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A Confirmation Factor Analysis Of Teaching Presence Within The Florida Online Reading Professional Development Program

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A CONFIRMATORY FACTOR ANALYSIS OF TEACHING PRESENCE WITHIN THE FLORIDA ONLINE READING PROFESSIONAL DEVELOPMENT PROGRAM

by

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ABSTRACT

The Community of Inquiry model provides a framework for recognizing and evaluating interpersonal behaviors in online educational settings. One of its three components, teaching presence (TP), describes those behaviors that are under the auspices of the online instructor. By examining these interactions and behaviors through the theoretical lens provided by teaching presence, and by measuring them with the Teaching Presence Scale (TPS), it may be possible to gain greater understanding of the practices employed most effectively by online instructors.

This dissertation describes the background, theoretical and empirical foundations, methods, and results of a study on TP. The purpose of the study was threefold: to validate the use of the TPS in an online professional development setting outside of the higher education context in which it was designed and tested; to confirm the factor composition of TP among facilitators in an online professional development course; and to determine the extent and direction of the relationship between teaching presence and student satisfaction.

The participants in this study (n = 718) were in-service educators enrolled at the Florida Online Reading Professional Development program. They responded to an instrument that included the 28 original TPS questions, plus 17 student satisfaction and 11 demographic items. Confirmatory factor analysis and Pearson's correlation were used to answer the three research questions and corresponding hypotheses.

The research questions were answered in the affirmative, and the null hypotheses rejected. There was support for the use of the TPS in an online professional development setting (all 28 TPS items loaded as hypothesized on the three TP factors); support for a three-factor model of TP using 17 of the 28 TPS items (X^2 [116, N = 718] = 115.56, p = .49, CFI = .999;

NNFI = .999; SRMR = .02; and RMSEA = .03); and evidence of a strong relationship between components of TP and student satisfaction (statistically significant correlations [$p < .001$] between TP and student satisfaction, r^2 values ranging from .25 to .57).

A discussion of the results, implications for practice, implications for further research, and limitations of the study were presented following the data analysis.

For Jack, my best friend and the love of my life,

and

For Richard and Shirley Miller, for providing a lifetime of love and support

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As I reach the finish line in this amazing race, I would like for all of the people mentioned above, along with many who are remembered fondly even if not specifically named, to know that they are parts of this experience without whom I would not have succeeded. In many ways, a person is the sum of her experiences and the encounters she shares with others. I am incredibly grateful to have so many people of honor and substance providing the foundation for my life and my endeavors.

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CHAPTER 1: INTRODUCTION

This chapter begins with a description of the context of this study. It continues by discussing the Community of Inquiry, a model of online learning effectiveness that includes Teaching Presence, the construct to be studied in this dissertation. It also includes a description of the development and validation of the Teaching Presence Scale, the instrument designed to measure this component of the Community of Inquiry. The role of student satisfaction in online learning experiences is then mentioned, in the context of its connection to teaching presence. The purpose statement, problem statement, and significance of the study are then presented, along with the research questions and hypotheses. Finally, a graphic representation of the hypothesized factor relationships is shown, followed by a list of definitions and a description of the limitations of the study.

The Prevalence of Online Education

In recent years, online education has become increasingly prevalent in American education. This is true in higher education, corporate training and professional development, military training and education, and K-12 education (McMurray, 2007; Strother, 2002; Thompson, 2006). Online education has become a popular supplement to and replacement for traditional, face-to-face instruction, offering a cost effective and remotely accessible means of instruction to students previously lacking such opportunity (McMurray, 2007; Strother, 2002).

While some principles and components of good online instruction are similar to those in face-to-face settings, there are substantial differences that need continued research (Swan, 2004). For example, how does one express oneself and understand others effectively without body language? How does a learner project personality, or "social presence," into online

communication? How does an instructor project "teaching presence," helping and interacting with students asynchronously, facilitating learning and fostering a positive sense of community in cyberspace? What are the relationships between these communication characteristics of an online learning community, and how are their inherent challenges overcome to present an optimal and satisfying learning experience for the online student?

These questions about the construction of a sense of learning community are not easily answered. They are, however, of arguable importance in both online and face-to-face learning situations. Vygotsky (1962) proposed that people's external social interactions become the basis for their internal thought processes, and that learning is therefore inherently tied to students' social and cultural experiences. Specifically, he argued that people learn through collaboration with peers (e.g., classmates) or superiors (e.g., teachers) possessing greater levels of competence; the more competent assist the less competent through the learning process (Tudge, 1992).

Other well-known learning and development theorists agreed that peer and student-teacher interaction play a powerful role in learning. While Piaget placed more emphasis on internal construction of knowledge than did Vygotsky, he acknowledged the role of peer interaction in the process (Tudge & Winterhoff, 1993). Bandura also examined the impact of social interaction in learning and developmental progress, and concluded that people tend to learn largely through observation and "cognitively active" imitation of social role models (Tudge & Winterhoff, 1993, p. 64). He also advocated a model of bidirectional reciprocation in learning. This was a radical departure from behaviorist models based on "unidirectional stimulus-response connections," placing emphasis on the importance of community interactions and mutual learning experiences (Tudge & Winterhoff, 1993, p. 65). Each of these three learning theorists

agreed, in their different ways, that human learning is fostered through personal interaction, especially when these interactions take place with the assistance of more competent or knowledgeable leaders.

The Community of Inquiry

Acknowledging this importance of community interactivity in the learning process, Garrison, Anderson, and Archer attempted to explain how the social factors critical to human learning (e.g., peer interaction and the presence of a guiding/supporting/challenging role model) can be found in solely online, computer-based educational experiences (2001). They proposed a "Community of Inquiry" conceptual framework to help identify and show the relationships between components that are required for learners to learn in online environments. This framework consists of cognitive presence, social presence, and teaching presence – educational elements that overlap and combine to comprise a total educational experience (Figure 1).

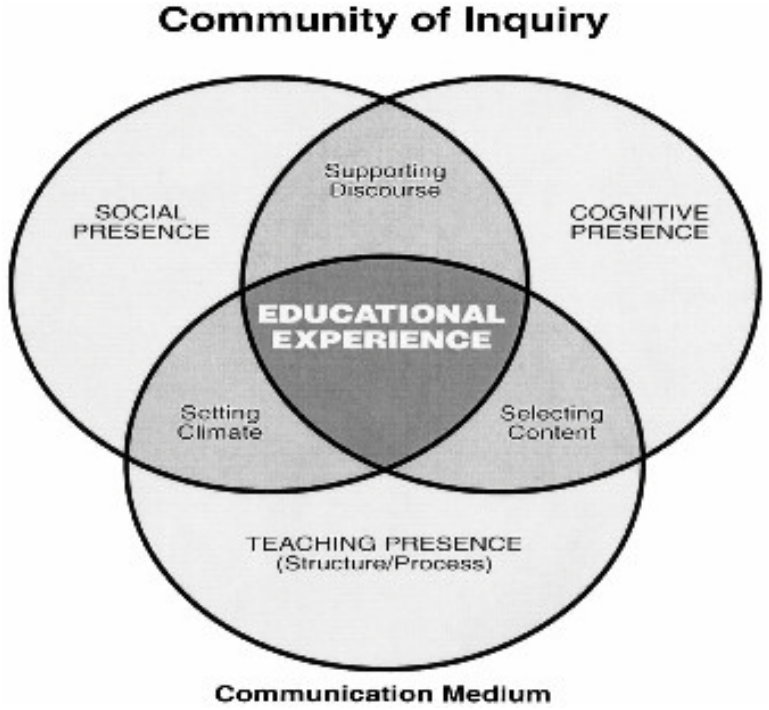

Figure 1. The Community of Inquiry model shows the relationships between required elements of successful online learning experiences.

Cognitive presence is defined as "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical Community of Inquiry" (Garrison et al., 2001, p. 11). It is one crucial component of high-level thinking and learning. Further discussion of cognitive presence is outside the scope of this study, but it is worth mentioning as part of the Community of Inquiry model that it comprises along with two other aspects of online learning, social presence and teaching presence.

Social presence originates from telecommunications research performed in the 1970s in order to determine the degree to which one is able to project one's personality into an experience and to interact with others' personalities in audio and visual media like facsimile machines, voice mail, and audio teleconferencing (Maness, 2008; Rourke, Anderson, Garrison, & Archer, 1999).

Social presence is updated and further defined by Garrison et al. as "the ability of participants in a Community of Inquiry to project themselves socially and emotionally, as 'real' people (i.e., their full personality), through the medium of communication being used," particularly in the medium of computer-mediated communication (2000, p. 94). Garrison et al. (2000) point out the inherent difficulties in projecting one's personality into online educational settings consisting entirely of written communication. Unlike in traditional, face-to-face settings, it is impossible in this type of online setting to read body language or listen to vocal inflections to achieve the deep levels of communication usually associated with social interactions. Forming a true Community of Inquiry in an online classroom is then challenging if social presence among students is weak, for it is these kinds of interactions that create a sense of community among learners.

Teaching presence is the third component of the Community of Inquiry model. In early days of online education, it was determined that there is just as much need for a facilitator to design, direct, and inform the learning experience online as there is in traditional, face-to-face classrooms (Garrison & Anderson, 2003). The concept of teaching presence is used to define and describe aspects of this facilitator's role. It is "the design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson, Rourke, Garrison, & Archer, 2001, p. 5). So, while cognitive presence describes learners' higher-order thinking and learning in an online environment, and social presence refers to the projection of and interaction between their personalities, teaching presence shows how a leader-facilitator helps to promote the most effective combinations of the two in order to bring about desired learning outcomes. It is this

third component of the Community of Inquiry, and the measurement thereof, that is the focus of this dissertation study.

Development and Validation of the Teaching Presence Scale

Teaching presence has received increasing attention from researchers in recent years. Shae, Fredericksen, Pickett, and Pelz (2003a) took the teaching presence framework and subsequent qualitative coding scheme introduced by Anderson et al. (2001), and created a survey to measure student perception of teaching presence in online courses at the State University of New York (SUNY) Learning Network (SLN). This instrument, the Teaching Presence Scale (TPS), reflects the three factors of teaching presence originally proposed by Anderson et al. (2001): instructional design and organization, facilitating discourse, and direct instruction (Shae et al., 2003a).

The instructional design and organization component breaks down into several subcategories of teaching presence responsibilities: "setting the curriculum, establishing time parameters, utilizing the medium effectively, establishing netiquette, and designing instructional methods effectively" (Shae, Pickett, & Pelz, 2003b, p. 69). Facilitating discourse includes "identifying areas of agreement and disagreement in online discussions, seeking to reach consensus, reinforcing student contributions, setting the climate for learning, drawing in other participants and prompting discussion, and assessing the efficacy of the process" (p. 70). Direct instruction includes "presenting content and questions, focusing the discussion on specific issues, confirming understanding, diagnosing misconceptions, and injecting knowledge from diverse sources" (p. 71).

The 28 items that make up the TPS reflect these three teaching presence factors (instructional design and organization, facilitating discourse, and direct instruction) and their subcategories. Each item was written in collaboration with the principal author of the teaching presence construct (Anderson et al., 2001; Shae et al., 2003b). There was no apparent quantitative exploration of the factor structure represented by the survey items in initial studies using the TPS. Rather, the TPS appears to have been constructed via discourse between Shae et al. (2003a) and Anderson, one of the original framers of the teaching presence concept. The TPS was then used in at least two studies without quantitative validation of its results through factor analysis (Shae et al., 2003a; Shae et al., 2003b).

The factor structure of the TPS was later explored using principal component analysis with direct oblique rotation (Shae, Li, & Pickett, 2006). The sample (n=1067) of survey respondents was taken from a pool of online students across 32 college campuses in the SUNY system (Shae et al., 2006). The survey data from the undergraduates in this online higher education context indicated that the teaching presence model consisted of two factors, not three. Instead of instructional design and organization, facilitating discourse, and direct instruction proposed by Anderson et al. (2001), students in this sample seemed to see a combination of facilitating discourse and direct instruction. Shae (2006) referred to this factor as "directed facilitation", and stated that it, along with the instructional design and organization factor, might make up a more accurate two-factor model of teaching presence than the three factors originally proposed.

Arbaugh and Hwang (2006) also studied the factor structure of the three-factor teaching presence model proposed by Anderson et al. (2001). They sampled 191 MBA students using the

survey created by Shae et al. (2003a). Unlike the results obtained in the factor analysis done by Shae et al. (2006), the confirmatory factor analysis conducted by Arbaugh and Hwang (2006) did support the validity of the three-factor model when four poorly-fitting items were dropped from the analysis.

Garrison (2007), one of the original authors of the Community of Inquiry and teaching presence models, suggested that one reason for this discrepancy could be the nature of the two different samples. The sample studied at the SUNY by Shae et al. (2006) were undergraduate students, while those studied by Arbaugh and Hwang (2006) were graduate students. Garrison (2007) hypothesized that the graduate students, older and more experienced with higher education, might have been more aware of the subtle distinctions between facilitating discourse and direct instruction online than were the younger undergraduate students. He suggests that further analysis of the factors comprising the teaching presence model should be conducted in order to illuminate this phenomenon, and that there would be value in testing the factor structure in different settings and on different populations. It is this suggestion that leads, in part, to the purpose of the current study.

An additional goal of this dissertation is to determine the amount and direction of relationship, if any, between teaching presence (as measured by TPS items) and students' satisfaction with their online course experience (as measured by end-of-course survey questions). As the prevalence of online education grows, not only is it interesting to gauge whether students perceive the online course experience to be beneficial, but it is important to see if factors like those contained in the teaching presence model can be harnessed to increase student satisfaction. The ability to positively impact students' cognitive and affective experiences within online

courses has practical implications for various facets of online education, from helping to gauge the effectiveness of online instructors, to ensuring students' continued interest in registering for an institution's online courses.

Purpose Statement

The purpose of this study is threefold: first, to validate the use of the Teaching Presence Scale in an online educational setting outside of the higher education context in which it was designed and tested; second, to confirm the factor composition of teaching presence among facilitators in an online professional development course; and third, to determine the extent and direction of the relationship, if any, between teaching presence and student satisfaction.

Problem Statement

In many online education programs, student satisfaction is a primary course effectiveness evaluation tool (Berge & Myers, 2001; Coppola, Hiltz, & Rotter, 2004). While it may be important to gauge student reactions as one measure of online teaching effectiveness, using this subjective tool as a primary basis for evaluation and decision making may be both inaccurate and imprecise (Shelvin, Banyard, Davies, & Griffiths, 2000). Instead, a more objective set of criteria are needed for evaluating the effectiveness of online courses and their instructors. These criteria do exist, and have been compiled into a survey instrument.

This instrument, the TPS, needs to be validated to determine whether its measurement items adequately represent the three-factor construct of teaching presence as intended. Moreover, the factor structure of teaching presence needs to be confirmed in a setting outside of higher

education, the only arena in which it has currently been tested. The confirmatory factor analysis proposed for the current study will allow for a test of the fit of the existing model using data gathered from a new setting, professional development. Finally, the data gathered by the instrument need to be correlated with traditional measures of student satisfaction to compare the instrument's capabilities with those of typical student report measures, and to determine whether teaching presence relates positively to learners' online experiences in a professional development setting.

Significance of Study

The significance of this study lies in the fact that teaching presence, as grounded in learning theory, may play a crucial part in explaining how instructors help to facilitate successful learning among students in solely online educational experiences. This could have implications for online instructor training that would lead to increased performance, satisfaction, and learning gains among students. The optimal online course experience for adult learners is a careful balancing act between building skills, tapping into and enhancing motivation, and providing an educational opportunity in accordance with their unique needs, while recognizing the limitations of a strictly virtual classroom (Gibbons & Wentworth, 2001). The teaching presence model, with its foundations in general and adult learning theory, sheds light on how best to create and measure such an experience.

Teaching presence has not yet been studied outside of higher education, and its use outside of academia has not been validated. There are online educational environments beyond higher education that could benefit from the study of teaching presence, and from the use of an

instrument capable of reliably measuring it. Confirming or rejecting the validity of the TPS in one of these alternative educational settings, online professional development for K-12 educators, would contribute to this end.

In his recent article addressing the current state of research on the Community of Inquiry, Garrison (2007) expressed the need for more of this type of validation research to be conducted on the Teaching Presence Scale designed by Shae et al. (2003a). As there was some disagreement about the number and nature of factors comprising teaching presence, and as the items on this survey have not been validated for use in online coursework outside of higher education, a confirmatory factor analysis (CFA) would shed light on both teaching presence factors and viability of the survey items when used in a professional development program (Arbaugh & Hwang, 2006; Garrison, 2007; Shae et al., 2003a).

The ability to measure teaching presence accurately in a professional development setting may inform the design of online facilitator training by contributing meaningfully to each phase of the instructional design process: analysis, development, design, implementation, and evaluation (ADDIE). An instrument capable of accurately measuring levels of teaching presence would certainly facilitate the analysis of facilitator teaching behaviors and instructional techniques. This analysis would then inform the development, design, and implementation of online facilitator training geared toward teaching online facilitators how to be better instructors by employing effective teaching presence behaviors. Evaluation would also be aided by the use of such a measurement tool. It would be possible to quantify and measure behaviors then exhibited by the online facilitators after training, noting those areas where teaching presence practices are incorporated effectively as well as those where training has left knowledge or

performance gaps. Finally, seeing how teaching presence and student satisfaction correlate would potentially provide insight on whether teaching presence can serve as a basis for improving the quality of the online learning experience, as perceived by the participant.

Research Questions and Hypotheses

The research questions to be answered in this study include the following:

1) Does the Teaching Presence Scale measure the teaching presence construct as intended in a professional development setting?

   H_1: The Teaching Presence Scale does measure the teaching presence construct as intended in a professional development setting.

2) Does the factor structure of "teaching presence" for teachers completing an online professional development program fit the original three-factor model of teaching presence proposed for use in higher education?

   H_2: There are three distinct factors inherent within teaching presence, including instructional design and organization, facilitating discourse, and direct instruction.

   H_3: TPS items 1-6 will load on the instructional design and organization factor.

   H_4: TPS items 7-18 will load on the facilitating discourse factor.

   H_5: TPS items 19-28 will load on the direct instruction factor.

3) Is there a correlation between teaching presence, as measured by the Teaching Presence Scale, and student satisfaction?

   H_6: There is a correlation between teaching presence, as measured by the Teaching Presence Scale, and student satisfaction.

The conceptual framework showing the relationship between the CFA variables in this study (e.g., TPS items and factors) is represented graphically in Figure 2.

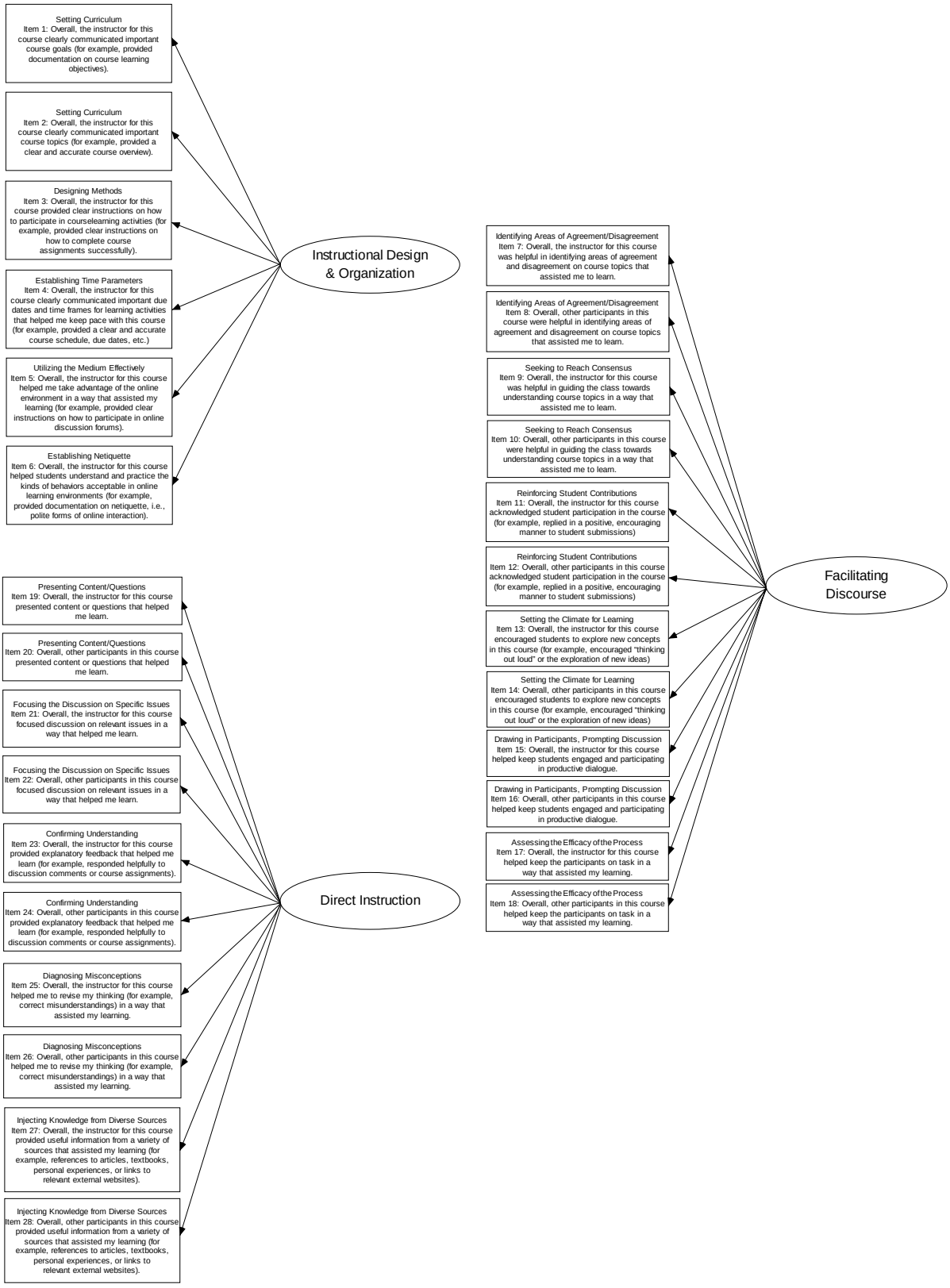

Figure 2. The hypothesized factor structure of the TPS (Shae et al., 2003a).

