt, 2015). The quality of online and blended learning experiences for K-12 students is directly affected by the quality of teachers (Archambault et al., 2014). Since the quality of online and blended learning is a concern for K-12 stakeholders as it impacts graduation rates (Picciano et al., 2012), more research on teaching

presence is necessary. This research study studied high school students and teaching presence but also determined if a difference exists between teaching presence in online and blended learning settings. Table 1 summarizes the CoI framework and perceived learning characteristics that were studied.

Table 1

Summary of the CoI Framework and Perceived Learning Characteristics

Cognitive Presence	Social Presence	Teaching Presence	Perceived Learning
Triggering events Exploration Integration Resolution	Affective expression Open communication Group cohesion	Direct instruction Facilitating discourse Instructional design and organization	Cognitive learning Affective learning Psychomotor learning

Perceived Learning

Many studies (Akyol & Garrison, 2011; Keramidas, 2012; Larson & Sung, 2009; Lim et al., 2007) have used course grades to compare the effectiveness of traditional, online, and blended learning environments. While course grades are a small measure of learning in collaborative online educational environments, they do remain an important indicator for students and faculty (Shea et al., 2012). In a comparison of online and face-to-face sections of an undergraduate special education course, Keramidas (2012) used course grades, in addition to attendance, as a factor for comparison of the two delivery formats. Larson and Sung (2009) also used course grades to compare student performance of students in an online course, blended course, and face-to-face course.

While some researchers have stated that course grades continue to be the most prevalent method of student learning outcomes (Dumont, 1996; Hiltz & Wellman, 1997), others have argued that using grades to operationalize student learning is not always the best method (Rovai

& Baker, 2005; Rovai & Barnum, 2003). According to Rovai and Baker (2005), not only do course grades have very restricted ranges, but they also have little relationship to what students have learned. Students may enroll in a course already knowing the material. Rather than being related to cognitive learning, the grade may reflect their class participation or attendance. The researchers also stated that it is unlikely that different teachers or even the same teacher will assign grades in a consistent manner over time; therefore, grades may not be a reliable measure of learning. Course grades may also not correctly measure learning outcomes but rather simply measure performance at a certain point in time (Gašević, Dawson, & Siemens, 2015). Given all of these reasons, using grades as a measure of cognitive learning can be problematic (Rovai & Barnum, 2003).

According to Rovai and Baker (2005), a student's self-reported perception of learning should reflect their view of the educational effectiveness of the course since instruction is intended to foster learning. Self-reporting in scholarly research of higher education students, including self-reports of student learning outcomes, has been found to be an adequate and appropriate measure (Pike, 2011). Rovai et al. (2009) developed the Cognitive, Affective, and Psychomotor (CAP) Perceived Learning Scale, a self-reporting instrument to measure learning in the cognitive, affective, and psychomotor domains in traditional and online higher education settings. Because the CAP Perceived Learning Scale considers learning across all three domains, it provides benefits to online and blended learning research by enabling instructors and researchers to study educational effectiveness across instructors, courses, and formats (Rovai et al., 2009). In this study, the CAP Perceived Learning Scale assisted in understanding the effectiveness of the CoI and online and blended learning environments (Rovai et al., 2009). Furthermore, the ability to measure perceived learning is important to this study because

increased perceived learning increases student achievement (Forehand, 2014) and therefore increases retention rates and lowers dropout rates.

In previous studies on different delivery formats of learning (Akyol & Garrison, 2011; Lim et al., 2007), both actual grades and perceived learning have been used. Akyol and Garrison (2011) used a mixed methods approach in an online graduate course and a blended graduate course to research processes and outcomes in community of inquires with different methods of delivery. The researchers used a concurrent triangulation strategy with transcript analysis, perceived learning, learning outcomes, satisfaction, and interviews to determine that cognitive presence in higher education is strongly associated with high levels of perceived learning. Akyol and Garrison (2011) contributed their findings to structured collaborative activities present in the course. The Spearman rank correlation coefficient was found to be significant between cognitive presence and perceived learning in both the online and the blended course; the students in the blended course showed higher levels of perceived learning as well as higher levels of satisfaction, cognitive presence, social presence, and teaching presence (Akyol & Garrison, 2011). These findings contrasted with the results of Lim et al. (2007) who also used a mixed-methods approach to compare learning outcomes between online and blended delivery formats with undergraduate students. No significant differences were found for perceived and actual learning in the two different delivery methods, and therefore the researchers concluded that the instructional delivery format may not affect learners' learning (Lim et al., 2007). No studies have yet examined the differences in online and blended high school courses with respect to perceived learning. Thus far, all studies conducted have used undergraduate and graduate students (Akyol & Garrison, 2011; Lim et al., 2007). Thus, this study focused on high school, ninth through 12th grade, online and blended learning students.

Summary

Social presence combined with appropriate teaching presence can result in a high level of cognitive presence, leading to fruitful critical inquiry (Garrison et al., 2000). Although CoI has been the most frequently researched model for higher education online learning (Alavi & Taghizadeh, 2013), research on the CoI and K-12 online and blended learning is limited due to the lack of a theoretical framework for online, K-12 learning (Borup et al., 2014). Although the CoI framework was originally designed to examine distance learning in higher education (Garrison et al., 2000), the framework may also provide insights for K-12 online and blended learning (Murphy & Rodriquez-Manzanares, 2009). A theoretical framework for K-12 online learning would advance the field (Corry & Stella, 2012) and help ensure quality instruction for online and blended learners (Picciano et al., 2012).

The lead researchers on the seminal work of the CoI called for research on the framework and high school students (Garrison, Anderson, & Archer, 2010). The predicted three factor solution for the CoI survey will be produced across all age groups as long as the courses are designed and delivered in a constructivist style (Kupeczynski et al., 2010). However, the age groups referenced were 18 years and older (Ice, Akyol, & Garrison, 2009). To date, no research has been completed using the CoI survey with high school students. Online education and blended learning in the K-12 setting has experienced record growth (Rice, 2014), so more research is essential.

Because multiple approaches or tools should be used to reveal the complexity of the cognitive dimension (Schire, 2006), the CoI presences and perceived learning were all measured. The literature review conducted by the author did not yield any quantitative studies of the CoI framework with high school students in online and blended learning environments. Furthermore,

in reviewing the research on actual learning and perceived learning, the author found no research that studied the differences between online and blended design approaches of K-12 learners. Examining the constructs of the CoI framework and how those constructs affect high school students in online and blended learning environments will add to the vast research on CoI where higher education has previously been a focus. Additionally, researching CoI and perceived learning with teens that range from well-adjusted, university-bound students to students who struggle academically, socially, behaviorally, and emotionally will provide benefits to the population. The findings of the study could support online and blended learning students that include troubled teens, minorities, pregnant, and parenting students. Researching the CoI and perceived learning will provide a better understanding of the differences between online and blended learning environments in high school, and will therefore promote the development of more effective secondary educational environments. Further researching the CoI and K-12 online and blended learning environments could increase the quality of these educational environments (Akyol & Garrison, 2011; Szeto, 2015).

CHAPTER THREE: METHODS

Overview

In this chapter, the methodology of the study is provided. After presenting the research design, the research questions and null hypotheses are stated, and the participants and setting, instrumentation, and procedures are described and discussed. The chapter is concluded with an identification and rationale of the data analysis.

Design

This quantitative study will examine the differences in blended learning and online learning with respect to high school learners' social presence, cognitive presence, teacher presence, and perceived learning. The data for analysis was acquired from archival data that was collected in the 2015-2016 school year to examine program effectiveness. A causal-comparative design was utilized to identify the possible cause-and-effect relationships between a non-manipulated independent variable and four dependent variables (Campbell & Stanley, 1963). This ex post facto design was chosen because the treatment under study occurred naturally, and the researcher was not able to manipulate the independent variable or randomly assign students to the courses (Gall et al., 2007). Because the researcher described conditions that already existed, using archival data that surveyed students who were already placed in certain English courses, the causal-comparative design was most appropriate (Gall et al., 2007).

Several research designs, including a correlational design and a quasi-experimental design, were considered and rejected in favor of a causal-comparative design. A correlational design examines relationships between two or more variables in a single group (Gall et al., 2007). A correlational design was rejected because rather than examining the extent that one variable correlated to another variable, the researcher sought to examine the differences in the

variables. A quasi-experimental design was considered because of the use of naturally occurring groups rather than randomly assigned groups (Gall et al., 2007). The researcher rejected this design, as there would not be one group of students receiving treatment while another group did not receive treatment. The researcher did not consider any qualitative designs, as the archival data used the CoI survey and CAP Perceived Learning Scale, two quantitative data collection instruments. The causal-comparative design was the design that best fit the current study. Table 2 includes a summary of these considerations.

Table 2

Research Designs Accepted and Rejected

Research Design	Summary	Accepted or Rejected
Quasi-experimental	Examines causality in situations without random assignment by manipulating the variables (Gall et al., 2007)	Rejected
Correlational	Examines relationships between two or more variables in a group without manipulating the variables (Gall et al., 2007)	Rejected
Causal-comparative	Examines the reasons for existing differences in groups without manipulating the variables (Campbell & Stanley, 1963)	Accepted

Research Questions

RQ1: Does a difference exist between high school students' social presence, cognitive presence, and teacher presence when enrolled in a blended course as compared to an online course?

RQ2: Does a difference exist between high school students' perceived learning when enrolled in a blended course as compared to an online course?

Hypotheses

The null hypotheses for this study were:

$H_0$1: High school students who are enrolled in a blended course will not statistically significantly differ in terms of the combination of social presence, cognitive presence, and teaching presence compared to students enrolled in an online course.

$H_0$2: High school students who are enrolled in a blended course will not statistically significantly differ in levels of social presence as measured by the simplified COI Framework survey compared to students enrolled in an online course.

$H_0$3: High school students who are enrolled in a blended course will not statistically significantly differ in levels of cognitive presence as measured by the simplified COI Framework survey compared to students enrolled in an online course.

$H_0$4: High school students who are enrolled in a blended course will not statistically significantly differ in levels of teacher presence as measured by the simplified COI Framework survey compared to students enrolled in an online course.

$H_0$5: High school students who are enrolled in a blended course will not statistically significantly differ in terms of perceived learning as measured by the CAP Perceived Learning Scale compared to students enrolled in an online course.

Participants and Setting

The population chosen for this study consisted of a convenience sample of students enrolled in either blended or online high school English courses in an online, southeastern public charter high school with a blended learning center. A convenience sample was chosen because

the groups of students were naturally occurring, available, and easy to study (Gall et al., 2007). Because of the nature of the educational settings, randomization of the sample was not possible. A high school population was chosen because of the lack of research on high school students and the community of inquiry (Borup et al., 2014; Garrison et al., 2010).

The online English department is comprised of one Black and three White female instructors that teach solely online. The four online teachers had teaching experience that ranged from one to four years in an online setting and five to 13 years in a brick and mortar setting. The degree levels of the instructors ranged from a bachelor's degree to a master's degree. While each teacher was considered highly qualified by the state and certified in secondary English, all teachers held multiple certifications in the areas of speech and drama, online teaching, middle school language arts, media specialist, or gifted education. The age range of the online teachers was 32 to 36 years old.

The blended teacher was a Black, 41-year-old with a bachelor's degree and 15 years of teaching experience in a brick and mortar setting. She was considered highly qualified by the state and was certified in Secondary English, middle grades language arts, and gifted education. A chi-square test of independence was conducted for a statistical analysis of possible differences between the two groups, online and blended learning teachers. The variables used for the analysis were degree obtained, number of certifications obtained, age, ethnicity, total years of teaching experience, and years of online teaching experience. The Pearson chi-square value for each was higher than .05; therefore, the results were not significant. Table 3 summarizes the Pearson chi-square value for each categorical variable.

Table 3

Summary of Pearson Chi-Square Values

Variable	*p*-value
Degree	.599
Certifications	.361
Age	.172
Ethnicity	.171
Total Years' Experience	.287
Online Years' Experience	.172

The school had a student population of 61.3% females and 38.7% males, more than 20% minority (predominantly black students), and more than 11% in special education. More than 54% of the students are eligible for free and reduced lunches. The public, online charter high school was state-authorized and free of charge to residents in the state. The school was one of four online, charter high schools in a state that had a 288% growth in full-time online school enrollment between the 2008-2009 to 2010-2011 school years (Watson et al., 2012). The mission of the school is to provide a challenging and enriching curriculum that educates and respects the individual students in order to give them the tools to be successful after high school. Although any student in the state with Internet access can attend, the school has recruited dropouts, pregnant and parenting teenagers, students who work to support their siblings or other family members, students with medical and/or mental health issues preventing them from being able to attend their local district public schools, adjudicated youth, and students who may have been bullied or find that their local schools are not a good fit. Because of the opportunity to

learn online, the aforementioned students have the opportunity to learn from home with more flexibility than a traditional, face-to-face setting. As a result, approximately 39% of graduates do not graduate with their cohorts but are fifth or sixth year seniors. Providing quality online and blended educations by using the CoI will lead to student success and assist in ensuring students graduate. The students range from well-adjusted, university-bound students to students who struggle academically, socially, behaviorally, and emotionally.

The high school where the study was conducted is a statewide, online public charter school serving students in grades nine through 12. The school's enrollment statewide was 799 students, with students from 43 of the 46 counties of the state. To best serve these students, the high school utilized both online learning and blended learning. The grades used in this study were ninth through 12 grades and included the following English courses: English 1, English 2, English 3, and English 4. Due to a limited sample size, the online English courses were analyzed as one group and the blended learning English courses were analyzed as another. A minimum sample size of 10 in each of these cells is suggested (Seo, Kanda, & Fujikoshi, 1995; Tabachnick & Fidell, 2007), which was a minimum of 40 in each group for a total of 80. Each selected participant had complete data; however, sample size was a limitation of the study. Since the data that was analyzed was archival data and the framework of the school has since changed, gathering additional data was not feasible; however, analyzing the existing data was important in adding to the existing gap in the literature and informing future course design and choices for instructional delivery. An additional known limitation was history as an extraneous variable. The students' prior experience and history with online and blended learning was an extraneous variable that could have impacted the results of the study and therefore will be a limitation to the results of the study. The researcher attempted to account for this potential extraneous variable by

ensuring that students were either enrolled in an online-only program or blended learning-only program for the 2015-2016 school year, verified by A. O'Neill (personal communication, June 20, 2016).

Online

The online setting was an asynchronous environment where students engaged in learning with no face-to-face interaction with the teacher. Online learning was defined as an English course in which students participated solely in online assignments via eSchoolware™ LMS. The instructors for the fully online courses required individual written assignments, daily and unit assessments, and course participation. The online students were given the opportunity to attend a weekly, synchronous lesson provided by the teacher. Although attendance was not required, students were required to watch the recording if they did not attend. For the online courses, the Edison Learning eSchoolware™ e-learning system and Adobe Connect™ was used. The Edison Learning eSchoolware™ platform consists of an integrated set of tools that enables students to access and retrieve content such as the syllabus and assignments, submit assignments, complete quizzes, and engage in class discussions asynchronously by the use of a discussion forum. Adobe Connect™ served as the online classroom, providing teacher- student interaction and student-student interaction. Teachers used Adobe Connect™ to tutor individual students or groups of students or to teach and record lessons. Table 4 summarizes the content, goals, and requirements of the English courses.

Table 4

Content, Goals, and Requirements of the English Courses

Course	Content	Goals	Requirements
English 1	Fiction and nonfiction writing	Strengthen writing skills Use reference materials to appropriately cite sources	eSchoolware assignments Essays USA TestPrep assignments Live lesson or recording participation
English 2	Fiction and nonfiction writing	Assess rhetorical and narrative techniques Identify and refine claims and counterclaims Ask and answer questions to aid research	eSchoolware assignments Essays Live lesson or recording participation
English 3	American literature	Read, analyze, and interpret a variety of genres, such as poetry, drama, folktale, and biography Interpret literature soundly	eSchoolware assignments Essays Live lesson or recording participation
English 4	British literature	Become active readers; Think critically and logically Write clearly and concisely	eSchoolware assignments Essays Live lesson or recording participation

In English 1, students learn effective communication in the context of fiction and nonfiction writings as well as in one-on-one and group discussions. Students strengthen their writing skills by varying syntax and sentence types and through the correct use of colons, semicolons, and conjunctive adverbs. Students learn to keep their audience, task, and purpose in mind while maintaining a formal style and objective tone and to use style manuals and reference materials to appropriately cite sources and ensure that their writing meets the conventions of formal English. In English 2, students explore the evolution of language in fiction and nonfiction, assess rhetorical and narrative techniques, identify and refine claims and counterclaims, and ask and answer questions to aid research. Students also evaluate and employ vocabulary and comprehension strategies to understand figurative, connotative, technical, and content area-specific meanings of words and phrases. In English 3, students study American literature as they read, analyze, and interpret a variety of genres, such as poetry, drama, folktale, and biography. Students are challenged to interpret each piece of literature soundly and to handle literary techniques skillfully. In English 4, students study British literature to become active readers, critical and logical thinkers, and clear, concise writers.