Definitions

ALN: Asynchronous Learning Network. These allow learners to "combine self-study techniques with asynchronous interactivity to create environments in which [they] can access remote learning resources asynchronously -- using relatively inexpensive equipment -- to learn at home, at the work place or at any place of their choosing" (Mayadas, 1997, p. 2). The Florida Online Reading Professional Development program (FOR-PD) is an ALN.

Confirmatory Factor Analysis (CFA): A statistical procedure that allows researchers to test whether the observable variables (in this study, survey items or questions) are, in fact, valid measures of latent, unobservable constructs (Suhr, 2004).

Construct: A latent phenomenon that cannot be directly observed, but may be measured with observable variables. In this study, the three components of teaching presence are latent constructs that may be measured by the observable variables in the TPS.

Facilitators: "instructors" in an online environment who are responsible for implementing, but not designing and developing, curriculum. At FOR-PD, facilitators are all highly qualified reading teachers, usually from the K-12 environment. They facilitate the FOR-PD course on a part-time basis, delivering instruction pre-designed by experts at FOR-PD. They are not allowed to vary or deviate from these materials, hence they are known as facilitators instead of teachers (a role which would typically include instructional design) in this course setting.

Factor loadings: “The pattern of item-factor relationships” (Brown, 2006, p. 2)

Florida Online Reading Professional Development (FOR-PD) program: professional development project active throughout the state of Florida. Its purpose is to assist K-12 teachers to become effective practitioners of scientifically-based reading instruction principles.

Item: A question on a survey; also called an observed measure or indicator (Brown, 2006).

Online education: For the purposes of this study, online education refers to a learning experience that takes place solely online, without a face-to-face classroom component (Allen, Seaman, & Garrett, 2007).

Participants: “students” in the FOR-PD course. As most of these “students” are themselves in-service teachers, and as much of the curriculum is aimed to help them be better reading teachers to their own students, they will be referred to as ‘participants’ in this study so as to distinguish them from the children in their classrooms.

Student Satisfaction: In online education, among adult learners, student satisfaction is defined by the following characteristics: "immediacy in interaction" (Wise, Chang, Duffy, & del Valle, 2004, p. 248); inclusion within social community (DeShields, Kara, & Kaynak, 2005); "convenience and flexibility" of instruction (Johnston, Killion, & Oomen, 2005, p. 4); "contact and interaction with instructor," including high quality feedback (Johnston et al., 2005, p. 4);

applicability of learning experience to solving real world problems (Bolton, 2006); and ease of use of the online course technology (Summers, Waigandt, & Whittaker, 2005). In this study, student satisfaction is measured by student-report (survey data) about participants' experiences with the FOR-PD course and its facilitators.

Limitations

There are some limitations inherent to this confirmatory factor analysis study. The TPS relies on self-report, given by participants who are nearing completion of the FOR-PD course. Because respondents are successful completers of the course, by nature of the end-of-course survey administration, data from less successful or less satisfied (non-completing) participants are lacking from the analysis. This may present a view of teaching presence that is not generalizable to all participants.

The fact that the TPS relies on these learner perceptions of teaching presence instead of on direct observation of teaching behaviors by neutral parties could present a similar limitation. One disadvantage of evaluating online learning experiences using learner perceptions is the rather shallow nature of the data obtained. If one considers Kirkpatrick's four levels of evaluation, level one is reaction (e.g., data obtained from student satisfaction surveys), level two is learning (e.g., evaluation of students' grades, pre- and post-tests to determine learning gains, or rubrics for qualitative analysis of student course work and interactions), level three is behavior (e.g., observation of students' application of what they have learned to real life settings, outside of the course), and level four is results (e.g., measuring ways the students' learning gains have generated results at an organizational level) (Berge & Myers, 2001). Higher-level applications of

learning are more difficult and expensive to evaluate, which helps account for the prevalence of level one evaluations, i.e., student reports of course satisfaction (Berge & Myers, 2001).

The problem with evaluations conducted at this level is that student reactions may not always be a valid measure of a teacher's effectiveness within the learning experience. Shelvin, Banyard, Davies, and Griffiths (2000) studied the use of student satisfaction surveys to evaluate university professors' teaching effectiveness. They found that the charisma of the instructor, as rated by students, accounted for a greater variance in student satisfaction than did the instructors' perceived teaching abilities or course design. In other words, the positive or negative student perceptions of instructors' personalities outweighed their perceptions of instructors' teaching abilities. Yet the results of such end-of-course student satisfaction surveys are routinely used as measures of online and face-to-face instructors' teaching effectiveness (Shelvin et al., 2000).

While learner perceptions are important, their objectivity may be challenged by experiences or feelings unrelated to the teaching presence construct being measured. A potential area for future study might include the adaptation of the TPS or the development of a new instrument relying on direct observation of teaching behaviors, eliminating some of the confounding effects of subjective learner report.

Delimitations

FOR-PD offers its online course in open enrollment, district, community college, and university sections. Because the goal of the current research is to test the use of the TPS in a professional development setting removed from higher education, it was decided to limit the study to open enrollment and district course sections. Both of these are presented by facilitators

who are veteran, in-service K-12 teachers, and are attended by participants who are also in-service K-12 teachers. Participation in district sections is coordinated through individual Florida school districts, with each section created specifically for and limited to teachers from a given district (FOR-PD, n.d.-c)

Open enrollment sections are sections of the course that do not limit enrollment to teachers from a specific school district. Participants in open enrollment sections may not have the existing connections to their FOR-PD section classmates that are seen in district sections, but they are in-service teachers with similar purposes in taking the FOR-PD course (FOR-PD, n.d.-c).

Additionally, this study only includes participants who were enrolled in and completed the FOR-PD course during the spring of 2009. It is assumed that non-completers have chosen to leave the course for a variety of reasons, the full range of which is unknown to the researcher. As non-completers of a course do not have the same course experience (at least in terms of duration and completeness, and possibly in terms of other affective factors as well), they were eliminated from the study in the interest of working with the most homogeneous sample as possible.

Chapter Summary

As online education has become an increasingly prevalent option for K-12 schools, higher educational institutions, the military, and corporations to deliver coursework and training, it has also presented new challenges for educators and researchers who seek to gain greater understanding and better utilization of this medium. There has been much interest among researchers on how best to harness what is known about learning theory to create effective

learning experiences in the totally online environment. In order to ensure quality online course design and facilitation, it is necessary to quantify the online experience, measuring the quality of interactions between students and instructors.

Results of such quantification could lead to improved instructor training, which could in turn lead to improved student experiences and outcomes. The Community of Inquiry proposed by Garrison, Anderson, and Archer (2001) is a framework designed to facilitate this quantification by illuminating social, cognitive, and teaching behaviors and interactions between participants in the online community.

One of the three components of the Community of Inquiry model, teaching presence, has gained particular attention through the development, validation, and use of a survey instrument designed for its measurement. Researchers have noted conflicting results of validation studies, in which some evidence supports an original, three-factor teaching presence model proposed by Garrison, Anderson, and Archer (2001), and other evidence refutes three factors in favor of two. The purpose of the current study is twofold: first, to validate the scores produced from this instrument, the Teaching Presence Scale, for use in an online professional development setting outside of higher education, and to determine the factor structure inherent to the construct; and second, to determine whether a relationship exists between teaching presence and student satisfaction.

CHAPTER 2: LITERATURE REVIEW

Online education is becoming increasingly popular as a means of instructional delivery. This is true in various educational settings, including secondary and higher education, corporate professional development, and military training and education (McMurray, 2007; Strother, 2002; Thompson, 2006). Online education may be defined as a learning experience in which at least 80% of the content is delivered to students online (Allen et al., 2007). It stands out among educational experiences because of its focus on online delivery, compared with:

1) Traditional education, in which no online component is used, just face-to-face instruction.

2) Web facilitated education, in which the online portion makes up less than 30% of instruction, e.g., use of a course management system to post syllabus and assignments.

3) Blended or hybrid learning, in which 30% to 79% of instruction takes place online, frequently in the form of online discussions, and the rest of the instruction is face-to-face.

This definition may be applied across different educational settings. As it is based on the percentage of instruction conducted online, it may be applied to professional development settings as effectively as to higher education or other settings.

Various benefits have been attributed to online education. Some administrators of online educational programs cite the economic savings that this delivery medium offers to hosting institutions (Strother, 2002). Others claim that it helps increase the degree completion rate and increases perceived value of the offering institution (Allen et al., 2007). Online education is also

said to offer students the opportunity to learn from great distances, improving accessibility to previously unavailable educational experiences (McMurray, 2007).

As online coursework has become an increasingly prevalent instructional vehicle in many educational communities and contexts, much effort has gone toward defining and quantifying the optimal online learning experience. Defining the successful learning experience is one step in the process of creating and replicating effective teaching and course design principles across educational settings.

It is the goal of this study to shed new light on how teaching presence contributes to effective online professional development learning experiences and student satisfaction. With this in mind, this chapter will begin by presenting the conceptual framework used by teaching presence researchers in an online higher education setting (Shae et al., 2003a; Shae et al., 2006; Shae et al., 2003b; Shae, Swan, Li, & Pickett, 2005).

The discussion will begin with the definition and examination of successful learning experiences from the general to the specific. First, a model will be presented showing characteristics of good, general learning experiences. Next, a model will be presented to show characteristics of effective learning experiences in higher education contexts. After that, these characteristics will be refocused to explain what comprises effective learning experiences in online higher education, which is the environment where the teaching presence construct and the Teaching Presence Scale (TPS) were first proposed and tested.

Additional literature will then be presented to extend this conceptual framework to describe the theoretical and empirical support for the variables and purpose of the current study. Empirical studies involving the TPS will be described, along with the results of attempts to

validate its use in online higher education. It will be established that many effective teaching principles tend to transcend the medium of delivery, that there are certain teaching behaviors that contribute specifically to the creation of effective online educational experiences, and that such behaviors apply consistently across settings in spite of certain differences between higher education and professional development settings. It will further be shown that principles of adult learning theory help to make this so. This is the foundation supporting the use of the TPS, an instrument designed for use in higher educational online coursework, to measure teaching presence at the Florida Online Reading Professional Development Program.

Finally, measures of student satisfaction will be discussed, beginning with a definition of student satisfaction and a discussion of its use as a measure of online course effectiveness. Literature will be presented that will indicate how student satisfaction is quantified, and then the discussion will be brought full-circle to show how teaching presence may relate positively with student satisfaction in online learning experiences.

Conceptual Framework

Defining the Successful Learning Experience: General Characteristics of Effective Learning Environments

The overall conceptual framework for the current dissertation study has, at its base, the conceptual framework proposed by Shae et al. (2003a) to provide a theoretical foundation for their teaching presence research. This conceptual framework by Shae et al. (2003a) begins with a description of general characteristics of effective learning environments, as presented by Bransford, Brown, & Cocking (2000). Bransford et al. (2000) compiled and edited a series of reports for the National Research Council in order to provide a broad explanation of how people

learn. According to these studies, effective learning environments have three distinct characteristics: they are learner centered, knowledge centered, and assessment centered.

Being learner centered means focusing on the "knowledge, skills, attitudes, and beliefs that learners bring to the educational setting" (Bransford et al., 2000, p. 133). This includes being aware of and sensitive to learners' culture, perspectives, misconceptions, and experiences.

Being knowledge centered means recognizing that there are existing bodies and structures of knowledge that can aid learners in strategic thinking and problem solving. Effective instructors have a thorough grounding in such knowledge, and are capable of leading learners toward its acquisition. Awareness of and sensitivity to learners' needs are important components of effective learning environments, but teaching the learners to access knowledge repositories and tools is essential to the learning process. These two characteristics, learner centricity and knowledge centricity, combine in exemplary learning situations when instructors first consider how learners will relate to the body of knowledge, then tailor the acquisition of that knowledge accordingly (Bransford et al., 2000).

Finally, being assessment centered means providing learners with opportunities to receive constructive feedback on their learning experiences and make revisions accordingly (Bransford et al., 2000). This helps learners and instructors to stay focused on educational goals, and provides them with an awareness of progress toward those goals. Assessment is an important part of any learning experience, and in order to be effective, must be carefully aligned with learning objectives and instruction.

When the feedback provided by good assessment practice is combined with a focus on and understanding of learners' needs and a strong knowledge base, an effective learning community is enabled. This is shown in Figure 3.

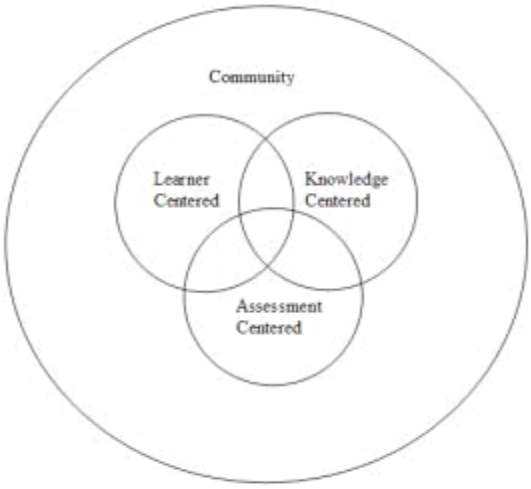

Figure 3. Perspectives on learning environments (Bransford et al., 2000).

Defining the Successful Learning Experience: Characteristics of Effective Higher Education Environments

Bransford et al. (2000) described these three characteristics of highly effective *general* learning environments. Chickering and Gamson (1987) offered a description that drills down to a deeper level, examining characteristics of effective learning experiences that are unique to *higher education* settings and the learner population therein. This description was the second theoretical piece presented by Shae et al. (2003a) as part of the conceptual framework for their teaching

presence research. The seven characteristics of effective higher education experiences proposed by Chickering and Gamson (1987) include:

1) Encouraging contact between students and faculty

2) Developing reciprocity and cooperation among students

3) Encouraging active learning

4) Giving prompt feedback

5) Emphasizing time on task

6) Communicating high expectations

7) Respecting diverse talents and ways of learning (1987, p. 3)

It is possible to see the three centricities described by Bransford et al. (2000) represented in this list. Respecting diverse talents (characteristic #7) is a clear example of learner centricity. Giving prompt feedback (characteristic #4) represents assessment centricity. Encouraging active learning (characteristic #3) denotes knowledge centricity. But in addition to these examples that support the centricities proposed by Bransford et al. (2000), Chickering and Gamson (1987) begin to lay the groundwork for several additional, specific characteristics of ideal student-teacher interaction. For example, encouraging contact between students and faculty (characteristic #1) and communicating high expectations (characteristic #6) describe the important components of faculty-student rapport. Developing reciprocity and cooperation among students (characteristic #2) and emphasizing time on task (characteristic #5) describe aspects of the instructor's function as a manager of the learning process.

Chickering and Gamson (1987) present a variety of teaching behaviors that contribute to effective learning environments, and in so doing, drill a layer deeper into what it takes to create

such situations. These principles they proposed can be seen situated within the framework presented by Bransford et al. (2000), as joint components of an effective learning community, in Figure 4.

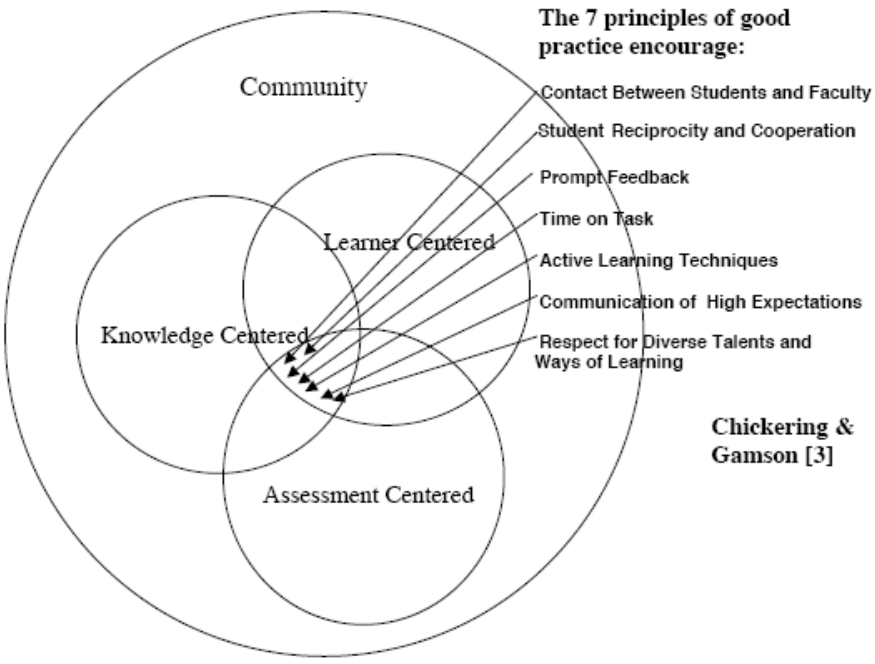

Figure 4. Principles of good practice and perspectives on learning environments (Shae, Pickett, & Pelz, 2003b).

Defining the Successful Learning Experience:
Characteristics of Effective Online Education Environments

Qualities of effective general and higher educational learning environments have thus been shown to fit together in a complementary manner. But what about *online* education? Do the components and behaviors associated with traditional learning situations transcend physical

barriers to apply with equal ease to learning contexts in which instructors and students may never meet face-to-face, may never be in a common room, and may never interact in real time? What can online instructors do to help bridge these barriers to facilitate an optimal learning experience?

These questions can be examined via the model proposed by Garrison, Anderson, and Archer (2001), whose work makes up the final theoretical piece included in the conceptual framework described by Shae et al. (2003a). Garrison et al. (2001) elaborated on the role of effective teachers in facilitating such a learning environment. These authors presented a model to help identify and show relationships between components necessary for online learners to have successful learning experiences (Garrison et al., 2001). This model, the "Community of Inquiry", consists of cognitive presence, social presence, and teaching presence, educational elements that overlap and combine to comprise a total educational experience. Functions of the instructor in this model include selecting content, setting climate, and supporting discourse. The learners contribute these functions to the learning process as well, making it a true community of inquiry shared by instructors and students.

The components of the Community of Inquiry can be seen in Figure 5.

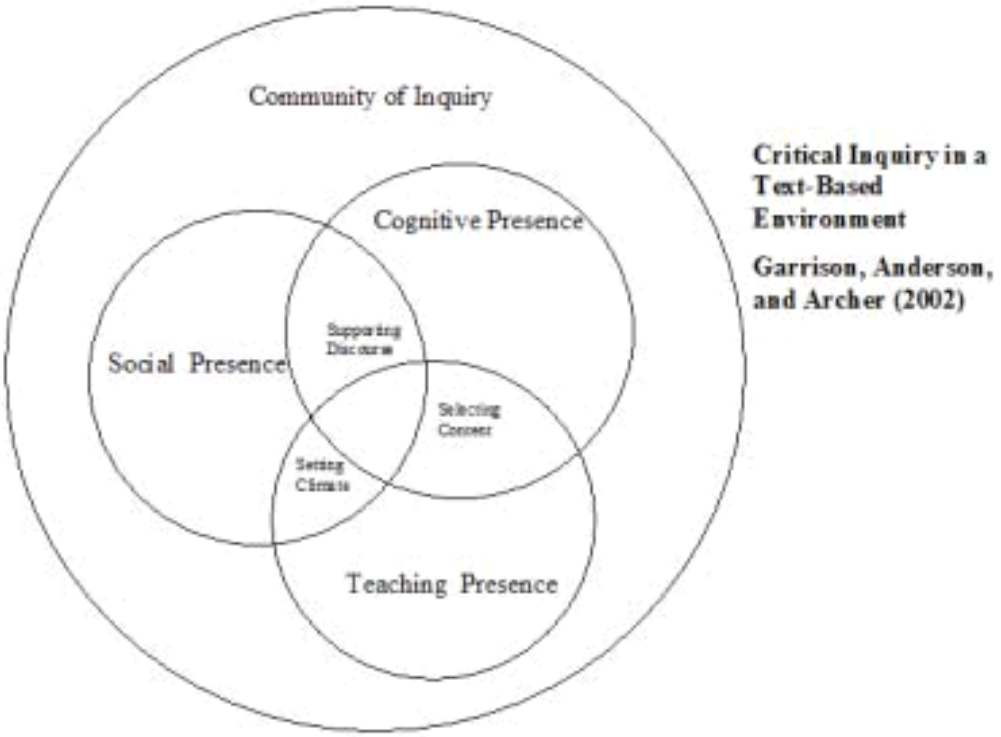

Figure 5. Elements of an educational experience (Shae et al., 2003b).