Blended

Blended learning, for the purposes of this study, took the form of an English course in which students participated in online assignments via eSchoolware™ learning management system (LMS) and attended a learning center daily where they received face-to-face instruction from a certified English teacher. The blended learning courses were equivalent to the online learning courses in content, instructional objectives, assignments, and assessments. For the online portion of the blended learning courses, the Edison Learning eSchoolware™ e-learning system was used. The learning outcomes for each of the blended learning and online learning

courses were equivalent. The instructor for the blended English courses required the same individual written assignments, daily and unit assessments, and course participation as the online learning courses. The assessments for both the blended and online courses drew from the same bank of questions for both multiple choice questions and free response questions, which ensured that the assessments were equivalent. The sole difference was that the blended learning students were at a brick and mortar establishment for three hours per day with a face-to-face teacher, whereas the online students completed their work solely online without any interaction with a face-to-face teacher, only an online teacher.

All courses were developed by the same subject matter expert (SME), and therefore used the same verbiage, formats, and resources. A high quality SME ensures that course material is relevant; designs activities, exercises, and assessment questions; and guarantees course quality (Wu, Liu, Zhang, & Ji, 2016). Using the same SME further ensured equivalent courses. Although different instructors taught the courses, the instructors specialized in English and used the same curricula, pacing guides, discussion requirements, and rubrics for grading.

Four levels of English courses were used for the study, English 1, 2, 3, and 4, and therefore the content and difficulty of each course differed. However, the blended and online sections of each course were equivalent. English 1 online and blended learning students completed identical eSchoolware™ online English 1 courses. English 2 online and blended learning students completed identical eSchoolware™ online English 2 courses. English 3 online and blended learning students completed identical eSchoolware™ online English 3 courses. English 4 online and blended learning students completed identical eSchoolware™ online English 4 courses. English 1 online and blended learning students were paired for data analysis, as were students in English 2, English 3, and English 4.

Instrumentation

The archival data was collected using the simplified CoI survey (P. Ice, personal communication, March 23, 2015) and the CAP Perceived Learning Scale (Rovai et al., 2009). The 34-question, simplified CoI survey uses a Likert scale to assess high school students' perceived sense of teaching presence, cognitive presence, and social presence. The CAP Perceived Learning Scale (Rovai et al., 2009) also uses a Likert scale to measure perceived learning on three overlapping domains: cognitive learning, affective learning, and psychomotor learning. Both survey instruments are explained below.

Community of Inquiry Survey

The 34-question, simplified CoI Framework survey (P. Ice, personal communication, March 23, 2015) was used to assess participants' perceived sense of social presence, cognitive presence, and teaching presence. Students responded to a five-point Likert scale (1- strongly disagree, 2- disagree, 3- neutral, 4- agree, 5- strongly agree) to a variety of questions such as ''The important topics for each course were clearly stated," ''I felt comfortable communicating with other students in my course," and "I wanted to know more about ideas we covered in class." The simplified CoI survey is an adapted survey for community college students from the original CoI survey (Arbaugh et al., 2008). Evidence supports good construct validity (P. Ice, personal communication, March 23, 2015). Cronbach's alpha was reported as .95 with a sample size of 92,000 (Ice, personal communication, March 23, 2015). Cronbach's alpha will be presented with the present study to demonstrate reliability with the sample population. The CoI survey (Arbaugh et al., 2008) is the most widely used instrument to quantitatively measure the CoI as it is reliable, provides support for the validity of the CoI framework, and provides an efficient means to study large student samples (Garrison et al., 2010). No CoI survey yet exists solely for

high school students. However, the simplified CoI survey was chosen for the readability level for high school students, as the validity and reliability is not expected to change (P. Ice, personal communication, March 23, 2015). To ensure the reliability of the instrument, Cronbach's alpha was calculated for this study.

CAP Perceived Learning Scale

The CAP Perceived Learning Scale (Rovai et al., 2009) was used to measure perceived learning. This instrument measures perceived learning on three overlapping domains: cognitive learning, affective learning, and psychomotor learning. The instrument consists of nine questions in which the student responds with on a scale of zero ("Not at all") to six ("Very much so"). The total scores for the CAP Perceived Learning Scale can range from a low of zero to a high of 54; whereas, the CAP subscale scores for cognitive, affective, and psychomotor learning can range from a low of zero to a high of 18. As with the CoI survey, to establish the internal consistency characteristics, reliability analysis was conducted using Cronbach's coefficient alpha; the total for the reliability for the scale was .79. The validity and reliability of the scale was proven as well as its appropriateness to use with a wide range of student populations with a Flesch-Kincaid grade level score of 7.5 (Rovai et al., 2009). The CAP Perceived Learning Scale (Rovai et al., 2009) was chosen because of its ability to be used in studying the effectiveness of different online learning techniques, models, theories (Rovai et al., 2009). Rovai et al. (2009) stated that when combined with existing instruments such as the CoI framework survey (Arbaugh et al., 2008), the CAP Perceived Learning Scale can be used to "connect learning effectiveness with specific education practices" (p. 11).

Table 5 is a comparison of the research questions, theories, data sources, data collection, and data analysis.

Table 5

Comparison of Research Questions, Theories, Data Sources, Data Collection, and Data Analysis

Research Question	Theory	Data Sources	Data Collection	Data Analysis
Does a difference exist between high school students' social presence, cognitive presence, and teacher presence when enrolled in a blended course as compared to an online course?	CoI framework	Blended learning English students and online learning English students who take the survey	Simplified CoI survey	Multivariate analysis of covariance
Does a difference exist between high school students' perceived learning when enrolled in a blended course as compared to an online course?	Cognitive, affective, and psychomotor learning	Blended learning English students and online learning English students who take the survey	CAP Perceived Learning Scale	Analysis of covariance

Procedures

The researcher requested permission from the director of the online, public charter high school to use archival data for the study that was collected for program evaluation purposes. After obtaining IRB approval, the archival data that was collected from students participating in an online or blended learning English 1, 2, 3, or 4 course was given to the researcher. The perceptions about the course were measured using the simplified CoI survey (P. Ice, personal

communication, March 23, 2015) and the CAP Perceived Learning Scale (Rovai et al., 2009). No identifying information was provided.

Data Analysis

To test the hypotheses for research question one, the researcher used a multivariate analysis of covariance (MANOVA). A multivariate analysis of variance (MANOVA) determines whether the groups differ on more than one correlated dependent variable (Gall et al., 2007). Since the CoI has three levels (social, cognitive, and teaching presence), a MANOVA is an appropriate analysis choice (Tabachnick & Fidell, 2007). Prior to conducting the analysis, the researcher conducted preliminary assumption testing. The researcher tested the assumption of multivariate normality to ensure that the sampling distributions of means of the various dependent variables and all linear combinations of the variables were normally distributed (Tabachnick & Fidell, 2007). Because covariates were found during assumption testing, the researcher used a multiple analysis of covariance (MANCOVA) (Rovai, Baker, & Ponton, 2013). The researcher used skewness and kurtosis to assess the normality of variables. The researcher used box plots to check the assumption of extreme outliers to avoid a Type I or Type II error (Tabachnick & Fidell, 2007). The researcher tested the homogeneity of variances and covariances to determine that the variances of each interval dependent were similar, assuming that the variance-covariance matrices within each cell of the design were sampled from the same population variance-covariance matrix and could reasonably be pooled to create a single estimate of error (Tabachnick & Fidell, 2007). The pooled matrix is misrepresentative of an estimate of error variance if the cell error matrices are heterogeneous (Tabachnick & Fidell, 2007). Levene's test was used to test the assumption of homogeneity of variance (Tabachnick & Fidell, 2007). The assumption of linearity was tested, as MANOVA assumes linear relationships

between all pairs of dependent variables, all pairs of covariates, and all dependent variable-covariate pairs in each cell. The researcher tested linearity by inspection of bivariate scatterplots (Tabachnick & Fidell, 2007). The researcher tested multicollinearity and singularity to ensure that the variables were not too highly correlated. The researcher computed squared multiple correlations for the variables to protect against multicollinearity and singularity (Tabachnick & Fidell, 2007). The researcher used Levene's test to test the assumption of the equality of group dispersions.

For research question two, the researcher conducted a one-way between-groups analysis of covariance (ANCOVA). The researcher conducted preliminary assumption testing prior to conducting the ANCOVA and tested for normality using the results of the Shaprio-Wilk statistic and by construction of a histogram. The researcher examined a scatterplot to check for linearity and tested the assumption of homogeneity of variance using Levene's test (Tabachnick & Fidell, 2007). The researcher also conducted testing to ensure that there was no violation of the assumptions of reliable measurement of the covariate, correlation among covariates, and homogeneity of regression slopes.

Seo et al. (1995) and Tabachnick and Fidell (2007) suggested a sample size of 10 in each cell. The researcher conducted a power analysis for a more accurate number. The researcher also estimated the size of the anticipated effect, variability expected in assessment of the effect, desired alpha level of 0.05, and desired power of 0.80 to determine the necessary sample size (Tabachnick & Fidell, 2007). The researcher predicted a larger sample size than this suggested minimum; every student in the school was given the opportunity to participate in the data collection for the archival data, and each selected participant had complete data.

CHAPTER FOUR: FINDINGS

Overview

In this chapter, the statistical tests and findings are provided. After presenting the research questions and null hypotheses, the descriptive statistics are reported. For research question one, the assumption testing and one-way between-groups multivariate analysis of covariance are described and discussed. For research question two, the assumption testing and one-way between-groups analysis of covariance (ANCOVA) are described and discussed.

Research Questions

RQ1: Do differences exist among the social presence, cognitive presence, and teacher presence of high school students enrolled in blended courses as compared to those enrolled in online courses?

RQ2: Does a difference exist between perceived learning of high school students enrolled in blended courses as compared to that of those enrolled in online courses?

Null Hypotheses

The null hypotheses for this study are:

$H_0$1: The scores of high school students enrolled in a blended course will not statistically significantly differ in terms of the combination of social presence, cognitive presence, and teaching presence compared to the scores of students enrolled in an online course.

$H_0$2: The social presence scores, as measured by the simplified COI Framework Survey, of high school students who are enrolled in a blended course will not statistically significantly differ from the social presence scores of students enrolled in an online course.

$H_0$3: The cognitive presence scores, as measured by the simplified COI Framework Survey, of high school students who are enrolled in a blended course will not statistically significantly differ from the cognitive presence scores of students enrolled in an online course.

$H_0$4: The teacher presence scores, as measured by the simplified COI Framework Survey, of high school students who are enrolled in a blended course will not statistically significantly differ from the teacher presence scores of students enrolled in an online course.

$H_0$5: High school students who are enrolled in a blended course will not statistically significantly differ in terms of perceived learning as measured by the CAP Perceived Learning Scale compared to students enrolled in an online course.

Descriptive Statistics

A total of 172 students were part of this study, all of whom were enrolled in an English course at an online public charter high school in South Carolina. Of these 172 students, 46 students were blended learning students while 126 students were online learning students. Table 6 summarizes the demographics of each group.

Table 6

Summary of Demographics

Demographics	Blended Learning (n = 46)	Online Learning (n = 126)
Female	23 (50%)	36 (28.6%)
Male	23 (50%)	90 (71.4%)
African American	14 (30.4%)	14 (11.1%)
American Indian	0 (0%)	3 (2.4%)
Asian	0 (0%)	1 (0.8%)
Caucasian	27 (58.7%)	90 (71.4%)
Hispanic	3 (6.5%)	6 (4.8%)
Other	2 (4.3%)	12 (9.5%)

Descriptive statistics for the study are presented in Table 7.

Table 7

Descriptive Statistics

Variable	Setting	*M*	*SD*
Teaching Presence	Blended	53.27	8.80
	Online	54.18	9.21
Social Presence	Blended	34.09	7.09
	Online	29.97	7.04
Cognitive Presence	Blended	46.31	7.79
	Online	46.04	8.54
Perceived Learning	Blended	35.87	7.90
	Online	36.84	9.77

Results

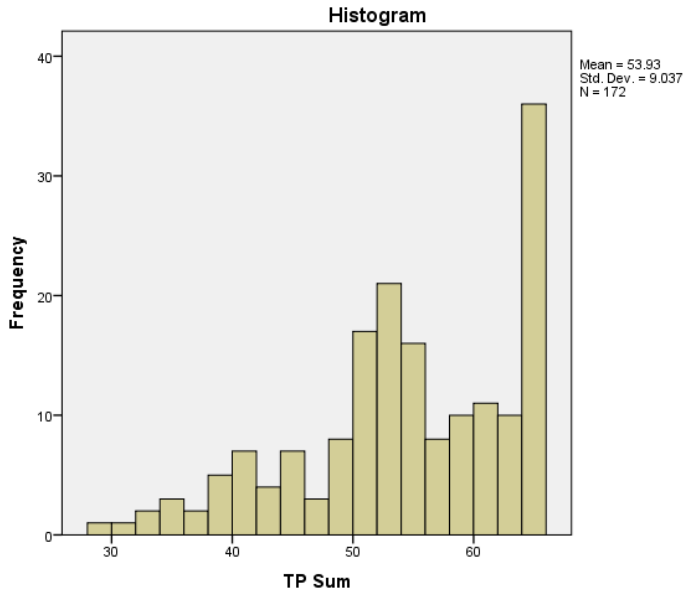
Research Question One

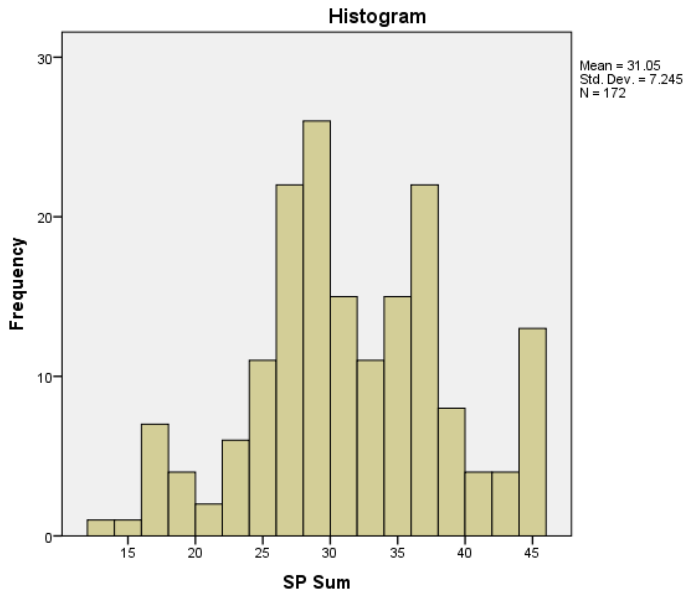
Research question one was as follows: Do differences exist among the social presence, cognitive presence, and teacher presence of high school students enrolled in a blended course as compared to those enrolled in an online course? A one-way multivariate analysis of variance (MANOVA) examines mean differences and statistical significances of differences among groups on more than one correlated dependent variable (Tabachnick & Fidell, 2007). Because the CoI has three levels (teaching, social, and cognitive presence), a MANOVA was an appropriate analysis to use. Because gender and ethnicity were found as covariates during assumption testing, the researcher used a multivariate analysis of covariance (MANCOVA) to analyze the first, second, third, and fourth null hypotheses (Tabachnick & Fidell, 2007).

Assumption testing was conducted prior to conducting the MANCOVA and is explained in the next section.

Assumption Testing

Normality. The researcher tested for normality through construction of histograms and through use of Shapiro-Wilk. The histograms for social presence and the total CoI showed a near normal distribution (see Figure 3). However, the histogram for teaching presence and cognitive presence appeared slightly negatively skewed.





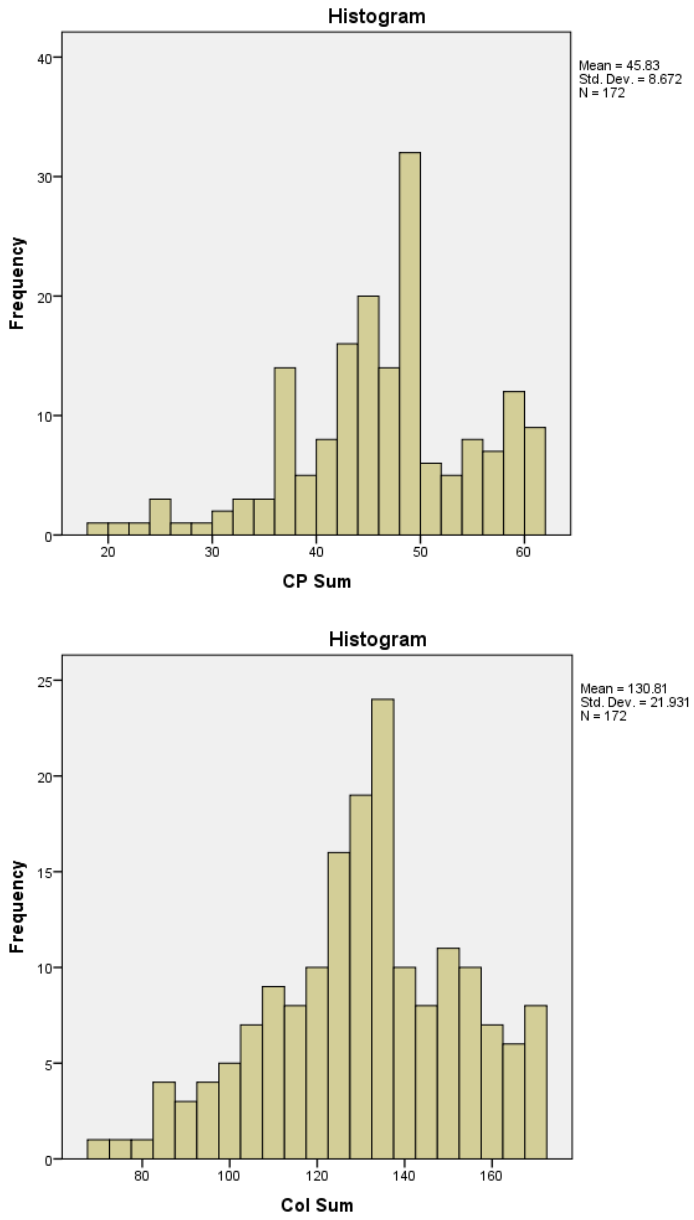


Figure 3. Histograms for normality testing of research question one.