Other researchers have also examined effective teaching behaviors in online educational settings. According to Graham et al. (2001), habits of effective online instructors stem from best practices previously established for traditional, face-to-face educators. Consider Chickering and Gamson's (1987) principles: "encouraging contact between students and faculty; developing reciprocity and cooperation among students; encouraging active learning; giving prompt feedback; emphasizing time on task; communicating high expectations; and respecting diverse talents and ways of learning" (p. 3). The best online teachers, like the best face-to-face teachers, practice these behaviors.

Graham et al. (2001) went on to note how these principles of quality education apply to online teaching and learning. For example, the effective design of online discussion assignments can facilitate reciprocity and cooperation among students. Asynchronous online presentation of students' course projects can encourage active learning. Deadlines set and enforced by instructors can promote time on task.

Sieber (2005) further clarified behaviors practiced by effective online instructors. These included being a "consultant, guide, and resource provider" instead of an "oracle and lecturer"; being an "expert questioner" instead of a "provider of answers"; being a "designer of students' learning experiences" rather than a "provider of content"; being a "member of the learning team" instead of occupying a "solitary role"; and "working with tasks that students help to construct" rather than having "sole autonomy" over the learning tasks (Sieber, 2005, p. 330).

Sieber (2005) drew certain distinctions between what could be considered traditional, instructor-centered instruction and that which lends itself to online environments. Gibbons and Wentworth (2001) also examined characteristics of online instruction that are unique to the medium, by looking through the lens of adult learning theory as proposed by Knowles (1980). They present the case that compared with more traditional educational settings, online learning environments call for learners to be self-directed, task-oriented, and intrinsically motivated. Their readiness to learn stems from their unique life experiences and career goals, which help to enrich the learning experience for all students when shared and discussed. The implications for instructors in such an environment include a shift away from expectations of student dependence on instructors as purveyors of knowledge, and toward expectations of students working both

independently and as a community, building upon and sharing their experiences throughout the learning process.

Summary of Research on Effective Online Learning Experiences

Coming full circle, ideal online learning experiences are learner centered, knowledge centered and assessment centered (Bransford et al., 2000). They are based on principles of meaningful interaction between students and faculty, collaboration between students, facilitation of a dynamic learning process, availability of timely feedback, emphasis on task-orientation and independence, communication of high expectations, and respect of diverse abilities and ways of learning (Chickering & Gamson, 1987). They have an andragogical slant, in which learners are expected to be both self-directed and collaborative, sharing their experiences and operating as a community, and in which instructors are guides and facilitators of a student-focused learning experience (Garrison et al., 2000; Graham et al., 2001; Sieber, 2005). This comprehensive model can be seen in Figure 6.

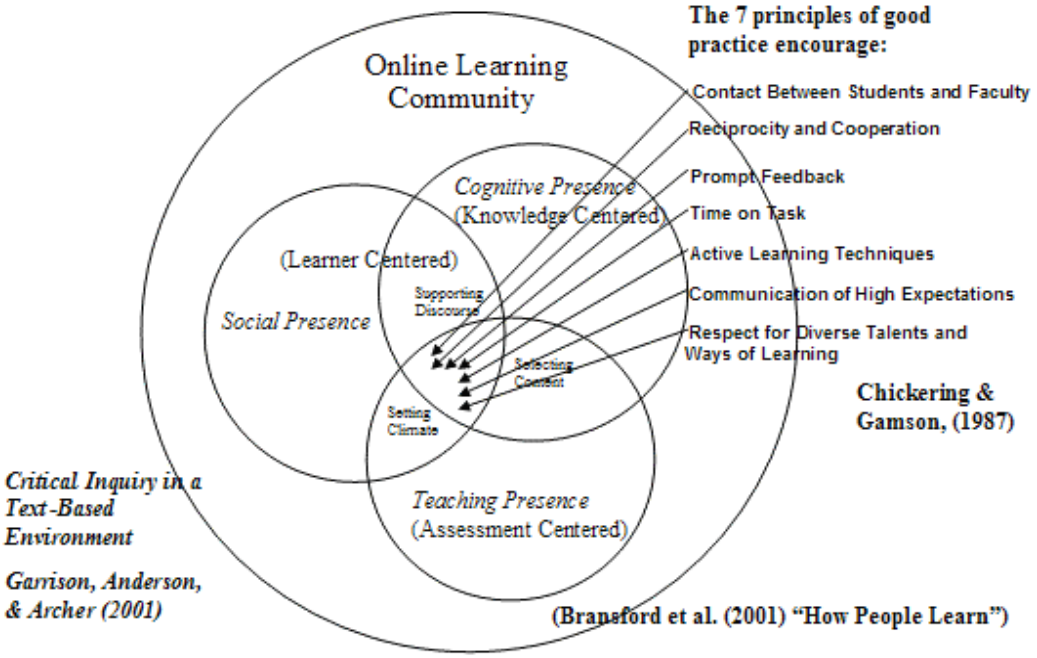

Figure 6. A conceptual framework for high quality online learning environments (Shae et al., 2003b).

In spite of the Community of Inquiry model having its origins in higher education settings, it is not difficult to make the case that such principles of effective learning transcend settings to apply outside of universities and community colleges. These principles are specific to learners, instructors, and the community they form together within the online medium, regardless of the nature of the content presented. In order for learning to happen as intended within any context of learning, the assumptions presented above must be present.

This section has included a description of the theoretical foundations for the conceptual framework used in teaching presence research conducted by Shae et al. (2003a). It has also included descriptions of additional theoretical research that both supports the work by Shae et al. (2003a) and serves as a transition to the original research conducted in this dissertation study.

The Community of Inquiry: Teaching Presence

With components of successful online learning experiences now described, it is time to examine the aspect of the Community of Inquiry that is the focus of the current study: teaching presence. This section will include a description of the teaching presence construct, and will then transition to a discussion of the empirical research performed on teaching presence via the Teaching Presence Scale (TPS) designed by Shae et al. (2003a). It will then include theoretical support for the use of the TPS in a setting outside of the online higher education context in which it was developed. Finally, theoretical support for the relationship between teaching presence and student satisfaction will be presented.

Teaching presence is the component of the Community of Inquiry that deals directly with teaching practices and the facilitator's role in the online learning experience (Garrison et al., 2001). It is "the design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson et al., 2001, p. 5). So while the cognitive presence component of the model describes learners' higher-order thinking and learning in an online environment, and the social presence component refers to the projection of and interaction between learners' personalities, teaching presence shows how an instructor helps to promote the most effective combinations of the two in order to bring about desired learning outcomes.

Effective online instructors' teaching presence practices can be broken down into three categories: instructional design and organization, facilitating discourse, and direct instruction (Anderson et al., 2001). Instructional design and organization practices include "setting [the] curriculum, designing methods [of instruction], establishing time parameters, utilizing [the]

medium effectively," and "establishing netiquette [rules governing polite online interactions]" (Anderson et al., 2001, p. 6).

Facilitating discourse includes "identifying areas of agreement and disagreement" between participants; "seeking to reach consensus [or] understanding;" "encouraging, acknowledging, or reinforcing student contributions;" "setting [the] climate for learning;" "drawing in participants [and] prompting discussion;" and "assessing the efficacy of the process" (Anderson et al., 2001, p. 8).

Direct instruction practices include "present[ing] comments and questions;" "focus[ing] discussions on specific issues;" "summarize[ing] discussions;" "confirm[ing] understanding through assessment and explanatory feedback;" "diagnose[ing] misconceptions;" "inject[ing] knowledge from diverse sources, e.g., textbook, articles, internet, personal experiences (includes pointers to resources);" and "respond[ing] to technical concerns" (Anderson et al., 2001, p. 10). See Figure 7 for a graphic illustration of these components of teaching presence.

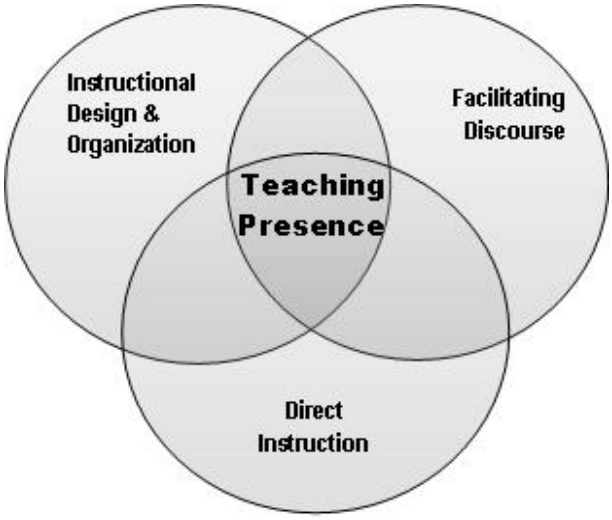

Figure 7. The components of Teaching Presence (Garrison & Anderson, 2003).

Measuring Teaching Presence

The Teaching Presence Scale (TPS) was developed as an instrument designed to measure teaching presence via student report. It was initially tested in two successive studies on samples (*n*=1150; *n*=6088) taken from a pool of online students across 32 college campuses in the State University of New York (SUNY) online education system (Shae et al., 2003a). The researchers developed the instrument in collaboration with the authors of the Community of Inquiry, and then administered the survey to students in the SUNY Learning Network (SLN). Initial tests of the TPS occurred in the summer of 2002 and again in the spring of 2003, after which the researchers ran correlations between teaching presence survey items and student reports of satisfaction and learning.

This instrument was then tested again in the summer of 2004 (*n*=2314), and yet again in the fall of 2004 (*n*=2253), with focus shifting toward analysis of the validity and reliability of the

instrument's results; the factor structure of the teaching presence construct; and the relationships between teaching presence, learning community, and student demographics (Shae et al., 2006). The authors found evidence that the teaching presence model consisted of two factors, not three. These two factors included one original factor, instructional design and organization, plus a hybrid of the other two original factors, facilitating discourse and direct instruction. Shae et al. (2006) proposed that this hybrid factor be termed "directed facilitation."

Other researchers, however, found support for the original three-factor model. Arbaugh and Hwang (2006) tested the Teaching Presence Scale on MBA students (*n*=191). Their confirmatory factor analysis indicated that with the elimination of four of the instrument's original items (three that cross-loaded on more than one factor, and one that failed to load with statistical significance on the planned factor), three distinct factors were represented as originally proposed by Anderson et al. (2001). It has been suggested that these differing results may be accounted for by differences in the demographics of the two samples (Garrison, 2007). The SUNY sample consisted of undergraduate students, while the Arbaugh and Hwang (2006) sample was comprised of graduate-level MBA students. Garrison (2007) surmised that the MBA students' greater levels of experience with higher education could have enabled them to grasp the subtle distinctions between facilitating discourse and direct instruction that escaped the undergraduate students in the study by Shae et al. (2006).

Additional research is recommended in order to explain this and to confirm the factors that comprise teaching presence (Garrison, 2007). Garrison (2007) also recommended studying the TPS in different educational settings. The current study addresses this by studying teaching presence in a professional development context.

Teaching Presence and Student Satisfaction in Professional Development

It has been shown throughout this chapter that principles of effective online learning transcend the type of content being taught. There are behaviors that, if practiced by instructors and students, contribute toward the creation of an optimal community of learning. And while this has been studied and measured by a number of researchers in higher education settings, it has not yet been studied similarly outside of a university environment. In this section, the unique characteristics of professional development will be briefly explored and related to the previous literature regarding ideal online learning conditions.

Professional development has been defined as "the continual deepening of [the] knowledge and skills [that are] an integral part of any profession" (Garet, Porter, Desimone, Birman, & Yoon, 2001, p. 916). Professional development is encouraged across numerous different career fields, and in many cases, is a mandatory part of retaining a job or professional license. As such, it is necessary to examine the unique needs and motivations of the adult learner in professional development programs in order to relate the focus of the current study back to those characteristics of successful online educational programs described earlier in this chapter.

Adult education, or andragogy, differs from traditional education, or pedagogy, in a number of ways. As can be seen in the etymology of the two terms, the focus of pedagogy is on teaching children, while the focus of andragogy is on teaching students old enough to be self-directed (Knowles, 1980; Knowles, Holton, & Swanson, 2006). According to Knowles (1980), pedagogy assumes that the student is a dependent personality, that the instructor's role is to build upon the student's experience, that students' readiness to learn is developmentally- and age-

based, that there is a subject-centered orientation to learning, and that motivation to learn is extrinsic (based on a system of rewards and punishment). Andragogy, on the other hand, assumes that the student is increasingly self-directed, that the instructor's role is to tap into the learner's existing life experience as a rich resource for the entire learning community, that students' readiness to learn is based upon life work and problems, that there is a task-centered or problem-centered orientation to learning, and that motivation to learn is intrinsic (based on internal curiosity or the need to solve problems).

As professional development is, by definition, geared toward adults, principles of andragogy should be applied within the learning experience in order for the environment to be appropriate for the learner population. This is part of what potentially makes online education a medium well-fitted to professional development; the same andragogical qualities that are appropriate for adult learners have been shown to be qualities that make up ideal online educational experiences (Chickering & Gamson, 1987; Garrison et al., 2000; Gibbons & Wentworth, 2001; Graham et al., 2001). If these qualities can be optimized, students in professional development reap the benefits. And partaking in such appropriate and optimal learning experiences is of particular importance to these adult learners, in view of the unique characteristics they possess and the fact that career advancement or even sustainment may rest on their ability to successfully navigate professional development.

Professionals in the field of education provide a prime example of the high stakes associated with meeting stringent professional development standards. Since the inception of the era of educational reform and accountability in the U.S., beginning during the 1950s as a Cold War race to maintain a competitive edge in the world scene, and evolving to current No Child

Left Behind (NCLB) legislation, educators have been under ever-mounting pressure to increase student achievement and learning gains.

As a result, a number of national organizations have developed standards and guidelines concerning professional development among teachers. Some organizations, like the U.S. Department of Education and the National Staff Development Council, deal with the teaching profession in general. Other organizations are content-specific, such as the National Research Center on English Learning and Achievement, the Learning First Alliance, and the National Council of Teachers of English, all of which offer standards for teachers of English language arts (Grant, Young, & Montbriand, 2001; NCTE, n.d.).

Additionally, each state's department of education sets and maintains standards governing teacher certification and professional development (FLDOE, n.d.). The Florida Online Reading Professional Development Program (FOR-PD) exists to aid Florida educators in maintaining such certification standards (FOR-PD, n.d.-c). It is used by teachers and administrators of all grade levels both in order to obtain certification to teach reading as a subject, and in order to learn about scientifically-based reading research that will help them reinforce effective reading habits among students in their own various content areas.

Availing themselves of such opportunities has become particularly important for Florida educators, as they are certainly representative of U.S. teachers experiencing the pressures associated with the gaps identified by the accountability movement. According to the 2007 National Assessment of Educational Progress (NAEP) report, 69% of 8th graders tested in the United States earned basic or below basic reading scores, indicating that they lacked even "partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at

each grade" (NAEP, 2007a; NAEP, 2007b). Twelfth grade students showed similar problems. The percentage of students testing at a basic level of reading achievement showed a 7% decline between 1992 and 2005, while those testing at a proficient level of reading achievement showed a 15% decline during the same time period. In essence, a sobering 65% of U.S. students preparing to graduate from high school are unable to read at a level that the U.S. Department of Education deems proficient (NAEP, 2005).

Likewise in Florida, in 2009, almost 30% of elementary school students failed to pass the Florida Comprehensive Assessment Test (FCAT) reading examination, while nearly 65% of 10th graders failed the FCAT reading test (FLDOE, 2009). And while some age groups have improved steadily in the last eight years since the FCAT's inception, 10th graders have barely maintained a 37% pass rate. This places an increasingly heavy burden on all Florida teachers to be teachers of reading, particularly in light of the high-stakes nature of the FCAT results – passing all parts of the FCAT, including the reading test, is a high school graduation requirement.

It is with these historical footnotes that the current study examines the unique needs and motivations of learners within the Florida Online Reading Professional Development Program. Not only does this student population share the special characteristics of all adult learners, they face ongoing pressure to improve and transform their professional development learning experiences into quantifiable results in their classrooms. It is little wonder that likewise, organizations like FOR-PD are constantly seeking feedback from students and other evaluators on the quality of the instruction they offer. The more they are able to optimize the learning

experience, the more likely they will retain their charter as a state-approved center for reading professional development.

To that end, organizations like FOR-PD are proactive in seeking learner feedback in the form of student satisfaction surveys. In online education experiences with adult learners, like those at FOR-PD, student satisfaction is defined by the following characteristics: (a) "immediacy in interaction" (Wise et al., 2004, p. 248); (b) inclusion within social community (DeShields et al., 2005); (c) "convenience and flexibility" of instruction (Johnston et al., 2005, p. 4); (d) "contact and interaction with instructor," including high quality feedback (Johnston et al., 2005, p. 4); (e) applicability of learning experience to solving real world problems (Bolton, 2006); and (f) ease of use of the online course technology (Summers et al., 2005).

These characteristics were chosen, in part, due to the difficulty of finding a single, all-inclusive definition of student satisfaction. Although there are numerous studies exploring student satisfaction, the definition of the term is frequently assumed to be common knowledge. The literature cited in the previous paragraph touched on aspects of student satisfaction that helped to define it precisely for the purposes of the current study. It may be noted that many of these characteristics relate to previous discussions of the characteristics of teaching presence and andragogy. For example, (a) "immediacy in interaction" (Wise et al., 2004, p. 248), (c) "convenience and flexibility" of instruction (Johnston et al., 2005, p. 4), and (e) applicability of learning experience to solving real world problems (Bolton, 2006) are reflective of certain needs particular to adult learners, as addressed by andragogy.

It is therefore not difficult to see how good, general learning principles like those proposed by Bransford et al. (2000), and the more specific principles proposed by other authors

mentioned previously (Chickering & Gamson, 1987; Garrison et al., 2000; Gibbons & Wentworth, 2001; Graham et al., 2001; Knowles, 1980; Knowles et al., 2006), connect with student satisfaction. Even without using the lens of the Community of Inquiry and its teaching presence component, researchers of student satisfaction have honed in on a number of the very characteristics that are foundational to teaching presence. The conjunction of teaching presence and student satisfaction is indicated in Figure 8.

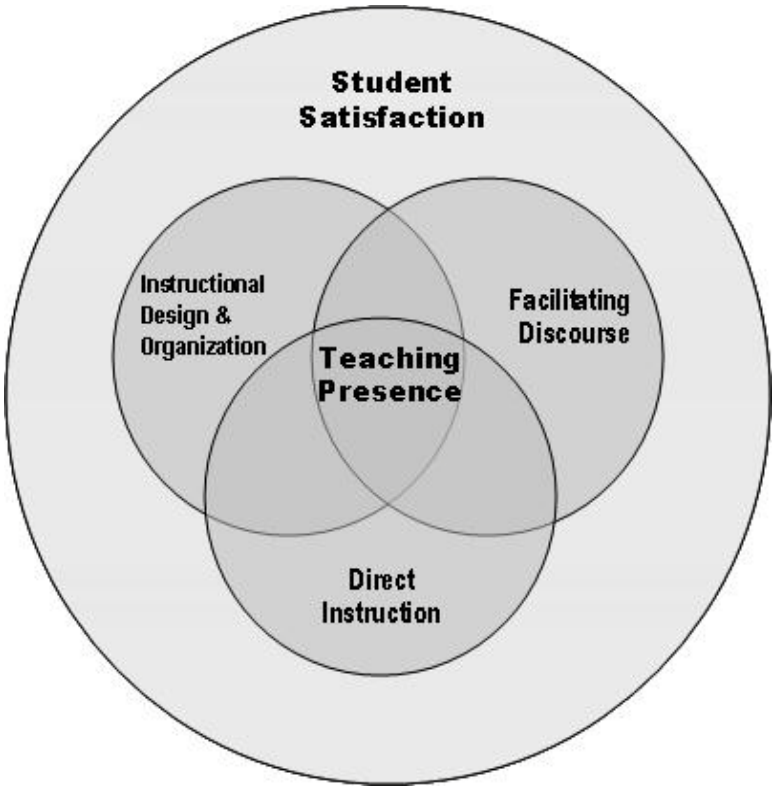

Figure 8. Student satisfaction and teaching presence.

As these do interconnect so intuitively, it is also not surprising that teaching presence and student satisfaction tend to be measured the same way – by student report. While knowledge of effective online teaching practices is increasingly available to organizations offering online

education, evaluation instruments designed to directly measure online teachers' use of these behaviors are not. Instead, instruments that examine students' learning gains and reactions to online coursework are used to make inferences about the effectiveness of the online instructor (Berge & Myers, 2001; Coppola et al., 2004).

One disadvantage of this approach is the rather shallow nature of the data obtained. If one considers Kirkpatrick's four levels of evaluation, level one is reaction (e.g., data obtained from student satisfaction surveys), level two is learning (e.g., evaluation of students' grades, pre- and post-tests to determine learning gains, or rubrics for qualitative analysis of student course work and interactions), level three is behavior (e.g., observation of students' application of what they have learned to real life settings, outside of the course), and level four is results (e.g., measuring ways the students' learning gains have generated results at an organizational level) (Berge & Myers, 2001). Higher level applications of learning are more difficult and expensive to evaluate, so most online courses assess teaching effectiveness at levels one and two, gauging students' reactions and measuring their learning gains (Berge & Myers, 2001).