The researcher used Shapiro-Wilk to test for normality because the blended learning group contained less than 50 participants (Tabachnick & Fidell, 2007). For each subscale, the Shapiro-Wilk results were less than .05 (p = .000 for teaching presence, p = .007 for social presence, p = .000 for cognitive presence) and therefore were not tenable. Although the assumptions of normality were violated, the test is still considered robust because the number of

participants exceeds 20 (Tabachnick & Fidell, 2007). Additionally, the researcher found no extreme outliers by inspection of boxplots.

To test for multivariate normality of the CoI data, the researcher analyzed Mahalanobis distances. Assumption for multivariate normality was not tenable due to one extreme outlier, as case 121 exceeded the critical value of 18.47 and was removed. After removal of the one case, the data was found tenable for multivariate normality. Removal of the one case resulted in a sample size of $n = 171$ for the CoI analysis.

Linearity. The assumption of linearity refers to the existence of a straight-line relationship between each pair of dependent variables (Rovai, Baker, & Ponton, 2014). Inspection of a matrix of scatterplots between each pair of CoI dependent variables (teaching presence, social, presence, and cognitive presence) showed a straight-line relationship and therefore indicated that the assumption of linearity was upheld (see Figure 4).

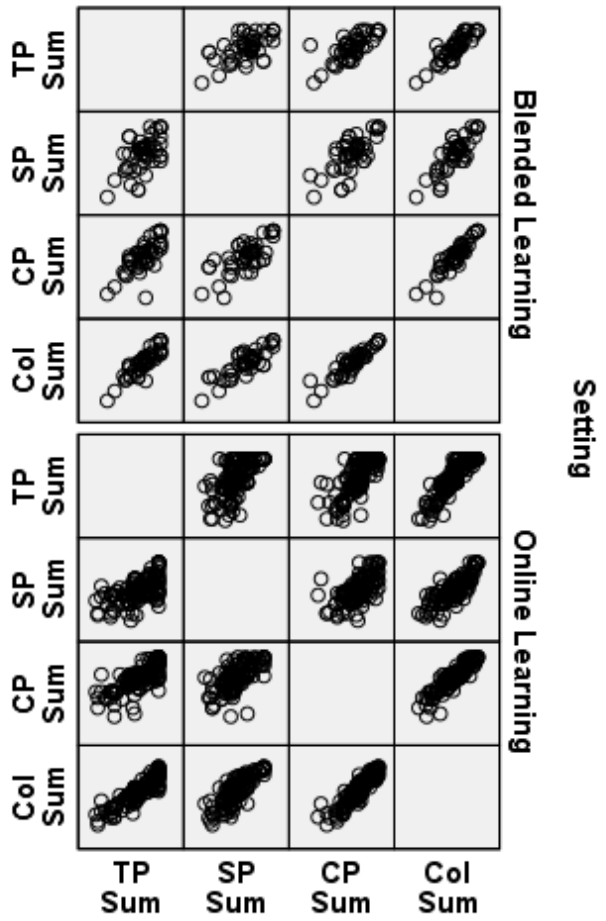


Figure 4. Scatterplot of Community of Inquiry Survey data.

Multicollinearity and singularity. Assumptions of multicollinearity and singularity were examined by consideration of Pearson's correlation coefficient. When dependent variables are highly correlated, multicollinearity occurs, whereas singularity occurs when the dependent variables are perfectly correlated (Rovai et al., 2014). Given that the dependent variables were moderately correlated, as indicated in Table 8, neither assumption was violated.

Table 8

Pearson Correlations Between CoI Dependent Variables

Dependent Variable	Teaching Presence	Social Presence	Cognitive Presence
Teaching Presence	-	.564	.745
Social Presence	.564	-	.644
Cognitive Presence	.745	.644	-

Homogeneity of variance. Levene's test of equality of variance tests the null hypothesis that the dependent variables have the same variance across groups (Rovai et al., 2014). The researcher used Levene's test to examine the assumption of homogeneity of variance for the CoI data. Results are as follows: for the teaching presence scale, $F(1, 169)= .818$, $p = .367$; social presence scale, $F(1, 169)= .001$, $p = .974$; and cognitive presence scale, $F(1, 169)= .096$, $p = .757$. Since the significance values for Levene's test were all greater than .05, the assumption of homogeneity of variance was not violated.

Results of assumption testing. The results of the assumption testing for the CoI data (research question one) is summarized in Table 9. Normality was slightly positively skewed for teaching presence and cognitive presence. One extreme outlier violated the assumption for multivariate normality and was removed. No additional violations of assumptions were found.

Table 9

Results of Assumption Testing for Research Question One (Community of Inquiry data)

Assumption	Result
Measurement of Covariate	Covariate
Presence of Correlation Between the DVs	Yes
Normality	Assumption Not Violated
Outliers	Assumption Not Violated
Multivariate Normality	One Extreme Outlier (Removed)
Linearity	Assumption Not Violated
Homogeneity of Variance	Assumption Not Violated
Multicollinearity	Assumption Not Violated
Singularity	Assumption Not Violated

Analysis of multivariate analysis of covariance. The researcher performed a one-way between-groups multivariate analysis of covariance (MANCOVA) to investigate the differences in blended learning and online learning with respect to the CoI. The researcher entered gender and ethnicity as covariates and used Pillai's Trace to interpret results of the MANCOVA analysis, as it was more robust than Wilks' Lambda because of unequal *n* values (Tabachnick & Fidell, 2007). Results of the MANCOVA Pillai's Trace = .107, $F(3, 165) = 6.605$, $p = .000$, partial eta squared = .107, revealed a significance different in the composite CoI score between the groups. This indicated that the blended learning students and the online learning students did differ in their community of inquiry. The effect size($\eta^2 = .107$) was considered a medium to large effect size (Tabachnick & Fidell, 2007).

Between-subjects effects. Because a significant result was found using Pillai's Trace, the researcher further investigated the dependent variables. Because separate analyses were being examined, a higher alpha level was set to reduce the chance of a Type I error (Tabachnick & Fidell, 2007). A Bonferroni adjustment was made by dividing the original alpha level of .05 by three, the number of dependent variables, for a new alpha level of .017. Social presence was the only dependent variable that recorded a significance value less than .017 with a value of .002. Teaching presence had a significance value of .712, and cognitive presence had a significance value of .841, both greater than .017. Therefore, the only significant difference between blended learning students and online learning students was their social presence. However, social presence only explained 5.7% of the variance.

Results of hypothesis one. The first hypothesis stated that there is no statistically significant difference in the scores of high school students enrolled in a blended course in terms of the combination of social presence, cognitive presence, and teaching presence compared to the scores of students enrolled in an online course. Results of the MANCOVA Pillai's Trace = .107, $F(3, 165) = 6.605$, $p = .000$, partial eta squared = .107, revealed a significance different in the composite CoI score between the groups, and therefore the researcher rejected the first null hypothesis.

Results of hypothesis two. The second hypothesis stated that there is no statistically significant difference in the social presence scores, as measured by the simplified COI Framework Survey, of high school students who are enrolled in a blended course compared to the social presence scores of students enrolled in an online course. Given the statistical analysis as explained above, the researcher also rejected the second null hypothesis.

Results of hypothesis three. The third hypothesis stated that there is no statistically significant difference in the cognitive presence scores, as measured by the simplified COI Framework Survey, of high school students who are enrolled in a blended course compared to the cognitive presence scores of students enrolled in an online course. The researcher failed to reject this null hypothesis.