While learning gains may be a valid measure of a teacher's effectiveness, student reactions may not. Shelvin, Banyard, Davies, and Griffiths (2000) studied the use of student satisfaction surveys to evaluate university professors' teaching effectiveness. They found that the charisma of the instructor, as rated by students, accounted for a greater variance in student satisfaction than did the instructors' perceived teaching abilities or course design. In other words, the positive or negative student perceptions of instructors' personalities outweighed their perceptions of instructors' teaching abilities. Yet the results of such end-of-course student

satisfaction surveys are routinely used as measures of online and face-to-face instructors' teaching effectiveness (Shelvin et al., 2000).

The TPS, like many other evaluation tools of its kind, is designed to gather data by gauging students' perceptions at the end of an online course. Although this instrument is also limited by its reliance on student report, it is the only existing measure of teaching presence, a theoretical model potentially capable of generating much information on online teaching phenomena (Anderson et al., 2001; Garrison, 2007; Shae et al., 2003a; Shae et al., 2006; Shae et al., 2003b; Swan, 2004). Its score validity and reliability have been tested in higher education settings with promising results, encouraging its use in those contexts and inviting validation studies in other online learning arenas (Arbaugh & Hwang, 2006; Garrison, 2007; Shae et al., 2003b). It is this theoretical foundation and the validity and reliability results produced so far that make this the teacher effectiveness instrument compelling for further study.

Chapter Summary

This chapter laid the theoretical and empirical foundation for the current study. It began with a description of the conceptual framework used by Shae et al. (2003a) in their research on teaching presence and their creation and validation of the Teaching Presence Scale in online higher education. This conceptual framework helped to define and examine successful learning experiences from the general to the specific, beginning with a model by Bransford et al. (2000) which showed characteristics of good, general learning experiences. This was followed by a model by Chickering and Gamson (1987), which showed characteristics of effective learning experiences in higher education contexts. After that, these characteristics were refocused to

explain what comprises effective learning experiences in online higher education. The Community of Inquiry model by Garrison et al. (2001) was presented, with a focus on its teaching presence component, and it was explained that each of these three models fit together to create theoretical support for research conducted on teaching presence in online higher education settings (Arbaugh & Hwang, 2006; Shae et al., 2003a; Shae et al., 2006; Shae et al., 2003b; Shae et al., 2005).

From there, additional theoretical and empirical research was presented to show how this conceptual framework was expanded to describe the unique components of the current study: teaching presence within a professional development setting, and its possible relationship with student satisfaction.

It was established that many effective teaching principles tend to transcend the medium of delivery, that there are certain teaching behaviors that contribute specifically to the creation of effective online educational experiences, and that such behaviors apply consistently across settings in spite of certain differences between higher education and professional development settings. It was also shown that principles of adult learning theory help to make this so. This is the foundation supporting the use of the Teaching Presence Scale, an instrument designed for use in higher educational online coursework, to measure teaching presence at the Florida Online Reading Professional Development Program.

Finally, measures of student satisfaction were discussed, beginning with a definition of student satisfaction and a discussion of its use as a measure of online course effectiveness. Literature was presented that to show how student satisfaction is quantified, and then the

discussion was brought full-circle to show how teaching presence may relate positively with student satisfaction in online learning experiences.

The next chapter will present the details of how the current study of teaching presence and student satisfaction was conducted within the FOR-PD online learning environment.

CHAPTER 3: METHOD

This chapter details the methods used to test hypotheses and answer research questions posited for this study. This begins with a restatement of the purpose and problem of the study, as well as the research questions and hypotheses. These are followed by descriptions of the research design, study setting, and participants. Data collection is then discussed, including details on the instrument and procedures used in the study. Finally, mention is made of the institutional review board approval granted for the study, along with the planned methods of data analysis and a brief statement regarding the intellectual property rights of parties involved in various parts of the study.

Purpose Statement

The purpose of this study is threefold: first, to validate the use of the Teaching Presence Scale (TPS) in an online educational setting outside of the higher education context in which it was designed and tested; second, to confirm the factor composition of teaching presence among facilitators in an online professional development course; and third, to determine the extent and direction of the relationship, if any, between teaching presence and student satisfaction.

Problem Statement

In many online education programs, student satisfaction is a primary course effectiveness evaluation tool (Berge & Myers, 2001; Coppola et al., 2004). While it may be important to gauge student reactions as one measure of online teaching effectiveness, using this subjective tool as a primary basis for evaluation and decision making may be both inaccurate and unjust. Instead, a

more objective set of criteria are needed for evaluating the effectiveness of online courses and their instructors. These criteria do exist, and have been compiled into a survey instrument.

This instrument needs to be validated to determine whether its measurement items adequately represent the three-factor construct of teaching presence as intended. Moreover, the factor structure of teaching presence needs to be confirmed in a setting outside of higher education, the only arena in which it has currently been tested. The confirmatory factor analysis proposed for the current study will allow for a test of the fit of the existing model using data gathered from a new setting, professional development. Finally, the data gathered by the instrument need to be correlated with traditional measures of student satisfaction to compare the instrument's capabilities with those of typical student report measures, and to determine whether teaching presence relates positively to learners' online experiences in a professional development setting.

Research Questions and Hypotheses

The research questions and hypotheses examined in this study include the following:

1) Does the Teaching Presence Scale measure the teaching presence construct as intended in a professional development setting?

   H_1: The Teaching Presence Scale does measure the teaching presence construct as intended in a professional development setting.

2) Does the factor structure of "teaching presence" for teachers completing an online professional development program fit the original three-factor model of teaching presence proposed for use in higher education?

H_2: There are three distinct factors inherent within teaching presence, including instructional design and organization, facilitating discourse, and direct instruction.

H_3: TPS items 1-6 will load on the instructional design and organization factor.

H_4: TPS items 7-18 will load on the facilitating discourse factor.

H_5: TPS items 19-28 will load on the direct instruction factor.

3) Is there a correlation between teaching presence, as measured by the Teaching Presence Scale, and student satisfaction?

   H_6: There is a correlation between teaching presence, as measured by the Teaching Presence Scale, and student satisfaction.

Research Design

The research design employed to answer the proposed research questions is correlational. The Teaching Presence Scale designed by Shae et al. (2003a) was intended to measure the three latent constructs of teaching presence: instructional design and organization, facilitating discourse, and direct instruction. The survey items Shae et al. (2003a) wrote represented observable variables to be used in measuring these latent, or unobservable, constructs. Confirmatory Factor Analysis (CFA) is a statistical procedure that allows researchers to test whether the observable variables (survey items or questions) are, in fact, valid measures of the latent, unobservable constructs comprising teaching presence in a manner expected (Suhr, 2004). CFA will provide evidence of the factor structure of these latent constructs, and will also provide evidence of the fit of the TPS items to the constructs they are intended to measure.

Study Setting and Participants

FOR-PD is a nationally recognized reading professional development project designed to help pre- and in-service teachers in the K through 12th grade educational arena improve their knowledge and understanding of scientifically-based reading research and instructional practices (FOR-PD, n.d.-b). In existence since 2002, FOR-PD has educated over 31,000 teachers, administrators, and future educators. In 2006-2007, more than 324 sections of the FOR-PD course were facilitated by 115 specially trained instructors.

FOR-PD offers a unique setting for researching teaching presence. It crosses two educational contexts, professional development and K-12 education. Its participating students are either certified, practicing, K-12 teachers who are engaging in professional development in order to be more effective teachers of reading, or university or community college students taking the course as part of a teacher certification program. FOR-PD instructors (also known as facilitators) are also experienced K-12 teachers who have proven track records as literacy leaders in the classroom. During the FOR-PD hiring process, they are carefully screened and deemed competent to lead the professional development of their peers. They are then given further training to promote their effectiveness as online instructors (FOR-PD, n.d.-a).

FOR-PD offers its online course in open enrollment, district, community college, and university sections. Because the goal of the current research is to test the use of the TPS in a professional development setting removed from higher education, it was decided to limit the study to open enrollment and district course sections. Both of these are presented by facilitators who are veteran in-service K-12 teachers, and are attended by participants who are also in-service K-12 teachers. Participation in district sections is coordinated through individual Florida

school districts, with each section created specifically for and limited to teachers from a given district (FOR-PD, n.d.-c)

Open enrollment sections are sections of the course that do not limit enrollment to teachers from a specific school district. Participants in open enrollment sections may not have the existing connections to their FOR-PD section classmates that are seen in district sections, but they are in-service teachers with similar purposes in taking the FOR-PD course (FOR-PD, n.d.-c).

Additionally, this study only included participants who were enrolled in and completed the FOR-PD course during the spring of 2009. It is assumed that non-completers have chosen to leave the course for a variety of reasons, the full range of which is unknown to the researcher. As non-completers of a course do not have the same course experience (at least in terms of duration and completeness, and possibly in terms of other affective factors as well), they were eliminated from the study in the interest of working with the most homogeneous sample as possible.

As was established previously, teaching presence has not yet been studied outside of higher education online settings, in spite of the increasing prevalence and importance of online education in a number of different contexts outside of higher education (McMurray, 2007; Strother, 2002; Thompson, 2006). Testing the use of the Teaching Presence Scale at FOR-PD could offer fresh insight not only into teaching presence phenomena in general, but into the roles and teaching presence characteristics of participants in a K-12 professional development context in particular.

Data Collection Instrument

The Teaching Presence Scale consists of 28 items, grouped by the three teaching presence factors and their subcategories. The response scale used throughout the TPS is a five point Likert scale: strongly agree, agree, neutral, disagree, and strongly disagree. The instructional design and organization factor includes six items; two addressing the "setting the curriculum" subcategory, and one apiece for the "designing methods" "establishing time parameters," "using the medium effectively," and "establishing netiquette" subcategories (Shae et al., 2003b, pp. 69-70). For example, one question from the "setting the curriculum" subcategory devised by Shae et al. (2003b, p. 69) is, "Overall, the instructor for this course clearly communicated important course outcomes (for example, provided documentation on course goals)." The "establishing netiquette" subcategory of this factor is represented by, "Overall, the instructor for this course helped student to understand and practice the kinds of behaviors acceptable in online learning environments (for example provided documentation on "netiquette" i.e. polite forms of online interaction)" (Shae et al., 2003b, p. 70).

The facilitating discourse factor includes 12 items; two apiece for each of the six subcategories ("identifying areas of agreement and disagreement; seeking to reach consensus and understanding; encouraging, acknowledging, and reinforcing student contributions; setting the climate for learning; drawing in participants and prompting discussion; [and] assessing the efficacy of the process") (Shae et al., 2003b, p. 70). For example, a question from the first of these subcategories, "identifying areas of agreement and disagreement," is worded, "Overall, **the instructor** for this course was helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn". The same question is then asked with a slight

modification, “Overall, **other participants** for this course were helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn” (Shae et al., 2003b, p. 70).

The direct instruction factor is represented by 10 items; again, two apiece for each of the five subcategories (“presenting content and questions, focusing the discussion on specific issues, summarizing discussion, confirming understanding, diagnosing misperceptions, injecting knowledge from diverse sources, [and] responding to technical concerns”) (Shae et al., 2003b, p. 71). For example, the first question that measures “confirming understanding” is, “Overall, **the instructor** for this course provided explanatory feedback that assisted me to learn (for example responded helpfully to discussion comments or course assignments)”. This is followed by, “Overall, **other participants** for this course provided explanatory feedback that assisted me to learn (for example responded helpfully to discussion comments or course assignments)” (Shae et al., 2003b, p. 72).

As shown above, each subcategory in facilitating discourse and direct instruction factors contains two items because of the authors’ goal of determining whether teaching presence takes place and is measurable not only between instructors and students, but also among the students themselves (Shae et al., 2003b). In these cases, the two items are worded identically, except that one asks the respondent to evaluate the teaching presence behavior of the instructor, and the other asks the respondent to evaluate the same teaching presence behavior among other course participants.

Development and Validation of the Teaching Presence Scale

The TPS was developed and piloted in 2002 at the State University of New York Learning Network (SLN) (Shae et al., 2003a). Each item on the survey had its basis in the teaching presence indicators identified by Anderson et al. (2001), and was in fact developed in consultation with Terry Anderson, one of the original teaching presence theorists (Shae et al., 2005). The pilot study was conducted on SLN students from the summer 2002 semester. Although all students attending the SLN's online courses that semester were invited to participate, 1150 or 15% of the enrollment population responded. The TPS was administered in conjunction with a student satisfaction survey, and correlations were run to determine relationships between teaching presence and student satisfaction with the SLN online learning experience.

It was found that respondents who reported high levels of instructional design and organization (the first of the three teaching presence factors) also reported high levels of satisfaction (r = .64) and learning (r = .59). The same results held true for the relationship between facilitating discourse (the second of the three teaching presence factors) and reported satisfaction (r = .64) and learning (r = .59). Additionally, respondents who perceived high levels of direct instruction (the third teaching presence factor) in their SLN experience also indicated high levels of satisfaction (r = .64) and reported learning (r = .61). The results of the study were used to inform training programs for the SLN faculty, so that instructors might be taught greater awareness of positive teaching presence behaviors, leading to enhanced confidence and effectiveness in the solely online courses that they taught (Shae et al., 2003a). No measures of the reliability or validity of the results of the TPS are provided for this pilot study.

The TPS was administered again in conjunction with a student satisfaction survey at the SLN in the spring 2003 semester (Shae et al., 2003b). This time 6088 students or 31% of the total enrollment population responded to the survey. Instructional design and organization again correlated positively with student satisfaction (r = .64) and reported learning (r = .60), as did facilitating discourse (r = .61 for satisfaction and r = .58 for reported learning). Direct instruction also correlated positively, albeit with less magnitude, with student reports of satisfaction (r = .41) and learning (r = .43). These results were again used as support for the SLN online faculty training program's emphasis on development of positive teaching presence behaviors. Again, no measures of the reliability and validity of the instrument's results were provided.

Shae et al. (2005) administered the TPS again in the summer of 2004 to a random sample (20%) of the enrolled online student population at the SLN. Of this sample, 93% responded (n = 2314). The TPS was combined with the Classroom Community Scale, an existing instrument designed to measure levels of connectedness and learning, in order to determine the extent to which teaching presence might contribute to the development of "community" in the SLN online courses (Shae et al., 2005). In this study, exploratory factor analysis (EFA) was conducted on the TPS items, and multiple regression was performed to evaluate the relationships between the teaching presence factors, measures of classroom community (e.g., connectedness and learning), and student demographics.

The EFA procedure consisted of maximum likelihood factor analysis with direct oblique rotation. A scree plot and the Kaiser-Gutman rule were used to determine the number of factors to be extracted. These both supported the interpretability of two factors, with eigenvalues for both exceeding 1.00. The researchers re-ran the analysis using two factors and the maximum

likelihood procedure with direct oblique rotation. The two-factor structure was confirmed, with 74.37% of the variability of the teaching presence construct accounted for by the instructional design and organization factor and another factor which combined direct instruction and facilitating discourse. The researchers coined a new term for this second factor, "directed facilitation" (Shae et al., 2005, p. 66). Reliability was also calculated for the results of this administration of the TPS, yielding a Cronbach's alpha coefficient of .97 for the overall results of the TPS, .94 for the instructional design results, and .97 for the directed facilitation results.

When Shae et al. (2005) went on to conduct the multiple regression analysis, it yielded statistically significant results, $F (21, 2288) = 183.13$, $p < .01$. These results indicated that 63% of the total variance of learning community could be accounted for by the revised (two-factor) teaching presence construct and one particular demographic characteristic, gender. As with the two previous SLN studies, these results were obtained to inform researchers and SUNY administrators about the needs and perceptions of their students, and about how best to train and support faculty to meet those needs. However, in this study the researchers also expanded their focus to include closer examination of the structure of the teaching presence model.

Shae et al. (2006) repeated this study in the fall of 2004, on a random sample of 2253 undergraduate students enrolled in the SLN, of which 47% responded ($n = 1067$). The three original factors of the teaching presence construct were again examined, using a principal component method with direct oblique rotation to determine factor structure. As with the 2005 study, two factors, instructional design and organization and "directed facilitation" were extracted (Shae et al., 2006, p. 181). It was determined that these factors accounted for 78.18% of the variability of the teaching presence construct. Reliability analysis for this study's results

yielded Cronbach's alpha measures of .98 for the TPS, .97 for the instructional design and organization items, and .93 for the directed facilitation items.

Arbaugh and Hwang (2006) also tested the TPS in the spring and summer semesters of 2004, this time in online courses from an MBA program at a university in the Midwestern United States. They invited the combined population of 330 students from both semesters to participate in the study and achieved a 57.6% response rate (n = 190). The primary purpose of this study was to evaluate the use of the TPS in this higher education (graduate school) setting, so unlike the SLN studies, no other measures or instruments were combined with those of the TPS. The researchers began with an analysis of internal reliability of the TPS's results. Cronbach's alpha coefficients were .90 for the instructional design and organization items, .94 for facilitating discourse items, and .89 for direct instruction items.

In this study, Arbaugh and Hwang (2006) opted to use confirmatory factor analysis (CFA) instead of EFA, for its ability to test the fit of the results with the theoretical three-factor model. The CFA was used "to test for significance of item loadings on each respective factor, relationships among the factors, and fit of hypothesized factor model to the data" (Arbaugh & Hwang, 2006, p. 15). The authors went on to justify their choice of CFA over EFA, "We used confirmatory factor analysis since it is better suited for theory testing than exploratory factor analysis in part because the researcher can specify the number of factors in the model *a priori* based on the theory of three components within teaching presence to date (Stevens, 2002), in addition to testing the significance of each item loading on its posited factor" (2006, p. 15).

While four of the TPS's items were removed because they fit poorly, the results did support the original three-factor model. Fit indices were considered good (GFI = 0.91; AGFI =

0.86; NFI = 0.98; X^2 (91 *df*) = 161.31; RMR = 0.04). The instructional design and organization factor had six items load on it with statistical significance, at $t > 1.96$. The facilitating discourse factor started with eight items, three of which were dropped due to poor fit. This left five items with statistically significant factor loadings ranging from .95 to .98. The direct instruction factor began with six items, one of which was dropped due to poor fit. The remaining five items loaded with factor loadings ranging from .23 to .91.

There were statistically significant phi relationships among these three factors. Instructional design and organization was positively related with facilitating discourse with a phi of .73. Instructional design and organization was also positively related with direct instruction with a phi of .69, and facilitating discourse was positively related with direct instruction with a phi value of .78 (Arbaugh & Hwang, 2006). In summary, Arbaugh and Hwang (2006) did find support for the original three-factor model proposed by Anderson et al. (2001).

As was shown in this section, the validation of the TPS has taken place in several iterations, over time, in different settings, and with several different measures of validity and reliability. Its items were developed by Shae et al. (2003a) in conference with one of the framers of the teaching presence model, and administered two different times via the SUNY Learning Network's online undergraduate courseware system without statistical tests of reliability or validity (Shae et al., 2003a; Shae et al., 2003b). It was then administered twice more at the same institution, with exploratory factor analysis and Cronbach's alpha tests conducted to evaluate the teaching presence factor structure and the internal consistency of the TPS's results, respectively (Shae et al., 2006; Shae et al., 2005). The EFAs indicated a two-factor structure for teaching presence, rather than the three originally proposed. Arbaugh and Hwang's (2006) administration

of the TPS to graduate business students and subsequent confirmatory factor analysis, on the other hand, did give evidence to support the original three-factor model.

In the current study, the TPS was administered to a new population of students, this time in a professional development setting outside of higher education. A CFA was again conducted to determine whether the original, three-factor model is supported in this different educational context. These items were also transformed into a composite variables (one variable per factor), whose scores were then used to run a correlation with composite variables from the FOR-PD student satisfaction items.

The Instrument Used in the Current Study: TPS Items

The 28 original TPS items were all included in the present study (see Appendix B). As discussed previously, the instructional design and organization factor includes six items, the facilitating discourse factor includes 12 items, and the direct instruction factor is represented by 10 items. Each item employs a five point Likert scale including “Strongly Disagree,” “Disagree,” “Neutral,” “Agree,” and “Strongly Agree”. Evidence of score reliability and validity from past empirical research were presented previously. For this study, score validity was established using confirmatory factor analysis, and score reliability was determined by calculating a Cronbach’s alpha coefficient.

The Instrument Used in the Current Study: Student Satisfaction Items

Following the 28 TPS items, 24 items were included from an existing FOR-PD end-of-course survey whose purpose is to measure students’ satisfaction with the course experience. The

first five of these (items 29 through 33) asked for basic information about the participant's experience (i.e., whether they completed the course, whether they had enrolled via their school district or open enrollment, why they enrolled in FOR-PD, whether it was their first attempt at FOR-PD, and what they thought of the pace of the course).

Questions 34 through 40 asked participants to rate the course on dimensions such as the content's ability to help meet their classroom needs and increase their knowledge of scientifically-based reading research, the ease of navigation through the course, appropriateness of the length of assignments and of the course itself, the helpfulness of course content tools in facilitating classroom implementation of reading strategies, and the amount of comfort respondents gained in using the reading strategies taught throughout the course. These were all measured using a five point Likert scale similar to that used with the TPS items ("Strongly Disagree," "Disagree," "Neutral," "Agree," and "Strongly Agree"). The validity of the scores produced by these items was measured via exploratory factor analysis, and the reliability of the scores was measured using a Cronbach's alpha coefficient. Based on the results of the exploratory factor analysis, items loading strongly together were combined into composite scores. The composite scores were computed by summing the responses and then dividing the total by the number of items. The composite scores were then used to run a correlation with composite variables from the TPS items.