Results of hypothesis four. The fourth hypothesis stated that there is no statistically significant difference in the teaching presence scores, as measured by the simplified COI Framework Survey, of high school students who are enrolled in a blended course compared to the teaching presence scores of students enrolled in an online course. The researcher failed to reject this null hypothesis.

Research Question Two

Research question two was as follows: Does a difference exist between perceived learning of high school students enrolled in a blended course as compared to that of those enrolled in an online course? An analysis of covariance (ANCOVA) determines whether the mean differences among groups are statistically different from one another while controlling for one or more covariates (Tabachnick & Fidell, 2007). An ANCOVA was used to analyze the fifth null hypothesis: $H_0$5: High school students who are enrolled in a blended course will not statistically significantly differ in terms of perceived learning as measured by the CAP Perceived Learning Scale compared to students enrolled in an online course. Prior to conducting the analysis, the researcher conducted assumption testing which is explained in the next section.

Assumption Testing

Normality. The researcher tested for normality using the results of the Shaprio- Wilk statistic and by construction of a histogram. Since the blended learning group contained less

than 50 participants, the results of Shapiro-Wilk (Tabachnick & Fidell, 2007) were used. The significance value was .000, which suggested a violation of the assumption of normality, which is common in larger sample sizes (Rovai et al., 2014). The ANCOVA was still considered robust, as the central limit theorem suggests that sampling distributions are normal even if the raw scores are not when using large samples (Tabachnick & Fidell, 2007).

The researcher also tested for normality by looking at the shape of the distribution for each group in the histogram. The histogram showed a negatively skewed distribution for total perceived learning.

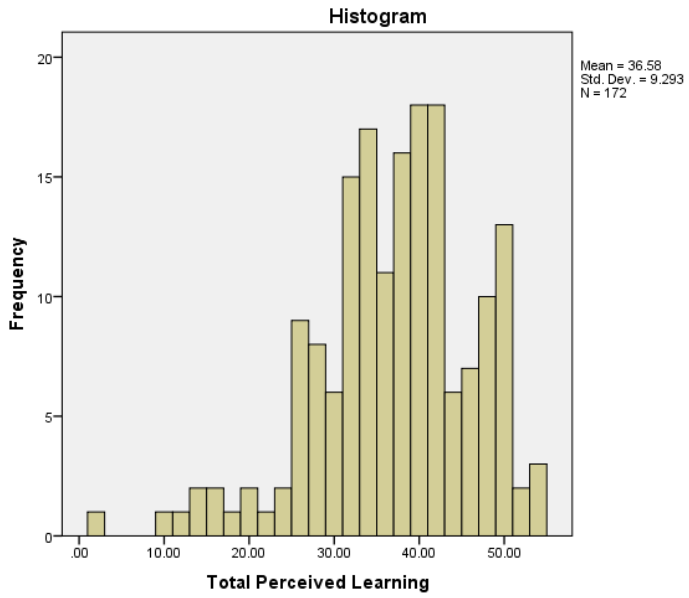


Figure 5. Histograms for normality testing of research question two.

Additionally, the researcher inspected boxplots to check for outliers. Although the researcher found seven outliers by examining the boxplot, no extreme outliers were found. The mean and the 5% trimmed mean were very similar; therefore, the assumption of no extreme outliers was tenable and the cases were retained in the data.

Reliability of the covariates. The reliability measure of the CAP Perceived Learning Scale was found to be have Cronbach's alpha value of .81, which indicated appropriate internal consistency (Tabachnick & Fidell, 2007).

Correlation among the covariates. Covariates should not be correlated with each other (Tabachnick & Fidell, 2007). Because more than one covariate was used, gender and ethnicity, the Pearson correlation coefficient was examined to check for correlation. The assumption of correlations among the covariates was not violated, as the Pearson correlation coefficient was -.122.

Linearity. To check for linearity, the researcher examined a scatterplot of the perceived learning data. The relationship between the variables was linear, and therefore the assumption of linearity was not violated.

Variance. Levene's test was used to test the assumption of homogeneity of variance (Tabachnick & Fidell, 2007). The significance value for Levene's test was .078, which is not significant. Since this number was greater than .05, the assumption of homogeneity of variance was not violated for the perceived learning data.

Homogeneity of regression slopes. The final assumption test for the perceived learning data was the testing of the homogeneity of regression slopes. The slopes of the regression lines should be the same for each group. The likelihood of making a Type II error and not rejecting a false null hypothesis by use of the covariate procedure increases when this assumption is violated (Rovai et al., 2014). To analyze homogeneity of regression slopes, a two-way, between-groups ANOVA was conducted. The significance level for the interaction was .110, which is greater than .05, and therefore not statistically significant (Tanachnick & Fidell, 2007). Because the result was not significant, the assumption of homogeneity of regression slopes was not violated.

Results of assumption testing. The results of the assumption testing for the perceived learning data (RQ2) is summarized in Table 10. The only assumption violated was normality.

Table 10

Results of Assumption Testing for Research Question Two (Perceived Learning data)

Assumption	Result
Measurement of Covariate	Covariate
Normality	Not Tenable
Reliability of the Covariate	Cronbach's α = .81; appropriate
Correlation among Covariates	Assumption Not Violated
Linearity	Assumption Not Violated
Homogeneity of Variance	Assumption Not Violated
Homogeneity of Regression Slopes	Assumption Not Violated

Analysis of covariance. A one-way between-groups analysis of covariance (ANCOVA) was conducted to examine the difference between total perceived learning of blended learning and online learning students. As previously discussed, preliminary testing was conducted to ensure that there was no violation of the assumptions of reliable measurement of the covariate, correlation among covariates, linearity, homogeneity of variance, and homogeneity of regression slopes. After adjusting for the covariates, the ANCOVA demonstrated that there was no significant difference between the two groups on the CAP Perceived Learning Scale scores, F (1, 168) = .013, p = .908, partial eta squared = .000.

Results of hypothesis five. The fifth null hypothesis stated that there is no statistically significant difference in high school students' perceived learning as measured by the CAP

Perceived Learning Scale who are enrolled in a blended course as compared to students enrolled in an online course. The ANCOVA analysis demonstrated that the main effect of setting was not significant, $F(1, 168) = .013$, $p = .908$, partial eta squared = .000. The effect size was very small. Consequently, there was insufficient evidence to reject the null hypothesis.

CHAPTER FIVE: CONCLUSIONS

Overview

This chapter summarizes and discusses the findings of the study. After providing the purpose of the study, the results of each research question are discussed and are compared to findings of earlier studies. Next, implications and limitations are explained. Finally, recommendations for future research are made.

Discussion

The purpose of this causal-comparative study was to examine the differences of blended learning and online learning with respect to community of inquiry (CoI) and perceived learning students at a public charter high school in South Carolina. The setting of this study was the independent variable and had two levels: blended and online learning environments. The dependent variables were the CoI constructs: teaching presence, social presence, cognitive presence, and perceived learning.

Research Question One

Research question one was as follows: Do differences exist among the social presence, cognitive presence, and teacher presence of high school students enrolled in a blended course as compared to those enrolled in an online course? Because gender and ethnicity were identified as covariates during assumption testing, a multivariate analysis of covariance (MANCOVA) was used to determine if differences existed between the blended learning students and online learning students' perceived social presence, cognitive presence, and teaching presence. Results indicated that there was a statistically significant difference in the composite CoI score between the groups. Therefore, the blended learning students and the online learning students did differ in their community of inquiry. Examination of the separate dependent variables (cognitive

presence, teaching presence, and social presence) indicated that the only significant difference between blended learning students and online learning students was their social presence. No statistically significant differences were found for blended learning and online learning students' cognitive presence or teaching presence.

In discussing the results of the current study, it is important to note that the existing CoI framework research focuses on higher education rather than K-12 blended or online learners. K-12 learners tend to be less motivated and less autonomous than higher education students (Borup et al., 2014). Because of learner differences, it is recommended to use caution when applying the findings of higher education research to K-12 settings (Morgan, 2015).

The findings of the current study are partially consistent with the findings of Akyol et al. (2009). After administering the CoI survey to blended and online graduate students, Akyol et al. (2009) found a difference in both social presence and teaching presence. Blended learning students showed higher perceptions of social presence and teaching presence than the online learning students. A difference in social presence could be attributed to the presence of a face-to-face teacher for the blended learning students. Emotional expression, a dimension of social presence, such as humor is not commonly found in online learning environments that are primarily text-based (Garrison & Anderson, 2003). While social presence has been perceived to be significantly stronger in an online environment than a face-to-face environment, emotional expression has not been perceived to be significantly stronger (Bowers & Kumar, 2015). Additionally, research has suggested that face-to-face interaction may positively contribute to social presence by establishing trust and group identity (Garrison & Vaughan, 2008).

Akyol and Garrison (2011) studied the differences in blended and online graduate students with respect to the CoI and found that blended learning students had higher perceptions

of social presence, cognitive presence, and teaching presence. While the current study found a statistically significant difference in social presence, it did not find a difference in teaching presence or cognitive presence for the two groups. The findings of the current study with regards to teacher presence support research that the components and indicators of teaching presence vary and depend on the learner level (Kupczynksi et al., 2010). For lower-level learners, the more objectivist elements were perceived to have the greatest impact on teaching presence, such as instructional design and organization. The instructional design and organization was equivalent for both the blended and online learners of the current study; therefore, the research of Kupczynki et al. (2010) is supported by the results of the current study that did not show a difference between the two groups.

Research Question Two

Research question two was as follows: Does a difference exist between perceived learning of high school students enrolled in a blended course as compared to that of those enrolled in an online course? An analysis of covariance (ANCOVA) was used to determine if high school students who were enrolled in a blended course statistically significantly differed in terms of perceived learning as measured by the CAP Perceived Learning Scale compared to students enrolled in an online course. The results of the ANCOVA indicated that there were no statistically significant differences between the two groups on the CAP Perceived Learning Scale scores.

The results of research question two can be understood in light of the research on blended, online, and perceived learning. While studies have not been conducted on blended learning, online learning, and perceived learning at the K-12 level, an abundance of studies have researched perceived learning in higher education courses. The findings of this study support

research that indicates that no difference exists in perceived learning in blended and online learning groups. Lim et al. (2007) found that no significant differences existed for perceived and actual learning in the two different delivery methods, and therefore the researchers concluded that the instructional delivery format may not affect learners' learning. The findings of Lim et al. (2007) and the current study were consistent with media comparison research. Media comparison research has shown that it is not the delivery method that leads to learning but rather the instructional methods (Clark & Mayer, 2008). Regardless of how the instruction is delivered, blended or online, when the instruction methods remain essentially the same, so does the learning (Clark & Mayer, 2008).

The findings of the current study contradicted the findings of Akyol and Garrison (2011) and Bowers and Kumar (2015). The study by Akyol and Garrison (2011) indicated that students in a graduate-level, blended learning course showed higher levels of perceived learning than students in an equivalent, online graduate course. The researchers also found that cognitive presence in higher education is strongly associated with high levels of perceived learning. Bowers and Kumar's (2015) research showed a significant difference in perceived learning in online and face-to-face undergraduate students. While both of these studies did show a difference in perceived learning in different learning environments and the current study did not (Akyol & Garrison, 2011; Bowers & Kumar, 2015), the studies surveyed different populations, undergraduate and graduate students versus high school students.

Additionally, the current study did not find a statistically significant difference in cognitive presence in the two delivery formats. If a strong relationship exists between cognitive presence and perceived learning (Akyol & Garrison, 2011), the results of the current study supported this conclusion, as a difference was not found for either cognitive presence nor

perceived learning. The current study, as aforementioned, indicated a statistically significant difference in social presence between the blended learning and online learning groups. Social presence has been shown to have a lesser impact on perceived learning than cognitive presence and teaching presence (Akyol & Garrison, 2011).

Implications

Blended and online learning for K-12 students has grown remarkably in recent years (Archambault, DeBruler, & Friedhoff, 2014; Toppin & Toppin, 2015); therefore, the quality of online learning and blended learning is especially important (Picciano et al., 2012). Research has indicated that high quality online learning and blended learning can provide benefits to students, schools, and states at the K-12 level by providing new opportunities that lead to improved student outcomes (Oliver & Stallings, 2014). The CoI framework provides guidelines for quality online and blended learning (Akyol & Garrison, 2011; Szeto, 2015) and can provide insights for K-12 online learning (Murphy & Rodriquez-Manzanares, 2009). Research on K-12 online and blended learning is a dire need, as the growth of online learning has out-paced the production of valid and reliable research (Toppin & Toppin, 2015).

The current study examined archival data collected from a diverse population of online and blended learning high school students. The population included former dropouts, full-time working students, bullied teenagers, pregnant and parenting teenagers, and students with medical and/or mental health issues preventing them from being able to attend their local district public schools–students who greatly benefit from the flexibility of online education.

The findings of the current study indicated that a difference in social presence existed between the blended and online learning groups. Social presence is described as a continuous process of identifying with the community, maintaining relationships, and being involved in

meaningful and trustful communication (Kozan & Richardson, 2015). Social presence, the extent to which participants feel affectively connected to one another, should be equally present in blended and online learning groups, as the difference in a true community of inquiry lies in the quality of the communication (Garrison et al., 2000). Increasing emotional expression, open communication, and group cohesion in the online learning setting is recommended for future practice. Increasing social presence has the option to increase the quality of blended and online learning and, therefore supports a diverse population that may include minorities, troubled teens, and pregnant and parenting students.

Limitations

The researcher used convenience sampling to select the participants; therefore, non-random procedures were used, subjecting the study to the selection threat of internal validity. The two groups used–the online English students and the blended learning English students–were as equivalent as possible to limit the threat. The setting was as equivalent as possible as the content, instructional objectives, assignments, and assessments were equivalent as the online students and the blended learning students used the same Edison Learning eSchoolware™ e-learning system. Although the two course settings were very similar and were comparable groups, the two were not exactly the same. The blended learning students were at a brick and mortar establishment for three hours per day with a face-to-face teacher, whereas the online students completed their work solely online without any interaction with a face-to-face teacher, only an online teacher. Additionally, the blended learning students had the advantage of synchronous peer editing with their compositions that the online students did not have access to. Thus, the setting was a limitation.

Sample size was a limitation of the study. Gathering additional data was not feasible, since the data being analyzed was archival data and the framework of the school has since changed. The students' prior experience and history with online and blended learning could have impacted the results of the study, and therefore was a limitation to the results of the study, as it could have affected the internal validity. The researcher attempted to account for this potential extraneous variable by ensuring that students were either enrolled in an online-only program or blended learning-only program for the 2015-2016 school year, (A. O'Neill, personal communication, June 20, 2016).

The results did not account for students at the school who chose not to participate. Since the study used archival survey data, responses made by students who did not respond to the survey or who dropped out of the courses were not accounted for. This subjected the study to unit nonresponse and the issue of non-ignorable nonresponse. Within the realm of non-ignorable non-response issues, item nonresponse was not be a problem in this study; however, the problem of unit nonresponse needs to be noted as a limitation when applying and making inferences based on this study (King, Honaker, Joseph, & Shever, 1998). Since the data analysis did not use statistical controls to address the issue of non-ignorable nonresponse, findings cannot be applied to the students who do not respond. Thus, care should be taken not to make invalid inferences based on the results (Hausman & Wise, 1979). Additionally, a threat to external validity is that the results should not be generalized to other populations.

Recommendations for Future Research

The findings of the current study were limited by a small sample size. Additionally, generalization of results is not possible because the data was only collected from one institution.

Future research should focus on replication of this study with a larger sample size and across other subject matters and high schools, both public and private.

Due to a limitation of sample size, the current study only researched the differences of blended learning and online learning with respect to the CoI and perceived learning. Many studies (Akyol & Garrison, 2011; Keramidas, 2012; Larson & Sung, 2009; Lim et al., 2007; Tseng & Walsh, 2016) have used course grades to compare the effectiveness of traditional, online, and blended learning environments. While course grades are a small measure of learning in collaborative online educational environments, they do remain an important indicator for students and faculty (Shea et al., 2012). Akyol and Garrison (2011) called for an emphasis on measuring actual learning outcomes in order to connect collaborative and engaging approaches of blended and online learning to depth of learning. They stated that linking processes and outcomes was critical in order to understand how to support cognitive presence in blended and online learning environments (Akyol & Garrison, 2011). Additionally, examining both actual grades and self-reports of learning is recommended, as they measure different aspects of learning processes and outcomes (Akyol & Garrison, 2011). A study with online graduate students more recently provided evidence that cognitive presence, teaching presence, social presence and perceived learning significantly predict actual learning as measured by course points (Rockinson-Szapkiw, Wendt, Wighting, & Nisbet, 2016). To add to the growing research of the CoI, perceived learning, and actual learning, a study using high school students as the population that examines both actual grades and self-reports of learning is recommended.

Because learning happens at the intersection of the presences (Arbaugh et al., 2008), understanding how cognitive presence, social presence, and teaching presence relate to each other is important (Kozan & Richardson, 2014). However, research on the overlapping

relationships of the presences is limited and has only been conducted using graduate students (Garrison et al., 2010; Kozan & Richardson, 2014). Future study on the interrelationships between and among social presence, teaching presence, and cognitive presence is recommended using a high school population.