Questions 41 through 50 asked respondents to rate their FOR-PD facilitator along dimensions such as feedback provided, interest in participants' learning, assessment of participants' progress, expression of expectations for performance, availability to assist students, promptness of responses in online discussions, promptness of responses via email or course mail,

respect and concern for students, facilitation of learning, and overall assessment of facilitator's effectiveness. These items used a four point scale ("Poor," "Fair," "Good," and "Excellent"). The validity of the scores produced by these items was measured via exploratory factor analysis, and the reliability of the scores was measured using a Cronbach's alpha coefficient. Based on the results of the exploratory factor analysis, items loading strongly together were combined into composite scores. The composite scores were computed by summing the responses and then dividing the total by the number of items. The composite scores were then used to run a correlation with composite variables from the TPS items

Questions 51 and 52 were also designed to evaluate the facilitator, asking participants to rate the frequency of their facilitator's participation in online discussions and the quality of that participation. The first of these two items used a five point scale ("Not at all," "Little," "Moderate," "Frequent," and "N/A"), while the second used a four point scale ("Needs improvement," "Satisfactory," "Above satisfactory," and "N/A").

The Instrument Used in the Current Study: Demographic Items

The original TPS included 11 demographic questions at the beginning of the survey, just prior to the 28 TPS items used in the current study. In the instrument compiled for use in this dissertation, similar demographic items were included, but were moved to the end of the survey. The original demographic items used in the SLN studies were also adjusted to reflect the different research setting at FOR-PD. In addition, they were modified to eliminate those items that were inappropriate for use with the current study's respondents.

For example, of the original 11 demographic questions included in the TPS as previously studied at the SLN, one question about participants' SUNY college affiliation was eliminated. Another question about participants' academic level (e.g., Freshman, Sophomore, Junior, etc.) was modified from the TPS to instead ask FOR-PD participants their level(s) of education completed. The wording for this question was derived from the Teacher Questionnaire, Schools and Staffing Survey 2007-2008 School Year published by the National Center for Educational Statistics (NCES, n.d.). As the FOR-PD participants were all certified, practicing educators with a minimum of a bachelor's degree, this change more appropriately reflected the respondents' academic status.

Likewise, an original TPS demographic question about students' university registration status (full-time vs. part-time) was changed to instead ascertain FOR-PD respondents' areas of teaching certification. The possible answer choices were taken from the Florida Department of Education website's teacher certification information (FLDOE, n.d.). Along these lines, a TPS question regarding SUNY participants' employment status (full-time, part-time, not employed) was changed to suit FOR-PD participants' status as in-service school district employees (the question asks participants to classify their current position at their school, with answer choices including things like "Regular full-time teacher," "Administrator," and "Library media specialist or Librarian"). The wording for this question is also derived from the Teacher Questionnaire, Schools and Staffing Survey 2007-2008 School Year published by the National Center for Educational Statistics (n.d.). Similarly, an item was added asking at what school level the participant taught, and included answers such as "Public Elementary School (K-2)," 'Public High School (9-12)," "Public Charter School," "Private School," and others. This question was taken

from the FOR-PD end-of-course survey, as was an item asking whether the participant obtained their degree from a college of education or another route.

Another TPS demographic question addressing whether the course was taken in a completely online format or a mixed-mode (classroom and web-based combined) format was eliminated, as all FOR-PD participants complete their professional development solely online. Instead, an item from the FOR-PD end-of-course survey was used asking respondents to describe their level of experience with online courses (whether FOR-PD was the first, second, third, fourth, or fifth online course they had taken). Similarly, an SLN question asking SUNY participants to state their main reason for taking courses online was dropped, as FOR-PD participants are unable to take this professional development course any other way. Instead, an item from the FOR-PD end-of-course survey was used asking respondents whether, based on the experience they had in the FOR-PD course, they would consider taking other online courses in the future ("Yes, as many as possible," "Yes, some additional courses," "Not sure," "Only if absolutely necessary," or "No"). Other questions included in the demographics section asked participants' gender, race (NCES, n.d.), age, and years of experience in K-12 education.

In all, three of the original demographic questions were eliminated entirely, while others were added and/or modified to be appropriate to the research setting. A total of 11 demographics questions were asked at the end of the present study's administration of the TPS. As previously mentioned, the 28 questions relating to teaching presence were left unchanged from their original wording and format, and in addition to these, 24 questions were added to the instrument from an existing FOR-PD end-of-course survey in order to measure student satisfaction. The entire

instrument (TPS questions, FOR-PD student satisfaction questions, and demographics questions) may be seen in Appendix B.

Data Collection Procedures

As previously stated, factor analyses of the Teaching Presence Scale have been conducted in the State University of New York Learning Network (Shae, 2006; Shae et al., 2003a; Shae et al., 2006; Shae et al., 2003b; Shae et al., 2005). The most successful response rate the researchers obtained occurred when they randomly selected 20% of the total students enrolled in the SLN during a given semester and offered them the opportunity to take the TPS online when they logged into their course. This yielded a 93% response rate (n=2181), a substantial improvement over previous administrations at SLN which yielded 15%, 31% and 47% respectively (Shae, 2006; Shae et al., 2003a; Shae et al., 2003b). The authors attributed the increase in response rate to the survey being presented directly through the respondents' online courses, instead of administered online but outside of the course. This successful response rate also appears to have been aided by emailed response requests from program administrators and encouragement from respondents' online professors (Shae et al., 2005).

The SLN total student population during the survey administration that obtained the 93% response rate was nearly 12,000. In contrast, it was determined that FOR-PD would have a total student population, in their open enrollment and district sections, of approximately 1061 (V. Zygouris-Coe, personal communication, February 20, 2009). It had also been noted that typical end-of-course survey responses at FOR-PD yield an average response rate of about 50% (B. Swan, personal communication, September 9, 2008). Indeed, this response rate exceeds the

average of 20% mentioned one study on Web surveys and the average of about 36% referenced in another review of literature (Andrews, Nonnecke, & Preece, 2003; Shinn, Baker, & Briers, 2007). Between the relatively small initial pool of respondents (*n*=1061) and the possibility of low response rates, there was potential for the number of responses in the current survey to be a concern. Given this, the entire population of spring 2009 district and open enrollment participants was surveyed.

There are different perspectives on the required sample size for CFA. Anderson and Gerbing (1984) suggest that the minimum sample size needed for CFA is 200. Gagne and Hancock (2006) suggest estimating CFA sample size based on design characteristics including number of indicators per factor and factor loading. Using Monte Carlo estimation, they found that the more items loading per factor and the higher the factor loadings, the better model convergence. The three factors in TPS have six, twelve, and ten items loading on the latent constructs. Applying Gagne and Hancock's criteria to the proposed analysis of the TPS, with a minimum of six items per factor on the TPS and a conservative estimate of factor loading of .2, the recommended sample size for satisfactory convergence was 1,000. If the factor loadings are slightly more liberal at .4, the required sample size is reduced to 100.

If the initial pool of participants in FOR-PD was approximately 1061 and an expected response rate was determined to be a conservative 30%, it was noted that the result would be a sufficient response of 328.

Improving Response Rate and Time

There was a need in the current study to maximize the rate and time of response to the Web-based survey. As was discussed above, the FOR-PD sections chosen for study provided a relatively small population of potential respondents. In order to avoid overburdening these learners with survey requests during their coursework, FOR-PD administrators requested that the TPS survey be given during the very last week of the course. The TPS was therefore administered via a link in messages sent by the FOR-PD principle investigator to respondents' school district email addresses on May 18, 2009, with a reminder sent on May 26, 2009. The respondents' work email addresses were used, as it is these that learners provide to FOR-PD upon registration in the course.

Response time was important as the survey was administered at the very end of the FOR-PD course, possibly impacting the motivation of participants to respond. Because of the need to maximize both response rates and response time, effort was focused on reviewing research discussing best practices for conducting online or Web surveys. Several scholars provide suggestions on the best ways to maximize response rates and times (Andrews et al., 2003; Cobanoglu & Cobanoglu, 2003; Dillman, 2007; Porter, 2004; Van Selm & Jankowski, 2006).

The Tailored Design Method (TDM) for conducting surveys also proposes elements that researchers should include in their survey research in order to achieve high response rates: create a respondent-friendly questionnaire, contact respondents five times (with a pre-notice contact, then the survey itself, then a thank-you contact, then a replacement survey, then a final contact), make it simple for respondents to answer and submit the survey, personalize all correspondence, and offer token, pre-paid compensatory incentives (Dillman, 2007).

The TDM was originally created with mailed, hard copy surveys in mind. The application of its elements in electronic surveys and communication is the subject of further study, as was found in various studies and literature reviews. The results of these will be presented in sections deemed most relevant to the currents study: respondent privacy, token incentives, and repeated contacts.

Respondent Privacy

Van Selm and Jankowski (2006) recommend that survey-related communications be sent with recipients' email addresses blind copied or posted as generic email groups in order to ensure confidentiality. This is certainly applicable to the current study, as FOR-PD administrators have advised the protection of respondent confidentiality during communication, as well as their anonymity when asking them to answer questions about their facilitators' teaching practices (V. Zygouris-Coe, personal communication, September 9, 2008). Anonymity was preserved in the current study by letting respondents login and answer survey questions without identifying themselves.

Token Incentives

Van Selm and Jankowski (2006) found it unclear whether incentives (whether lottery-type prizes awarded to a few respondents or small amounts of monetary compensation provided to all) for completing Web surveys are effective. Porter (2004) stated that token incentives sent to respondents with the survey did positively influence response rates, while those offered at the completion of the survey did not.

Cobanoglu and Cobanoglu (2003) found evidence that a combination of incentives (e.g. a token incentive given to each potential respondent and a large incentive given in a prize drawing to a small number of respondents) produced response rates greater than a token incentive alone, a large, lottery-style incentive alone, or no incentives at all. Both the token incentives given to each potential respondent and the lack of any incentives produced response rates greater than did the large incentive awarded by drawing.

As it was not financially feasible to provide a token incentive to the anticipated 1061 FOR-PD population members, and as research indicates the ineffectiveness of offering fewer, larger incentives by drawing, the decision was made to forgo incentives as a means of improving response rate.

Repeated Contacts

Van Selm and Jankowski (2006) found that repeated email contacts with recipients, sent a few days apart, could improve response rates. Additionally, their research indicated that response time can be increased by sending a notification email before sending the message containing the survey link, supporting Dillman's (2007) recommendation of a pre-notice contact. Andrews, Nonnecke and Preece (2003) agreed. They noted that pre-notice messages offering respondents the possibility of opting in or out of participation brought about higher response rates, as did follow-up reminder emails.

Porter (2004) corroborated this, mentioning the results of one study in which response rates went up to 44% when the email message with the survey link was preceded by a pre-notice email inviting participation. This rate went up again to 67% when non-respondents were sent a

follow-up email reminding them to participate, and to nearly 72% when non-respondents were sent a final email establishing a deadline for participation (Porter, 2004).

Because of time constraints and the FOR-PD organization's request to avoid over-saturating respondents with too many survey requests, it was decided to forgo the pre-notice email. It was anticipated that instead, the response rate would be aided by the direct request for participation coming from the FOR-PD principle investigator, a program leader known to the respondents, as was the case in the study performed by Shae et al. (2005). There was, however, one follow-up email reminding learners to respond to the survey.

Survey Implementation Procedures and Timeline of Interactions

Shae et al. (2005) found it helpful to provide respondents access to the TPS via their online course Web pages. There were certain logistical limitations surrounding the administration of the TPS at FOR-PD, however, which were not part of the survey processes at the SUNY Learning Network. First, permission to alter the FOR-PD course interface to include a direct login to the survey could not be obtained due to staffing limitations and the need to keep all course content consistent across course sections. Instead, it was agreed that the principle investigator of the FOR-PD project would send scripted initial and reminder email messages to participants' work email address accounts inviting them to complete the survey by following an external link to the TPS where it was hosted in Zoomerang, a Web survey system made available for this study via a FOR-PD-owned license. The FOR-PD organization provided the text for the email messages, deriving it from emails sent out during previous administrations of FOR-PD end-of-course surveys.

For reasons stated above, there were two email interactions with participants. The first was sent on Monday, May 18, 2009. Its primary purpose was to notify them of the intent of the study and invite participation in the survey. The second and final email was sent a week later on Tuesday, May 26, 2009. Copies of these messages may be seen in Appendix C.

Institutional Review Board Approval

Permission to conduct this research on adult FOR-PD learners was obtained from the University of Central Florida Institutional Review Board (IRB) as an addendum to the existing agreement governing research conducted at FOR-PD. This was a simple matter of adding the author of the current study as an approved researcher at FOR-PD. The notification of IRB approval is included in Appendix A.

Data Analysis

Research Questions 1 and 2: Confirmatory Factor Analysis

Confirmatory factor analysis was chosen in order to determine the appropriateness of the TPS items for measuring teaching presence in this online professional development setting, and to evaluate the fit of the items to their respective, hypothesized latent constructs. This procedure was also selected for its ability to show how factors break down within the analysis, allowing for comparison with the original three-factor teaching presence model proposed by Anderson et al. (2001), and indicating whether the TPS would be valid for describing and measuring teaching presence within FOR-PD online interactions. Cronbach's alpha coefficient was also chosen to be

used to establish the internal consistency reliability of the items for each identified factor and for the instrument's overall results.

Research Question 3: Correlation

Pearson correlation was selected to gauge the amount and direction of relationship, if any, between teaching presence and student satisfaction. In order to perform the correlation, the items representing each factor within teaching presence were transformed into composite variables and scores, using the summing and averaging technique mentioned previously. Each teaching presence factor produced one composite variable.

Student satisfaction items (satisfaction with the course, items 34-40; and satisfaction with the facilitator, items 41-50) were analyzed using exploratory factor analysis (EFA). Based on the results of the EFA, composite variables were created. Pearson correlation coefficients were generated between the TPS composite scores and the student satisfaction composite scores. Reliability of the TPS items' scores and those of the student satisfaction questions was calculated using Cohen's alpha coefficient.

Intellectual Property

It is hereby acknowledged that the author of this study will make no attempt to publish, present, or otherwise publicly disseminate the results of this research study, or information about any aspect of the FOR-PD project, without first notifying and obtaining approval from FOR-PD investigators. Furthermore, it is acknowledged that the data gathered during the course of this study will be shared openly with FOR-PD for use by its investigators, who agree that they will

notify and obtain approval from the researcher of this current study prior to publishing, presenting, or otherwise publicly disseminating information based on the shared data.

Chapter Summary

This chapter discussed the methodological details of this research study, including the correlational research design used to examine the validity and reliability of the results of the Teaching Presence Scale (TPS) when used with participants in an online professional development course, and to test the fit of the teaching presence factor structure with the original, three-factor model of the construct. The study setting at the Florida Online Reading Professional Development program and its participants were described, as were some of the anticipated challenges of data collection at FOR-PD. A discussion also ensued about empirically-supported means of maximizing response rate and time.

The data collection instrument was described in detail, along with its development and validation history within higher education settings. Data analysis procedures were also discussed. This included a brief explanation of the confirmatory factor analysis method that was used to test the factor structure of the teaching presence construct, and also of the correlation procedure chosen to test for a relationship between teaching presence and student satisfaction. Finally, Institutional Review Board approval and the intellectual property rights, both of the researcher and of individuals affiliated with the online professional development program serving as the research site were briefly highlighted. The following chapters will describe and discuss the data collected at FOR-PD and its subsequent analysis.

CHAPTER 4: ANALYSIS

This chapter contains information on how the data were analyzed, including descriptions of the sample, the hypothesized model, the data screening procedures used, and the results of the analysis for each research question. In addition, results of ancillary analysis are provided as a measure of further exploration into model fit.

Description of Sample

All participants in the Florida Online Reading Professional Development (FOR-PD) program district and open enrollment sections for the spring 2009 semester (N = 1061) were invited by email to take part in the survey.

Missing Data and Exclusion of Cases

Initial Exclusions

Of the original population of 1061 participants, 836 (79%) responded to the instrument as it was presented online via Zoomerang.com. Of these, 4 (<.5%) were excluded because they answered that they had not actually completed the course. As the TPS is designed to capture end-of-course impressions of online course completers, and as the experience of a non-completer may be very different from that of a completer, non-completers were eliminated from the sample to help maximize group homogeneity (Shae et al., 2003a).

Confirmatory Factor Analysis Exclusions

Of the cases remaining (n = 832), listwise deletion was used to exclude 114 additional participants (14%) due to missing data in one or more of the Teaching Presence Scale items used for the confirmatory factor analysis (CFA). This resulted in a sample size of 718.

The listwise deletion method was chosen based on several factors: (a) an assumption of randomness of the missing data, (b) all measured variables effectively serving as dependent variables, and (c) sample size after listwise deletion proving large enough to satisfy sample size criteria for performing CFA.

To satisfy (a), an assumption of randomness of the missing data, the dataset was examined for clear patterns of missing responses. Each variable had missing responses, the percentage of which ranged from .36% to 1.5%. No single variable contained a discernable majority of missing data, which might have otherwise indicated a non-random reason for missing responses (Hair, Black, Babin, Anderson, & Tatham, 2006).

Regarding (b), all measured variables effectively serving as dependent variables: in a CFA, measured variables are treated as dependent variables and latent factors are treated as independent variables (Tabachnick & Fidell, 2001). According to Hair et al. (2006, p. 56), "Cases with missing data for dependent variable[s] typically are deleted to avoid any artificial increase in relationships with independent variables". This offered support for the use of listwise deletion, as imputation is an inappropriate choice for dealing with missing data in dependent variables.

Regarding (c), sample size after listwise deletion proving large enough to satisfy sample size criteria for performing CFA: Hair et al. (2006) suggest that one part of deciding how much missing data one can delete is to consider the impact to the planned statistical analysis. According to Tabachnick and Fidell (2001), a sample size is optimal for CFA if there are at least 10 cases per parameters estimated. As this analysis included 59 parameters estimated, the sample size is optimal with at least 590 cases. Listwise deletion of cases with missing responses produced a sample size larger than that (n=718), which was therefore adequate for performing the planned analysis. Syntax to perform a listwise deletion was thus entered into SPSS, eliminating cases with missing responses and yielding a complete dataset (n=718) for use in the CFA. It is upon this dataset that the results of the demographic analysis are based; these details will be discussed further in the section on sample demographics.

Exploratory Factor Analysis Exclusions

After the CFA, a correlation was generated to test for a relationship between student satisfaction and teaching presence scores. This began with exploratory factor analyses (EFA) of the two sets of student satisfaction items representing two different factors (satisfaction with the course and satisfaction with the facilitator). Listwise deletion was used again on the sample of 718 during both EFAs, removing cases with missing data in the two respective groups of student satisfaction items. This yielded sample sizes of 684 for the items measuring satisfaction with the course, and 663 for the items measuring satisfaction with the facilitator.

Correlation Analysis Exclusions

Listwise deletion was used once more during the correlation analysis of teaching presence and student satisfaction scores, to remove all cases that were missing data in the teaching presence items, the satisfaction with course items, or the satisfaction with facilitator items. This yielded a sample size of 649 for the correlation procedure.

Sample Demographics

Respondent demographic information is presented in Table 1. Of the 718 participants in the sample used for the CFA, 151 (22%) were male and 542 (78%) were female. Approximately 67% (n = 460) of respondents were White, followed by 17% (n = 114) Hispanic and 14% (n = 97) Black. Participants' ages were fairly evenly distributed across categories ranging from 22 to 65+ years, but the majority (17%; n = 116) were between 26 and 30 years old.

There was an almost even split between the participants who had obtained their degrees through a college of education (57%; n = 393) and the participants who came into teaching through another route (43%; n = 301). The majority of respondents (43%; n = 298) had between two and five years of experience in K-12 education, and most (86%; n = 597) were regular full-time teachers. Many (31%; n = 213) were public high school teachers, followed closely by public middle school teachers (23%; n = 157). For a majority of respondents, (35%; n = 242), FOR-PD was their first online course experience. This was followed by those for whom it was their fifth online course (27%; n = 187) and those for whom it was their second online course (19%; n = 129). Of the total population (N=718), 83% (n = 571) said that they would consider taking additional online courses in the future.

Pertaining to their FOR-PD course participation, most respondents (82%, *n* = 571) indicated that they enrolled in the course through sections organized by their school districts, rather than via open enrollment. The primary reason most participants (51%, *n* = 356) took the course was that it was a necessary part of obtaining a reading endorsement for their Florida teaching certificate. The majority of participants (87%, *n* = 609) were enrolled in FOR-PD for the first time. However, some participants (13%, *n* = 91) were repeating it after having not completed it during a previous convening.