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APPENDIX A

Community of Inquiry Survey Instrument (draft v12)

Teaching Presence

Design & Organization

1. The instructor clearly communicated important course topics.

   The important topics for each course were clearly stated.

2. The instructor clearly communicated important course goals.

   Expectations for learning goals were clearly stated.

3. The instructor provided clear instructions on how to participate in course learning activities.

   Instructions for completing course activities were clearly stated.

4. The instructor clearly communicated important due dates/time frames for learning activities.

   Due dates for assignments were clearly stated.

Facilitation

5. The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.

When there was disagreement about topics, the instructor helped me understand the different viewpoints.

6. The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.
   The instructor made sure the entire class understood the main points for each unit in a way that helped me understand the material.

7. The instructor helped to keep course participants engaged and participating in productive dialogue.
   The instructor kept students interested in discussions by making sure the purpose was clear.

8. The instructor helped keep the course participants on task in a way that helped me to learn.
   The instructor helped me to learn by keeping students on task.

9. The instructor encouraged course participants to explore new concepts in this course.
   The instructor encouraged students to share and explore new ideas.

10. Instructor actions reinforced the development of a sense of community among course participants.

The instructor's actions made students feel like the time they spent learning together was productive.

Direct Instruction

11. The instructor helped to focus discussion on relevant issues in a way that helped me to learn.

    The instructor helped me to learn by discussing important issues.

12. The instructor provided feedback that helped me understand my strengths and weaknesses relative to the course's goals and objectives.

    The instructor gave me feedback that helped me understand my strengths and weaknesses in relationship to the expectations for assignments.

13. The instructor provided feedback in a timely fashion.

    The instructor provided feedback and grades in a timely fashion.

Social Presence

Affective expression

14. Getting to know other course participants gave me a sense of belonging in the course.

    I felt like I fit in with the other students in my course.

15. I was able to form distinct impressions of some course participants.

I felt like I could relate to some of the other students in my course.

16. Online or web-based communication is an excellent medium for social interaction.

    I effectively communicated with other students through discussion, emails, etc.

Open communication

17. I felt comfortable conversing through the online medium.

    I felt comfortable communicating with other students in my course.

18. I felt comfortable participating in the course discussions.

    _____

19. I felt comfortable interacting with other course participants.

    I felt comfortable interacting with other students.

Group cohesion

20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.

    I felt that I could disagree with other students without them getting upset with me.

21. I felt that my point of view was acknowledged by other course participants.

    I felt like other students listened to points I made.

22. Online discussions help me to develop a sense of collaboration.

    Discussing topics helped students work together more effectively.

Cognitive Presence

Triggering event

23. Problems posed increased my interest in course issues.

    Questions asked in the course were of interest to me.

24. Course activities piqued my curiosity.

    I wanted to know more about ideas we covered in class.

25. I felt motivated to explore content related questions.

    I felt motivated to learn more about questions asked in the course.

Exploration

26. I utilized a variety of information sources to explore problems posed in this course.

    A variety of content was used to explore the questions asked in the course.

27. Brainstorming and finding relevant information helped me resolve content related questions.

    Sharing ideas and finding important information helped me complete assignments.

28. Online discussions were valuable in helping me appreciate different perspectives.

    Some of my ideas changed or were strengthened from sharing different ideas with the rest of the class.

Integration

29. Combining new information helped me answer questions raised in course activities.

    When I learned new things in class, I understood how to use them in my assignments.

30. Learning activities helped me construct explanations/solutions.

    Assignments were designed in a way that helped me develop meaningful answers.

31. Reflection on course content and discussions helped me understand fundamental concepts in this class.

    When I completed assignments, I could look back and see where both the content and discussions had helped me understand the answers I had developed.

Resolution

32. I can describe ways to test and apply the knowledge created in this course.

    I know when and where to use strategies and ideas I learned in this class.

33. I have developed solutions to course problems that can be applied in practice.

    The answers I developed in this course can be applied to real problems.

34. I can apply the knowledge created in this course to my work or other non-class related activities.

    I learned things in this class that I can use at work or in my career.

5 point Likert-type scale

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

APPENDIX B

On Feb 3, 2016, at 1:49 PM, Harrell, Kyleigh B <[redacted]> wrote:

Dr. Garrison, I am a doctoral candidate at Liberty University in Lynchburg, Virginia. As we have previously discussed, I am working on a dissertation that will examine if there is a difference in high school students' social presence, cognitive presence, and teacher presence who are enrolled in a blended learning course as compared to those who are enrolled in an online course. I am working under the supervision of Dr. Jillian Wendt.

I am writing to kindly request permission to use your community of inquiry framework diagram as it appears in Critical Inquiry in a Text-based Environment: Computer Conferencing in Higher Education (2000) and your practical inquiry model as it appears in Researching the Community of Inquiry Framework: Review, Issues, and Future Directions (2007) as figures in my dissertation manuscript. I would truly appreciate your consideration of my request.

Thank you for your time and consideration!

With Regards,

Kyleigh Harrell

Doctoral Candidate, Liberty University

Kyleigh,

You have my permission to use the CoI framework and Practical Inquiry diagrams.

I am interested in your findings.

Best wishes,

DRG

APPENDIX C

CAP Perceived Learning Scale

DIRECTIONS:

A number of statements that students have used to describe their learning appear below. Some statements are positively worded and others are negatively worded. Carefully read each statement and then circle the appropriate number following each statement to indicate how much you agree with the statement, where lower numbers reflect less agreement and higher numbers reflect more agreement. There is no right or wrong response to each statement and your course grade will not be influenced by how you respond. Do not spend too much time on any one statement but give the response that seems to best describe the extent of your learning. ***Please respond to all statements.***

1. I can organize course material into a logical structure. 0 1 2 3 4 5 6
2. I cannot produce a course study guide for future students. 0 1 2 3 4 5 6
3. I am able to use physical skills learned in this course outside of class. 0 1 2 3 4 5 6
4. I have changed my attitudes about the course subject matter as a result of this course. 0 1 2 3 4 5 6
5. I can intelligently critique the texts used in this course. 0 1 2 3 4 5 6
6. I feel more self-reliant as the result of the content learned in this course. 0 1 2 3 4 5 6
7. I have not expanded my physical skills as a result of this course. 0 1 2 3 4 5 6
8. I can demonstrate to others the physical skills learned in this course. 0 1 2 3 4 5 6
9. I feel that I am a more sophisticated thinker as a result of this course. 0 1 2 3 4 5 6

Scoring Key

Total CAP Score

Score the test instrument items as follows:

- Items 1, 3, 4, 5, 6, 8, and 9 are directly scored; use the scores as given on the Likert scale, i.e., 0, 1, 2, 3, 4, 5, or 6. Items 2 and 7 are inversely scored; transform the Likert scale responses as follows: 0 = 6, 1 = 5, 2 = 4, 3 = 3, 4 = 2, 5 = 1, and 6 = 0.
- Add the scores of all 9 items to obtain the total CAP score. Scores can vary from a maximum of 54 to a minimum of 0. Interpret higher CAP scores as higher perceptions of total learning.

CAP Subscale Scores

Add the scores of the items as shown below to obtain subscale scores. Scores can vary from a maximum of 18 to a minimum of 0 for each subscale.

- Cognitive subscale: Add the scores of items 1, 2, and 5.
- Affective subscale: Add the scores of items 4, 6, and 9.
- Psychomotor subscale: Add the scores of items 3, 7, and 8.

APPENDIX D

8/30/2016

[redacted]

Dear Kyleigh Harrell:

After careful review of your research proposal entitled The Impact of Blended Learning on Social Presence, Cognitive Presence, Teaching Presence, and Actual Learning, we have decided to grant you permission to conduct your study at Odyssey Online Learning.

Check the following boxes, as applicable:

☒ Data will be provided to the researcher stripped of any identifying information.

☒ I/We are requesting a copy of the results upon study completion and/or publication.

Sincerely,

[redacted]

[redacted]

APPENDIX E

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

September 9, 2016

Kyleigh Harrell
IRB Application 2624: The Impact of Blended Learning on Social Presence, Cognitive Presence, Teaching Presence, and Actual Learning

Dear Kyleigh Harrell,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your research with the data safeguarding methods mentioned in your IRB application.

Your study does not classify as human subjects research because it will not involve the collection of identifiable, private information.

Please note that this decision only applies to your current research application, and any changes to your protocol must be reported to the Liberty IRB for verification of continued non-human subjects research status. You may report these changes by submitting a new application to the IRB and referencing the above IRB Application number.

If you have any questions about this determination or need assistance in identifying whether possible changes to your protocol would change your application's status, please email us at irb@liberty.edu.

Sincerely,

[redacted]

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
The Graduate School

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