Table 1. Demographic information of the participants (*N*=718)

	Frequency	Percent	Valid percent
Gender			
Female	542	75.5	78.2
Male	151	21.0	21.8
Missing	25	3.5	
Race			
American Indian or Alaska Native	7	1.0	1.0
Asian or Pacific Islander	8	1.1	1.2
Black, not of Hispanic or Latino origin	97	13.5	14.1
Hispanic or Latino	114	15.9	16.6
White, not of Hispanic or Latino origin	460	64.1	67.1
Missing	32	4.4	
Age			
22-25	75	10.4	10.9
26-30	116	16.2	16.8
31-35	83	11.6	12.0
36-40	95	13.2	13.7
41-45	94	13.1	13.6
46-50	83	11.6	12.0
51-55	69	9.6	10.0
56-60	52	7.2	7.5
61-65	22	3.1	3.2
65+	2	.3	.3
Missing	27	3.8	
How degree was obtained			
College of Education	393	54.7	56.6
Other route	301	41.9	43.4
Missing	24	3.3	
Years of experience in K-12 education			
0-1	93	13.0	13.4
2-5	298	41.5	42.9
6-10	115	16.0	16.5
11-15	75	10.4	10.8
16-20	35	4.9	5.0
21+	79	11.0	11.4
Missing	23	3.2	
Current position			
Regular full-time teacher	597	83.1	86.1
Regular part-time teacher	12	1.7	1.7
Itinerant teacher	7	1.0	1.0
Administrator	24	3.3	3.5
Library media specialist or librarian	10	1.4	1.4
Other professional staff	43	6.0	6.2
Missing	25	3.5	

Table 1. Demographic information of the participants (*N*=718, continued)

	Frequency	Percent	Valid percent
Type of school employed			
Public elementary (K-2)	78	10.9	11.2
Public elementary (3-5)	91	12.7	13.1
Public middle (6-8)	157	21.9	22.6
Public high (9-12)	213	29.7	30.6
Public charter	30	4.2	4.3
Public K-8	20	2.8	2.9
Public K-12	54	7.5	7.8
Private	7	1.0	1.0
Higher education	4	.6	.6
Other	41	5.7	5.9
Missing	23	3.2	
Level of experience with online courses			
First online course	242	33.7	34.9
Second online course	129	18.0	18.6
Third online course	90	12.5	13.0
Fourth online course	46	6.4	6.6
Fifth online course	187	26.0	26.9
Missing	24	3.3	
Type of FOR-PD course enrollment			
School district	571	79.5	81.5
Open enrollment	130	18.1	18.5
Missing	17	2.4	
Reason for enrolling in the FOR-PD course			
Reading Endorsement	356	49.6	50.8
Content Area Reading – Professional	50	7.0	7.1
Development (CAR-PD)	87	12.1	12.4
Alternative Certification Program/District	17	2.4	2.4
Reading Endorsement for Teachers of English	63	8.8	9.0
for Speakers of Other Languages (ESOL)	61	8.5	8.7
Recertification	67	9.3	9.6
My own professional development	17	2.4	
Other			
Missing			
Was this first attempt at FOR-PD course			
Yes	609	84.8	87.0
No	91	12.7	13.0
Missing	18	2.5	

Hypothesized Model

Survey data from the FOR-PD participants served as the basis for a confirmatory factor analysis (CFA) that was conducted using LISREL 8.7. CFA was chosen because of its strength in testing *a priori* hypothetical models (Tabachnick & Fidell, 2001). As the teaching presence construct has three hypothetical components, and as the Teaching Presence Scale was created with specific items designed to measure each of these three components, CFA allows the researcher to test how well the FOR-PD sample covariance matrix fits an estimated population covariance produced by the hypothesized model. The hypothesized model is shown in Figure 9, in which ovals represent latent variables and rectangles represent measured variables. Unidirectional lines with arrows connecting variables indicate hypothesized direct effects, while bidirectional lines between latent variables indicate covariance with no implied direction of effect (Tabachnick & Fidell, 2001).

A three-factor model is hypothesized, including Instructional Design and Organization, Facilitating Discourse, and Direct Instruction as latent factors (Anderson et al., 2001). Teaching Presence Scale Items 1 through 6 are hypothesized to serve as indicators for Instructional Design and Organization. Items 7 through 18 are hypothesized to indicate Facilitating Discourse, and items 19 through 28 are hypothesized to indicate Direct Instruction. The three latent factors are hypothesized to covary with each other.

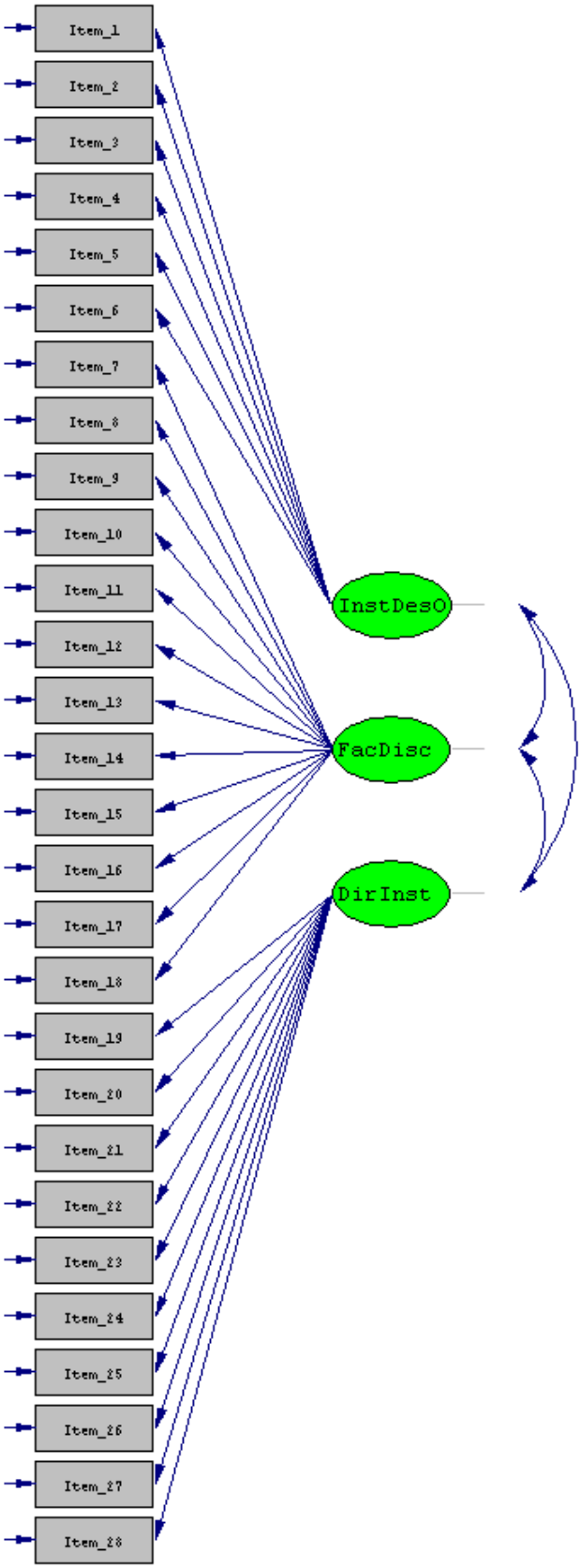

Figure 9. Hypothesized CFA model.

Data Screening

As confirmatory factor analysis tends to be sensitive to the distributional characteristics of the dataset, data (*n*=718) were then screened using univariate tests for normality. Muthen and Kaplan (1985) and Curran, West, and Finch (1996) determined through extensive simulation and analysis that CFA results began to be significantly distorted and the likelihood of Type I error inflated as univariate skewness and kurtosis values approached absolute values of 2 and 7, respectively. Skewness and kurtosis statistics for each Teaching Presence item indicated values approaching these outer bounds. Skewness for items 1 through 28 ranged from -.669 to -2.477, with four items (#1, 2, 3, and 4) slightly exceeding an absolute value of 2. Kurtosis values for items 1 through 28 ranged from .205 to 6.933, with one item (#4) approaching a value of 7. These results were indicative of non-normality, but there is little agreement on what constitutes acceptable levels of non-normality in CFA (Hancock & Mueller, 2006). As skewness and kurtosis levels were largely within parameters specified by Muthen and Kaplan (1985) and Curran et al. (1996), it was decided to proceed without making further modifications to the dataset.

This decision did impact the choice of estimation method to be used within the CFA. Due to several benefits it provides, e.g., "asymptotically unbiased, consistent, and efficient parameter estimates and standard errors (Bollen, 1989)" and that it "allows for a formal statistical test of model fit," maximum likelihood (ML) estimation was chosen (Curran et al., 1996, p. 17). An assumption of normality is crucial with this estimation method, without which its use of the normal theory chi square statistic results in an inflated rate of model rejection and Type I error. This problem can be alleviated by the use of the Satorra-Bentler chi square statistic and other

alternatives instead of the normal theory chi square statistic, so these fit indices were examined in the current analysis in light of the difficulties in clearly establishing normality.

Research Question Results

Research Question 1 and Hypothesis 1

1) Does the Teaching Presence Scale measure the teaching presence construct as intended in a professional development setting?

H_1: The Teaching Presence Scale does measure the teaching presence construct as intended in a professional development setting.

Robust maximum likelihood was the method of estimation used to estimate the model. The independence model that challenges the hypothesis that all variables are uncorrelated was rejected, X^2 (378, N = 718) = 150181.78. The hypothesized model was then tested, and indicators of model fit were examined.

The chi-square goodness-of-fit index was statistically significant and therefore indicative of a poorly-fitting model, X^2 (347, N = 718) = 9167.46, $p < .01$, but reliance on this statistic is to be done with caution due to its susceptibility to non-normality and sample size (Brown, 2006). As the current study has a moderately large sample (N = 718), and as the data did have some tendencies toward non-normality, a Satorra-Bentler scaled chi-square and a chi-square corrected for non-normality were examined, X^2 (347, N = 718) = 4454.58, $p < .01$ and X^2 (347, N = 718) = 407.48, p = .014, respectively. The latter may provide some indication of goodness-of-fit,

although it is still statistically significant, as it is less than two times the model degrees of freedom (Tabachnick & Fidell, 2001).

The comparative fit index, or CFI, (.97) and non-normed fit index, or NNFI (.97) provided support for goodness of model fit, as values in excess of .95 and .90, respectively, are considered to be indicative of a well-fitting model (Schumacker & Lomax, 2004; Tabachnick & Fidell, 2001). The standardized root mean square residual, or SRMR (.093) was less supportive of goodness-of-fit, as values less than .08 are desirable. The root mean square error of approximation, or RMSEA (.13) also failed to provide support, as values in excess of .10 imply a poor model fit. These values and their acceptable levels can be seen in Table 2.

Table 2. Goodness of fit indices from the CFA of the 28-item, three-factor model of teaching presence

Goodness of fit criterion	Model statistic	Acceptable level
Chi-square	X^2 (347, N = 718) = 9167.46, p < .01	Not statistically significant, and/or less than two times the model degrees of freedom
Satorra-Bentler chi-square	X^2 (347, N = 718) = 4454.58, p < .01	Not statistically significant, and/or less than two times the model degrees of freedom
Chi-square adjusted for non-normality	X^2 (347, N = 718) = 407.48, p = .014	Not statistically significant, and/or less than two times the model degrees of freedom
CFI	.97	>.95
NNFI	.97	>.90
SRMR	.093	<.08
RMSEA	.13	<.10

The fact that these fit indices were rather weak could indicate a poorly-fitting model, answering the research question, "Does the Teaching Presence Scale measure the teaching presence construct as intended in a professional development setting?" ambiguously. It may therefore be unadvisable to reject the null hypothesis. This will be explored further in a subsequent section on ancillary analysis for this research question.

Research Question 2 and Hypotheses 2 through 5

2) Does the factor structure of "teaching presence" for teachers completing an online professional development program fit the original three-factor model of teaching presence proposed for use in higher education?

H_2: There are three distinct factors inherent within teaching presence, including instructional design and organization, facilitating discourse, and direct instruction.

There were three distinct factors inherent within teaching presence, and they were shown to share a positive covariance (see Figure 10). As was also previously presented, indicators of model fit were mixed. The minimum fit function chi-square test, the chi-square for independence model (df = 378), and the Satorra-Bentler scaled chi-square test were all statistically significant, which is indicative of a poorly fitting model. Additionally, the chi-square corrected for non-normality, X^2 (347, N = 718) = 407.48, p = .014, was examined. Although it was also statistically significant, it did seem to provide some indication of goodness-of-fit as it is less than two times the model degrees of freedom (Tabachnick & Fidell, 2001). As the chi-square statistic is easily distorted by large sample sizes and non-normality, other indications of model fit were also

examined (Brown, 2006). These included the CFI (.97), NNFI (.97), SRMR (.09), and RMSEA (.13).

The CFI and NNFI provided support for goodness of model fit, as values in excess of .95 and .90, respectively, are considered to be indicative of a well-fitting model (Tabachnick & Fidell, 2001). The SRMR was less supportive of goodness-of-fit, as values less than .08 are desirable. The RMSEA also failed to provide support, as values in excess of .10 imply a poor model fit. These values and their acceptable levels are shown in Table 2.

Despite these possible indications of poor model fit, confirmatory factor analysis and the resulting path diagram did show that there are three distinct factors inherent within teaching presence, including instructional design and organization, facilitating discourse, and direct instruction. The second research question is thus answered in the affirmative, and it does appear to be advisable to reject the null for hypothesis #2.

H_3: TPS items 1-6 will load on the instructional design and organization factor.

As shown in Figure 10, TPS items 1 through 6 did load on the instructional design and organization factor. All path coefficients were statistically significant, indicating that each item is indeed a statistically significant indicator of the latent construct of instructional design and organization. Factor loadings ranged from .90 to .96, indicating a very strong relationship between the TPS items and the latent teaching presence construct. As 0 indicates the complete absence of a relationship between the item and the construct, and 1 indicates a perfect relationship between the two, the closer the values are to 1, the stronger the relationship is.

As shown in Table 3, standard error of measurement values ranged from .04 to .05, and uniqueness (measurement error of the variance) values ranged from .08 to .18. These indicate that only very small amounts of the variance were attributable to phenomena other than the item's ability to measure the latent factor. Additionally, r^2 values ranged from .82 to .92, meaning that 82% to 92% of the score variance could be accounted for by these items' ability to measure the teaching presence construct of instructional design and organization.

In summary, confirmatory factor analysis did show that items 1-6 loaded successfully on the instructional design and organization factor. This part of the second research question is thus answered in the affirmative, and it does appear to be advisable to reject the null for hypothesis #3.

H_4: TPS items 7-18 will load on the facilitating discourse factor.

As shown in Figure 10, TPS items 7 through 18 did load on the facilitating discourse factor. Again, all path coefficients were statistically significant, indicating that each item is a statistically significant indicator of the facilitating discourse construct. Factor loadings ranged from .75 to .94, again indicating reasonably strong relationships (approaching a value of 1) between the TPS items and the latent teaching presence construct.

As shown in Table 3, standard error of measurement values ranged from .04 to .05. Uniqueness (measurement error of variance) values ranged from .11 to .43. This indicated that for some of the items (especially 8, 10, 12, 14, 16, and 18) there were increased amounts of the variance attributable to phenomena other than the items' ability to measure the latent factor. The r^2 values ranged from .56 to .89, meaning that 56% to 89% of the score variance could be

accounted for by these items' ability to measure the teaching presence construct of facilitating discourse. The r^2 values were lower for the same five even-numbered items that had greater uniqueness values, indicating that these items may not measure facilitating discourse as strongly as do items 7, 9, 11, 13, 15, and 17. This will be the subject of additional discussion later in this chapter when ancillary models are presented.

In summary, confirmatory factor analysis did show that items 7 through 18 loaded successfully on the facilitating discourse factor. This part of the second research question is thus answered in the affirmative, and it does appear to be advisable to reject the null for hypothesis #4.

H_5: TPS items 19-28 will load on the direct instruction factor.

As shown in Figure 10, TPS items 19 through 28 did load on the direct instruction factor. Once again, all path coefficients were statistically significant, indicating that each item is a statistically significant indicator of the direct instruction construct. Factor loadings ranged from .75 to .96, again indicating reasonably strong relationships (approaching a value of 1) between the TPS items and the latent teaching presence construct.

As shown in Table 3, standard error of measurement values ranged from .04 to .05. Uniqueness (measurement error of variance) values ranged from .08 to .43. This indicated that for some of the items (especially 20, 22, 24, 26, and 28) there were increased amounts of the variance attributable to phenomena other than the items' ability to measure the latent factor. The r^2 values ranged from .57 to .92, indicating that 57% to 92% of the score variance could be accounted for by these items' ability to measure the teaching presence construct of direct

instruction. The r^2 values were lower for the same five even-numbered items that had greater uniqueness values, indicating that these items may not measure direct instruction as strongly as do items 19, 21, 23, 25, and 27. This will be the subject of additional discussion later in this chapter when ancillary models are presented.

In summary, confirmatory factor analysis did show that items 19 through 28 loaded successfully on the direct instruction factor. This part of the second research question is thus answered in the affirmative, and it does appear to be advisable to reject the null for hypothesis #5.

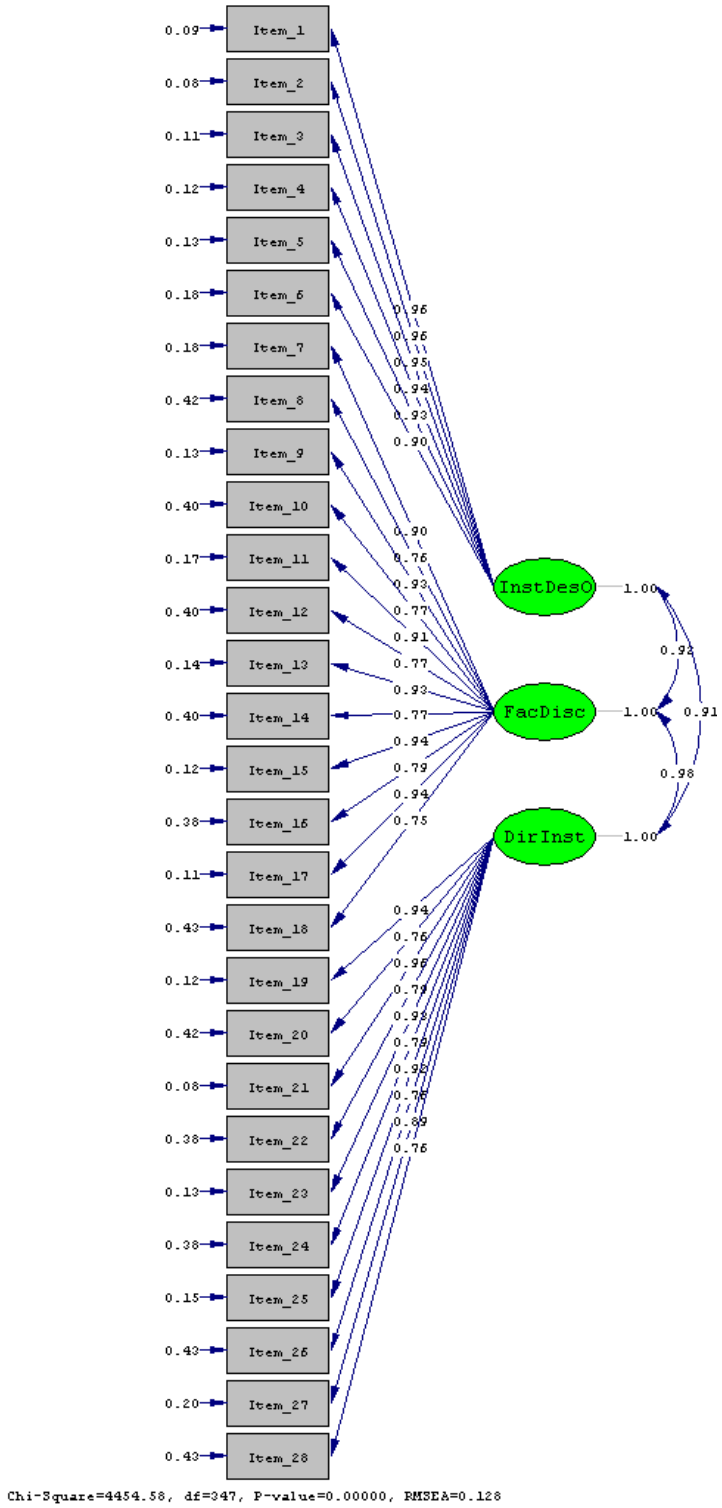

Figure 10. CFA path diagram including results of confirmatory factor analysis.

Table 3. Results of confirmatory factor analysis of teaching presence variables

Measure and variable	Unstandardized factor loading	*SE*	Uniqueness	*t*
TPS – Instructional Design and Organization				
Item 1: Overall, the instructor for this course clearly communicated important course outcomes.	.96	.05	.09	57.90
Item 2: Overall, the instructor for this course clearly communicated important course topics.	.96	.05	.08	64.09
Item 3: Overall, the instructor for this course provided clear instructions on how to participate in course learning activities.	.95	.04	.11	73.68
Item 4: Overall, the instructor for this course clearly communicated important due dates/time frames for learning activities that helped me keep pace with the course.	.94	.04	.12	74.38
Item 5: Overall, the instructor for this course helped me take advantage of the online environment to assist my learning.	.93	.05	.13	57.26
Item 6: Overall, the instructor for this course helped student to understand and practice the kinds of behaviors acceptable in online learning environments.	.90	.05	.18	52.02
TPS – Facilitating Discourse				
Item 7: Overall, the instructor for this course was helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn.	.90	.04	.18	67.18
Item 8: Overall, other participants in this course were helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn.	.76	.05	.42	29.82
Item 9: Overall, the instructor for this course was helpful in guiding the class towards agreement/understanding about course topics that assisted me to learn.	.94	.04	.13	97.51
Item 10: Overall, other participants in this course were helpful in guiding the class towards agreement/understanding about course topics that assisted me to learn.	.78	.05	.40	32.07

Table 3. Results of confirmatory factor analysis of teaching presence variables (continued)

Measure and variable	Unstandardized factor loading	*SE*	Uniqueness	*t*
TPS – Facilitating Discourse (continued)				
Item 11: Overall, the instructor in this course acknowledged student participation in the course.	.91	.04	.17	72.67
Item 12: Overall, other participants in this course acknowledged student participation in the course.	.77	.05	.40	30.67
Item 13: Overall, the instructor for this course encouraged students to explore concepts in the course.	.93	.04	.14	74.25
Item 14: Overall, other participants in this course encouraged students to explore concepts in the course.	.78	.05	.40	32.43
Item 15: Overall, the instructor for this course helped to keep students engaged and participating in productive dialog.	.94	.04	.12	96.94
Item 16: Overall, other participants in this course helped to keep students engaged and participating in productive dialog.	.79	.05	.38	33.53
Item 17: Overall, the instructor for this course helped keep the participants on task in a way that assisted me to learn.	.94	.04	.11	125.49
Item 18: Overall, other participants in this course helped keep us on task in a way that assisted me to learn.	.75	.05	.43	28.91
TPS – Direct Instruction				
Item 19: Overall, the instructor for this course presented content or questions that helped me to learn.	.94	.05	.12	62.76
Item 20: Overall, other participants in this course presented content or questions that helped me to learn.	.76	.05	.42	28.44
Item 21: Overall, the instructor for this course helped to focus discussion on relevant issues in a way that assisted me to learn.	.96	.04	.08	132.05

Table 3. Results of confirmatory factor analysis of teaching presence variables (continued)

Measure and variable	Unstandardized factor loading	*SE*	Uniqueness	*t*
TPS – Direct Instruction (continued)				
Item 22: Overall, other participants in this course helped to focus discussion on relevant issues in a way that assisted me to learn.	.79	.05	.38	32.53
Item 23: Overall, the instructor for this course provided explanatory feedback that assisted me to learn.	.94	.04	.13	101.38
Item 24: Overall, other participants in this course provided explanatory feedback that assisted me to learn.	.79	.05	.38	31.22
Item 25: Overall, the instructor for this course helped me to revise my thinking in a way that helped me to learn.	.92	.04	.15	91.69
Item 26: Overall, other participants in this course helped me to revise my thinking in a way that helped me to learn.	.76	.05	.43	31.01
Item 27: Overall, the instructor for this course provided useful information from a variety of sources that assisted me to learn.	.90	.05	.20	52.20
Item 28: Overall, other participants in this course provided useful information from a variety of sources that assisted me to learn.	.75	.05	.43	29.82

The correlation matrix for this analysis can be seen in Appendix D. The LISREL syntax used to produce the output for this CFA can be viewed in Appendix E.

Ancillary Analyses for Research Questions 1 and 2

Because of the weakness of the initial model as indicated by statistically significant chi square goodness-of-fit indices and mixed results among other fit indices, ancillary analyses were generated. These analyses were performed in order to determine whether alternative teaching presence models, as presented by other researchers, might produce stronger evidence of model fit

using data from the current study. There were two such alternative models proposed; a three-factor model using fewer items as proposed by Shae et al. (2005) at the beginning of their 2005 study at the SUNY Learning Network, and a two-factor model then proposed by Shae et al. (2005) after principle component analysis indicated the presence of two factors (instructional design and organization, and directed facilitation) rather than three (instructional design and organization, facilitating discourse, and direct instruction) .

A Three-Factor Model without Participant Items (Shae et al., 2005)

The first model explored in the current ancillary analysis was proposed by Shae et al.(2005). In this study at the SUNY Learning Network, Shae et al. modified their selection of TPS items in reaction to initial exploratory factor analysis. Instead of using the original 28-item TPS (with six items measuring instructional design and organization, 12 items measuring facilitating discourse, and 10 items measuring direct instruction) they used a modified TPS which included six instructional design and organization items, six facilitating discourse items, and five direct instruction items. The latter two TPS components included all items pertaining to the instructor (e.g., "Item 21: Overall, the instructor for this course helped to focus discussion on relevant issues in a way that assisted me to learn"), but did not include those items pertaining to other participants (e.g., "Item 22: Overall, other participants in this course helped to focus discussion on relevant issues in a way that assisted me to learn").

Although the rationale for excluding these items is not discussed in the article by Shae et al. (2005), the results of the initial analysis in the current study seem to support this modification. It may be seen in Table 2 that the factor loadings and r^2 values were all weaker for the

participant-oriented items than for the instructor-oriented items. For example, the aforementioned Item 21, pertaining to the instructor's helpfulness in focusing discussion on relevant issues, had a factor loading of .96 and an r^2 of .92. Its factor loading was statistically significant (t = 132.05). More than 92% of the score variance could be accounted for by this item's ability to measure the teaching presence construct of direct instruction. On the other hand, Item 22, pertaining to the other participants' helpfulness in focusing discussion on relevant issues, had a factor loading of .79 and an r^2 of .63. Its factor loading was also statistically significant (t = 32.53), but overall, it appeared to be a weaker measure of direct instruction than the item pertaining to the instructor's performance.

The CFA was therefore re-run using only the scores from items 1-6 (hypothesized to load on the instructional design and organization factor); items 7, 9, 11, 13, 15, and 17 (hypothesized to load on the facilitating discourse factor); and items 19, 21, 23, 25, and 27 (hypothesized to load on the direct instruction factor). As shown in Figure 11, the items in this first ancillary model loaded successfully on the intended factors.

TPS items 1 through 6 loaded on the instructional design and organization factor. As presented in Table 4, all path coefficients were statistically significant, ranging from .90 to .96 (and possessing t test statistic values ranging from 52.16 to 74.89), standard error of measurement values ranging from .04 to .05, and measurement error of variance values ranging from .08 to .19. Additionally, r^2 values ranged from .82 to .92. TPS items 7, 9, 11, 13, 15, and 17 all loaded on the facilitating discourse factor. Again, all path coefficients were statistically significant, ranging from .91 to .95 (and possessing t test statistic values ranging from 67.01 to 122.30), standard error of measurement values ranging from .04 to .05, measurement error of

variance values ranging from .10 to .17. In addition, r^2 values ranged from .83 to .90. TPS items 19, 21, 23, 25, and 27 all loaded on the direct instruction factor. All path coefficients were statistically significant, ranging from .91 to .97 (and possessing *t* test statistic values ranging from 53.87 to 127.32), standard error of measurement values ranging from .04 to .05, and measurement error of variance values ranging from .07 to .17. Additionally, r^2 values ranged from .81 to .93.

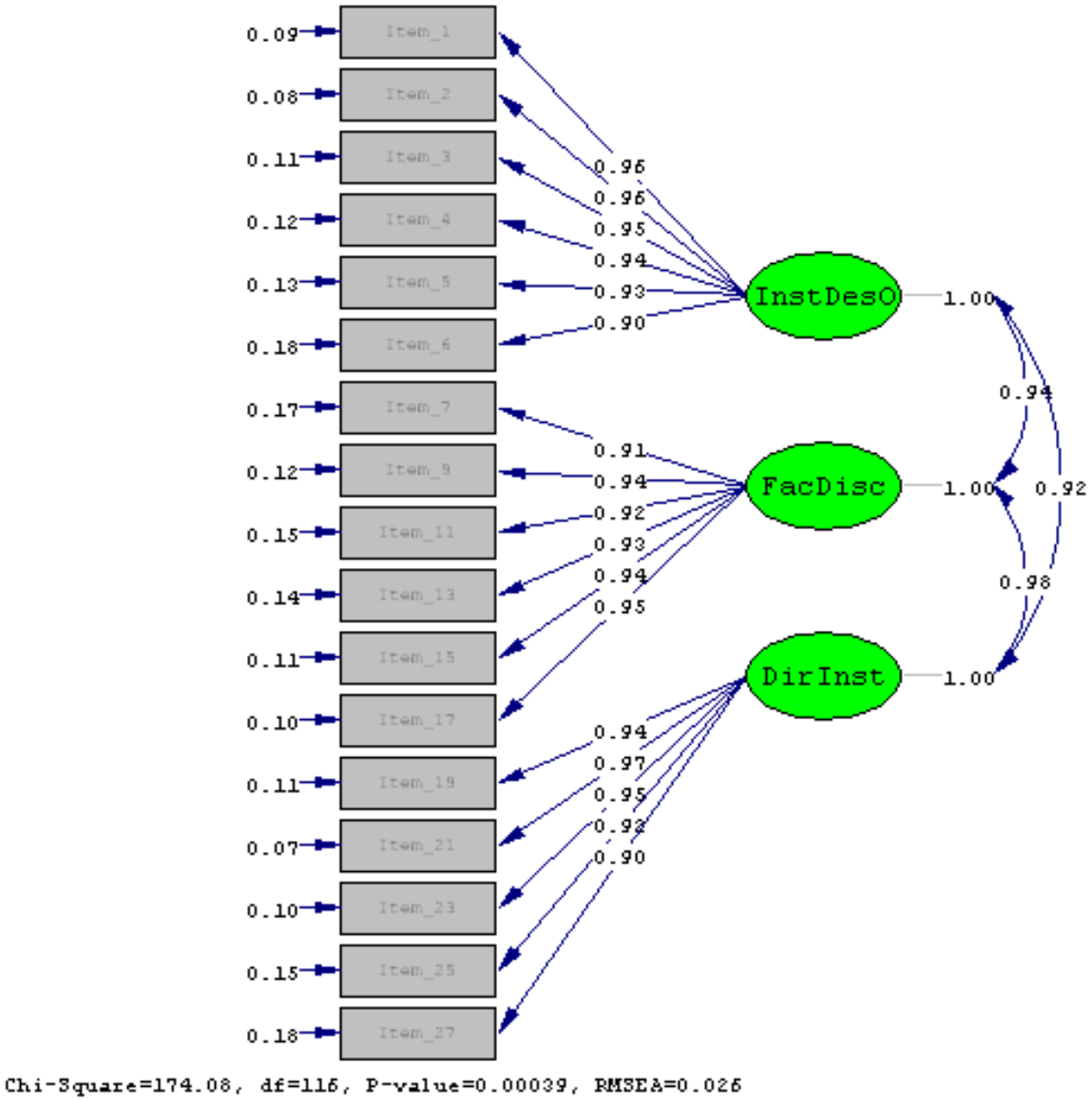

Figure 11. Three-factor model from Shae et al. (2005).

Table 4. Results of first ancillary confirmatory factor analysis of 17 teaching presence variables (three-factor model).

Measure and variable	Unstandardized factor loading	*SE*	Uniqueness	*t*
TPS – Instructional Design and Organization				
Item 1: Overall, the instructor for this course clearly communicated important course outcomes.	.96	.05	.09	58.10
Item 2: Overall, the instructor for this course clearly communicated important course topics.	.96	.05	.08	64.70
Item 3: Overall, the instructor for this course provided clear instructions on how to participate in course learning activities.	.95	.04	.11	74.36
Item 4: Overall, the instructor for this course clearly communicated important due dates/time frames for learning activities that helped me keep pace with the course.	.94	.04	.12	74.89
Item 5: Overall, the instructor for this course helped me take advantage of the online environment to assist my learning.	.93	.05	.14	57.61
Item 6: Overall, the instructor for this course helped student to understand and practice the kinds of behaviors acceptable in online learning environments.	.90	.05	.19	52.16
TPS – Facilitating Discourse				
Item 7: Overall, the instructor for this course was helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn.	.91	.04	.17	68.86
Item 9: Overall, the instructor for this course was helpful in guiding the class towards agreement/understanding about course topics that assisted me to learn.	.94	.04	.12	89.95
Item 11: Overall, the instructor in this course acknowledged student participation in the course.	.93	.04	.15	77.60
Item 13: Overall, the instructor for this course encouraged students to explore concepts in the course.	.93	.05	.14	67.01

Table 4. Results of first ancillary confirmatory factor analysis of 17 teaching presence variables (three-factor model, continued).

Measure and variable	Unstandardized factor loading	*SE*	Uniqueness	*t*
TPS – Facilitating Discourse (continued)				
Item 15: Overall, the instructor for this course helped to keep students engaged and participating in productive dialog.	.94	.04	.11	95.75
Item 17: Overall, the instructor for this course helped keep the participants on task in a way that assisted me to learn.	.95	.04	.10	122.30
TPS – Direct Instruction				
Item 19: Overall, the instructor for this course presented content or questions that helped me to learn.	.94	.05	.11	59.03
Item 21: Overall, the instructor for this course helped to focus discussion on relevant issues in a way that assisted me to learn.	.97	.04	.07	127.32
Item 23: Overall, the instructor for this course provided explanatory feedback that assisted me to learn.	.95	.04	.10	109.84
Item 25: Overall, the instructor for this course helped me to revise my thinking in a way that helped me to learn.	.92	.04	.15	81.10
Item 27: Overall, the instructor for this course provided useful information from a variety of sources that assisted me to learn.	.91	.05	.18	53.87

Robust maximum likelihood was again the method of estimation used to estimate the model. The independence model that challenges the hypothesis that all variables are uncorrelated was rejected, X^2 (136, N = 718) = 69807.78. The first ancillary model was then tested, and indicators of model fit were much improved as compared to the 28-item model, X^2 (116, N = 718) = 980.29, $p < .01$; CFI = .999; NNFI = .999; SRMR = .02; and RMSEA = .03.

The chi-square goodness-of-fit index was statistically significant and technically indicative of a poorly-fitting model, but as stated previously, reliance on this statistic is to be done with caution due to its susceptibility to non-normality and sample size (Brown, 2006). As with the 28-item model, a Satorra-Bentler scaled chi-square and a chi-square corrected for non-normality were examined, X^2 (116, N = 718) = 174.08, $p < .01$ and X^2 (116, N = 718) = 115.56, p = .49, respectively. The latter definitely provides indication of goodness-of-fit, as it is no longer statistically significant (p = .49), and as it is clearly less than two times the model degrees of freedom (Tabachnick & Fidell, 2001).

The CFI and NNFI provided support for goodness of model fit, as values in excess of .95 and .90, respectively, are considered to be indicative of a well-fitting model (Tabachnick & Fidell, 2001). The SRMR and RMSEA were also supportive of goodness-of-fit, as values less than .08 are desirable in the former, and values lower than .05 in the latter are indicative of a well-fitting model. These values and their acceptable levels are presented in Table 5.

Table 5. Goodness of fit indices from the CFA of the 17-item, three-factor model of teaching presence

Goodness of fit criterion	Model statistic	Acceptable level
Chi-square	X^2 (116, N = 718) = 980.29, p < .01	Not statistically significant, and/or less than two times the model degrees of freedom
Satorra-Bentler chi-square	X^2 (116, N = 718) = 174.08, p < .01	Not statistically significant, and/or less than two times the model degrees of freedom
Chi-square adjusted for non-normality	X^2 (116, N = 718) = 115.56, p = .49	Not statistically significant, and/or less than two times the model degrees of freedom
CFI	.999	>.95
NNFI	.999	>.90
SRMR	.02	<.08
RMSEA	.03	<.10

The correlation matrix for the TPS items can be seen in Appendix D. The LISREL syntax used to produce the output for this CFA can be seen in Appendix E.

A Two-Factor Model of Teaching Presence (Shae et al., 2005)

The second model explored in the current ancillary analysis was also proposed by Shae et al. (2005). This model emerged when a principal component analysis with direct oblique rotation was used on the scores produced by the TPS. Shae et al. (2005) found that certain items (1 through 5) loaded on the instructional design and organization factor, as anticipated. However, other items loaded on one factor that seemed to combine facilitating discourse and direct instruction. This new factor was termed “directed facilitation”, and included items 6, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, and 27 (Shae et al., 2005).

The CFA was again performed, including these modifications to the model. As shown in Figure 12, the items in this second ancillary model also loaded successfully on the intended factors.

TPS items 1 through 5 loaded on the instructional design and organization factor. As shown in Table 6, all path coefficients were statistically significant, ranging from .93 to .96 (and possessing *t* test statistic values ranging from 55.35 to 73.70), standard error of measurement values ranging from .04 to .05, and measurement error of variance values ranging from .08 to .14. Additionally, r^2 values ranged from .86 to .93. TPS items 6, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, and 27 all loaded on the directed facilitation factor. All path coefficients were statistically significant, ranging from .87 to .97 (and possessing *t* test statistic values ranging from 48.19 to 123.55), standard error of measurement values ranging from .04 to .05, and measurement error of variance values ranging from .08 to .24. Additionally, r^2 values ranged from .76 to .92.

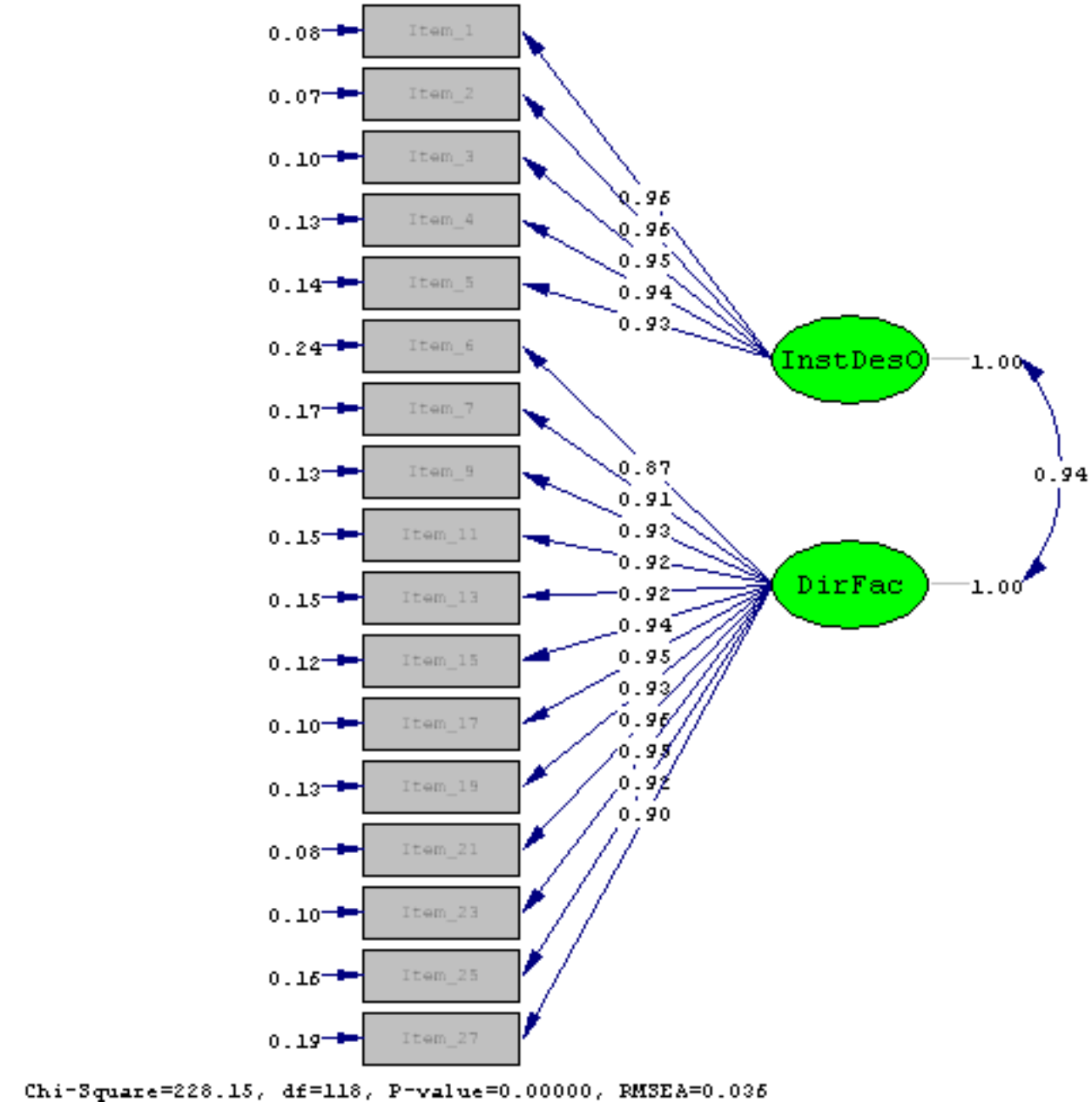

Figure 12. Two-factor model from Shae et al. (2005)

Table 6. Results of second ancillary confirmatory factor analysis of 17 teaching presence variables (two-factor model).

Measure and variable	Unstandardized factor loading	*SE*	Uniqueness	*t*
TPS – Instructional Design and Organization				
Item 1: Overall, the instructor for this course clearly communicated important course outcomes.	.96	.05	.08	56.05
Item 2: Overall, the instructor for this course clearly communicated important course topics.	.96	.05	.07	61.29
Item 3: Overall, the instructor for this course provided clear instructions on how to participate in course learning activities.	.95	.04	.10	73.70
Item 4: Overall, the instructor for this course clearly communicated important due dates/time frames for learning activities that helped me keep pace with the course.	.94	.04	.13	72.45
Item 5: Overall, the instructor for this course helped me take advantage of the online environment to assist my learning.	.93	.05	.14	55.35
TPS – Directed Facilitation				
Item 6: Overall, the instructor for this course helped student to understand and practice the kinds of behaviors acceptable in online learning environments.	.87	.05	.24	48.19
Item 7: Overall, the instructor for this course was helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn.	.91	.04	.17	68.10
Item 9: Overall, the instructor for this course was helpful in guiding the class towards agreement/understanding about course topics that assisted me to learn.	.93	.04	.13	87.00
Item 11: Overall, the instructor in this course acknowledged student participation in the course.	.92	.04	.15	74.73
Item 13: Overall, the instructor for this course encouraged students to explore concepts in the course.	.92	.05	.15	67.24

Table 6. Results of second ancillary confirmatory factor analysis of 17 teaching presence variables (two-factor model, continued).

Measure and variable	Unstandardized factor loading	*SE*	Uniqueness	*t*
TPS – Directed Facilitation (continued)				
Item 15: Overall, the instructor for this course helped to keep students engaged and participating in productive dialog.	.94	.04	.12	93.21
Item 17: Overall, the instructor for this course helped keep the participants on task in a way that assisted me to learn.	.95	.04	.10	119.82
Item 19: Overall, the instructor for this course presented content or questions that helped me to learn.	.93	.05	.13	62.15
Item 21: Overall, the instructor for this course helped to focus discussion on relevant issues in a way that assisted me to learn.	.96	.04	.08	123.55
Item 23: Overall, the instructor for this course provided explanatory feedback that assisted me to learn.	.95	.04	.10	110.37
Item 25: Overall, the instructor for this course helped me to revise my thinking in a way that helped me to learn.	.92	.04	.16	85.78
Item 27: Overall, the instructor for this course provided useful information from a variety of sources that assisted me to learn.	.90	.05	.19	54.27

Robust maximum likelihood was again the method of estimation used to estimate the model. The independence model that challenges the hypothesis that all variables are uncorrelated was rejected, X^2 (136, N = 718) = 69807.78. The first ancillary model was then tested, and indicators of model fit were similar to those in the first ancillary model analysis, X^2 (118, N = 718) = 1226.25, $p < .01$; CFI = .998; NNFI = .998; SRMR = .02; and RMSEA = .04.

As with the previous two analyses, a Satorra-Bentler scaled chi-square and a chi-square corrected for non-normality were examined, X^2 (116, N = 718) = 228.15, $p < .01$ and X^2 (116, N

= 718) = 128.36, p = .24, respectively. Again, the latter was indicative of goodness-of-fit, as it was not statistically significant (p = .24), and it is less than two times the model degrees of freedom (Tabachnick & Fidell, 2001).

The CFI and NNFI again provided support for goodness of model fit, as values in excess of .95 and .90, respectively, are considered to be indicative of a well-fitting model (Tabachnick & Fidell, 2001). The SRMR and RMSEA were also supportive of goodness-of-fit, as values less than .08 are desirable in the former, and values lower than .05 in the latter are indicative of a well-fitting model. These values and their acceptable levels are presented in Table 7.

Table 7. Goodness of fit indices from the CFA of the 17-item, two-factor model of teaching presence

Goodness of fit criterion	Model statistic	Acceptable level
Chi-square	X^2 (118, N = 718) = 1226.25, p < .01	Not statistically significant, and/or less than two times the model degrees of freedom
Satorra-Bentler chi-square	X^2 (116, N = 718) = 228.15, p < .01	Not statistically significant, and/or less than two times the model degrees of freedom
Chi-square adjusted for non-normality	X^2 (116, N = 718) = 128.36, p = .24	Not statistically significant, and/or less than two times the model degrees of freedom
CFI	.998	>.95
NNFI	.998	>.90
SRMR	.02	<.08
RMSEA	.04	<.10

Summary of Model Fit in Ancillary Analyses.

Although both ancillary models showed evidence of a better fit than did the original model (with 28 items and three factors), the first ancillary model (with 17 items and three

factors) was slightly better-fitting than the second model (with 17 items and two factors). As a result, it was decided to use the scores from the first ancillary model (with 17 items and three factors), instead of either the original model (with 28 items and three factors) or the second ancillary model (with 17 items and two factors), when performing the correlational analysis with the student satisfaction items. These fit indices are shown in Table 8.

Table 8. Comparison of all three CFA models' goodness of fit indices

Goodness of fit criterion	Initial three-factor model (Shae et al., 2003a)	Ancillary three-factor model statistic (Shae et al., 2005)	Ancillary two-factor model statistic (Shae et al., 2005)	Acceptable level
Chi-square	X^2 (347, N = 718) = 9167.46, p < .01	X^2 (116, N = 718) = 980.29, p < .01	X^2 (118, N = 718) = 1226.25, p < .01	Not statistically significant, and/or less than two times the model degrees of freedom
Satorra-Bentler chi-square	X^2 (347, N = 718) = 4454.58, p < .01	X^2 (116, N = 718) = 174.08, p < .01	X^2 (116, N = 718) = 228.15, p < .01	Not statistically significant, and/or less than two times the model degrees of freedom
Chi-square adjusted for non-normality	X^2 (347, N = 718) = 407.48, p = .014	X^2 (116, N = 718) = 115.56, p = .49	X^2 (116, N = 718) = 128.36, p = .24	Not statistically significant, and/or less than two times the model degrees of freedom
CFI	.97	.999	.998	>.95
NNFI	.97	.999	.998	>.90
SRMR	.09	.02	.02	<.08
RMSEA	.13	.03	.04	<.10

To re-visit the first research question and its accompanying hypothesis, with the use of the first ancillary model (three factors and 17 items), it is now definitely possible to answer the

question, “Does the Teaching Presence Scale measure the teaching presence construct as intended in a professional development setting?” in the affirmative. Model fit indices with this model were clearly indicative of the TPS’ ability to measure teaching presence at FOR-PD. The null hypothesis is therefore rejected. It is also clear now that the second research question, “Does the factor structure of teaching presence for teachers completing an online professional development program fit the original three-factor model of teaching presence proposed for use in higher education?” may be answered in the affirmative. It is also again possible to reject the null hypotheses regarding the loading of items onto the three factors, with the understanding that removal of the items pertaining to participants’ teaching presence behaviors was necessary in order to improve model fit.

The correlation matrix for the TPS items can be seen in Appendix D. The LISREL syntax used to produce the output for this CFA can be seen in Appendix E.

Research Question 3 and Hypothesis 6

3) Is there a correlation between teaching presence, as measured by the Teaching Presence Scale, and student satisfaction?

H_6: There is a correlation between teaching presence, as measured by the Teaching Presence Scale, and student satisfaction.

Validity and Reliability Analysis of Student Satisfaction Items.

Seventeen items were used to measure student satisfaction. Questions 34 through 40 asked participants to rate the course on dimensions such as the content’s ability to help meet their

classroom needs and increase their knowledge of scientifically-based reading research, the ease of navigation through the course, appropriateness of the length of assignments and of the course itself, the helpfulness of course content tools in facilitating classroom implementation of reading strategies, and the amount of comfort respondents gained in using the reading strategies taught throughout the course. These were all measured using a five point Likert scale similar to that used with the TPS items ("Strongly Disagree," "Disagree," "Neutral," "Agree," and "Strongly Agree").

Questions 41 through 50 asked respondents to rate their FOR-PD facilitator along dimensions such as feedback provided, interest in participants' learning, assessment of participants' progress, expression of expectations for performance, availability to assist students, promptness of responses in online discussions, promptness of responses via email or course mail, respect and concern for students, facilitation of learning, and overall assessment of facilitator's effectiveness. These items used a four point scale ("Poor," "Fair," "Good," and "Excellent").

In order to begin the process of correlating the TPS scores with the student satisfaction scores, an exploratory factor analysis (EFA) was conducted on the student satisfaction variables to ascertain their underlying factor structure. It was anticipated that there would be two factors, one for satisfaction with the FOR-PD course and one for satisfaction with FOR-PD facilitators.

Evidence of the first factor, Satisfaction with the FOR-PD Course, and for the construct validity of the seven items (#34-40) measuring it was obtained using EFA. As was discussed previously in this chapter, listwise deletion was used to eliminate the cases missing data for one or more of these questions, resulting in a sample size of 684. The first step in determining the factorability of items 34 through 40 was review of the communalities. There were no

communalities above 1.0, so all seven items were retained for analysis. The initial factorability of these items was examined using common criteria for determining factorability including: (a) reviewing correlation of items; (b) Kaiser-Meyer-Olkin measure of sampling adequacy (overall and individual); (c) Bartlett's test of sphericity; and (d) communalities.

Regarding (a), the correlation of the items, all seven items correlated greater than .30 with at least one other item, and all seven were statistically significant ($p < .001$). These correlations can be seen in Table 9. Regarding (b), the Kaiser-Meyer-Olkin measure of sampling adequacy was .864, larger than the recommended value of .50. The measure of sampling adequacy values for the individual items were all .782 or above, again proving to be larger than the recommended value of .50. Regarding (c), Bartlett's test of sphericity was statistically significant [X^2 (21) = 2654.59, $p < .001$]. Regarding (d), communalities, all seven items had communality values in excess of the recommended value of .30. This may be seen in Table 10. This provides evidence of shared variance among the items.

As these four common criteria for determining factorability were all easily met, it was deemed reasonable to proceed with determining the factor structure of the seven items.

Table 9. Correlation matrix for student satisfaction items 34 - 40 (N = 684)

Item	34	35	36	37	38	39	40
34: I found the FOR-PD course content met my needs on learning how to integrate literacy into my content area instruction.	---						
35: The course content increased my knowledge of scientifically-based reading research.	.785	---					
36: It was easy to navigate through the course.	.561	.591	---				
37: The assignments were of an appropriate length (not too time consuming).	.474	.414	.479	---			
38: The course in general was of an appropriate length.	.540	.527	.492	.740	---		
39: The literacy log was helpful for classroom implementation of strategies.	.600	.580	.491	.451	.496	---	
40: I am comfortable using the reading strategies taught in FOR-PD.	.642	.581	.470	.420	.488	.505	---

Table 10. Factor loadings and communalities based on maximum likelihood analysis for student satisfaction items 31 - 40 (N = 684)

Item	Factor 1	Communality
Question 34: I found the FOR-PD course content met my needs on learning how to integrate literacy into my content area instruction.	.869	.755
Question 35: The course content increased my knowledge of scientifically-based reading research.	.842	.709
Question 36: It was easy to navigate through the course.	.685	.469
Question 37: The assignments were of an appropriate length (not too time consuming).	.613	.375
Question 38: The course in general was of an appropriate length.	.688	.473
Question 39: The literacy log was helpful for classroom implementation of strategies.	.701	.491
Question 40: I am comfortable using the reading strategies taught in FOR-PD.	.712	.507

The maximum likelihood estimation procedure with promax rotation was used to extract the factors from the data. Initial eigenvalues indicated that the first factor explained about 61% of

the variance. The remaining factors did not have eigenvalues greater than one, so solutions for more than one factor were not examined. The one-factor solution, which represented 54% of the variance explained when extracted, was preferred due to theoretical support, review of the scree plot which indicated that the eigenvalues leveled off after one factor, and difficulty in interpreting two or more factors.

All items contributed to a simple factor structure and had a primary factor ranging from .613 to .869, well above the recommended value of .30. Table 10 contains the factor loading pattern matrix for this final solution. The name of the factor is Satisfaction with Course. The results of the factor analysis lend support to internal structure validity evidence supporting the conclusion that the scores produced by these seven items are a valid assessment of participants' satisfaction with the FOR-PD course.

Internal consistency for these scores was examined using Cronbach's alpha, and produced a value of .885. A substantial increase in this Cronbach's alpha value would not be achieved by deleting any items from the scale. Finally, a composite score was created for the factor by computing the mean of the seven items making up the scale. This composite score was then used as part of a Pearson correlation with TPS scores and other student satisfaction scores, to be discussed further in the Correlation section.

Evidence of the second factor, Satisfaction with the FOR-PD Facilitators, and for the construct validity of the 10 items (#41-50) items measuring it was obtained, again using EFA. As was discussed previously in this chapter, listwise deletion was used to eliminate the cases missing data for one or more of these questions, resulting in a sample size of 663. The first step in determining the factorability of items 41 through 50 was, again, review of the communalities.

There were no communalities above 1.0, so all 10 items were retained for analysis. The initial factorability of these items was examined, once again using common criteria for determining factorability including: (a) reviewing correlation of items; (b) Kaiser-Meyer-Olkin measure of sampling adequacy (overall and individual); (c) Bartlett's test of sphericity; and (d) communalities.

Regarding (a), the correlation of the items, all 10 items correlated greater than .30 with at least one other item, and all 10 were statistically significant ($p < .001$). This can be seen in Table 11. Regarding (b), the Kaiser-Meyer-Olkin measure of sampling adequacy was .960, comfortably larger than the recommended value of .50. The measure of sampling adequacy values for the individual items were all .936 or above, again proving to be larger than the recommended value of .50. Regarding (c), Bartlett's test of sphericity was statistically significant [X^2 (45) = 8385.43, $p < .001$]. Regarding (d), communalities, all 10 items had communality values in excess of the recommended value of .30. This may be seen in Table 12. This provides evidence of shared variance among the items.

As these four common criteria for determining factorability were all easily met, it was deemed reasonable to proceed with determining the factor structure of the 10 satisfaction with facilitator items.

Table 11. Correlation matrix for student satisfaction items 41 - 50 (N = 663)

Item	41	42	43	44	45	46	47	48	49	50
41: Rate the feedback concerning your performance in this course.	---									
42: Rate the facilitator's interest in your learning.	.840	---								
43: Rate the facilitator's assessment of your progress in the course.	.797	.847	---							
44: Rate the facilitator’s expression of expectations for performance.	.752	.815	.817	---						
45: Rate the facilitator’s availability to assist students.	.745	.806	.768	.786	---					
46: Rate the promptness of facilitator responses in online discussions.	.742	.781	.764	.730	.800	---				
47: Rate the promptness of facilitator responses in email or course mail.	.707	.756	.727	.715	.831	.858	---			
48: Rate the facilitator’s respect and concern for students.	.710	.763	.745	.734	.761	.724	.719	---		
49: Rate the facilitator’s facilitation of learning.	.778	.829	.821	.792	.786	.760	.748	.808	---	
50: Overall assessment of facilitator.	.797	.844	.830	.800	.811	.830	.804	.831	.894	---

Table 12. Factor loadings and communalities based on maximum likelihood analysis for student satisfaction items 41 - 50 (N = 663)

Item	Factor 1	Communality
41: Rate the feedback concerning your performance in this course.	.861	.742
42: Rate the facilitator's interest in your learning.	.915	.837
43: Rate the facilitator's assessment of your progress in the course.	.895	.800
44: Rate the facilitator’s expression of expectations for performance.	.869	.755
45: Rate the facilitator’s availability to assist students.	.883	.780
46: Rate the promptness of facilitator responses in online discussions.	.872	.760
47: Rate the promptness of facilitator responses in email or course mail.	.855	.730
48: Rate the facilitator’s respect and concern for students.	.854	.729
49: Rate the facilitator’s facilitation of learning.	.913	.834
50: Overall assessment of facilitator.	.940	.884

The maximum likelihood estimation procedure with promax rotation was again used to extract the factors from the data. Initial eigenvalues indicated that the first factor explained about 81% of the variance. The remaining factors did not have eigenvalues greater than one, so solutions for more than one factor were not examined. The one-factor solution, which represented 79% of the variance explained when extracted, was preferred due to theoretical support, review of the scree plot which indicated that the eigenvalues leveled off after one factor, and difficulty in interpreting two or more factors.

All items contributed to a simple factor structure and had a primary factor ranging from .854 to .940, well above the recommended value of .30. Table 12 contains the factor loading pattern matrix for this final solution. The name of the factor is Satisfaction with Facilitator. The results of the factor analysis lend support to internal structure validity evidence supporting the conclusion that the scores produced by these seven items are a valid assessment of participants' satisfaction with the FOR-PD facilitators.

Internal consistency for these scores was examined using Cronbach's alpha and produced a value of .973. A substantial increase in this Cronbach's alpha value would not be achieved by deleting any items from the scale. Finally, a composite score was created for the factor by computing the mean of the seven items making up the scale. This composite score was then used as part of a Pearson correlation with TPS scores and other student satisfaction scores, to be discussed further in the Correlation section.

Reliability Analysis of Teaching Presence Scale Items

Evidence of the factor structure and validity of the 17 TPS items used in the first ancillary model (with three factors) was presented in the section on ancillary model analysis. Internal consistency for these scores was examined using Cronbach's alpha, and produced a value of .982. A substantial increase in this Cronbach's alpha value would not be achieved by deleting any items from the scale. Finally, composite scores were created for each of the three teaching presence factors (instructional design and organization, facilitating discourse, and direct instruction) by computing the mean of the items making up each subscale. These composite scores were then used as part of a Pearson correlation with the two composite variables representing student satisfaction scores. This will be discussed further in the Correlation section.

Correlation of Teaching Presence Scale and Student Satisfaction Items

Correlation coefficients were computed to determine if there were relationships among the three TPS composite variables (one for each factor: instructional design and organization, facilitating discourse, and direct instruction) and the two student satisfaction composite variables (one for satisfaction with FOR-PD course, one for satisfaction with FOR-PD facilitators). Review of a scatterplot of the variables suggested that linear relationships between the variables were feasible, so the decision was made to continue with the correlation procedure.

The results of the correlational analyses indicate that all of the 10 correlation coefficients were statistically significant. For the most part, the results indicate positive and moderate to strong relationships between the three teaching presence composite variables and the two student satisfaction composite variables, where moderate correlation is defined by a coefficient ranging

from .50 to .70, and strong correlation is defined by a coefficient ranging from .70 to .90 (Hinkle, Wiersma, & Jurs, 2003). As participants' sense of teaching presence moves in a positive direction, so does their feeling of satisfaction with both the course and the facilitator. The correlation coefficients can be seen in Table 13.

Table 13. Correlations between teaching presence and student satisfaction (N = 649)

Subscale	Instructional Design & Organization	Facilitating Discourse	Direct Instruction	Satisfaction with the Course	Satisfaction with the Facilitator
Teaching Presence: Instructional Design & Organization	---				
Teaching Presence: Facilitating Discourse	.877	---			
Teaching Presence: Direct Instruction	.842	.935	---		
Student Satisfaction: Satisfaction with the Course	.503	.550	.585	---	
Student Satisfaction: Satisfaction with the Facilitator	.664	.752	.754	.449	---

The strongest relationship was seen between direct instruction and satisfaction with facilitators, r (649) = .754, r^2 = .57, p < .001, followed by facilitating discourse and satisfaction with facilitators, r (649) = .752, r^2 = .57, p < .001, and instructional design and organization with satisfaction with facilitators, r (649) = .664, r^2 = .44, p < .001. Relationships between teaching presence factors and satisfaction with the course were not quite as strong, but still statistically significant, with direct instruction relating most strongly with satisfaction with the course, r

(649) = .585, r^2 = .34, p < .001. This was followed by the relationship between facilitating discourse and satisfaction with the course, r (649) = .55, r^2 = .30, p < .001, and between instructional design and organization and satisfaction with the course, r (649) = .503, r^2 = .25, p < .001. Shared variance between all of these variables was greater than 25%, generally interpreted to be large effects (Cohen, 1988).

To sum up the results of this analysis, it was clear that the third research question, "Is there a correlation between teaching presence, as measured by the Teaching Presence Scale, and student satisfaction?" may be answered in the affirmative. It is equally clear that the corresponding null hypothesis may be rejected.

Summary of Research Question Findings

All three research questions were answered in the affirmative, and each of the six null hypotheses were rejected. A summary of the results of each research question and hypothesis is shown in Table 14.

Table 14: A summary of the results of each research question and hypothesis

Research questions	Hypotheses	Results
1) Does the Teaching Presence Scale measure the teaching presence construct as intended in a professional development setting?	H_1: The Teaching Presence Scale does measure the teaching presence construct as intended in a professional development setting.	Null hypothesis rejected. Best-fitting model was ancillary three-factor model (Shae et al., 2005), also later used for correlation with student satisfaction: X^2 (116, N = 718) = 115.56, p = .49; CFI = .999; NNFI = .999; SRMR = .02; RMSEA = .03
2) Does the factor structure of "teaching presence" for teachers completing an online professional development program fit the original three-factor model of teaching presence proposed for use in higher education?	H_2: There are three distinct factors inherent within teaching presence, including instructional design and organization, facilitating discourse, and direct instruction.	Null hypothesis rejected. The best-fitting CFA model did include three factors for teaching presence: X^2 (116, N = 718) = 115.56, p = .49; CFI = .999; NNFI = .999; SRMR = .02; RMSEA = .03
	H_3: TPS items 1-6 will load on the instructional design and organization factor.	Null hypothesis rejected. TPS items 1 through 6 did load on the instructional design and organization factor: • Factor loadings ranged from .90 to .96 • r^2 values ranged from .82 to .92
	H_4: TPS items 7-18 will load on the facilitating discourse factor.	Null hypothesis rejected. TPS items 7 through 18 did load on the facilitating discourse factor: • Factor loadings ranged from .75 to .94 • r^2 values ranged from .56 to .89
	H_5: TPS items 19-28 will load on the direct instruction factor.	Null hypothesis rejected. TPS items 19 through 28 did load on the direct instruction factor: • Factor loadings ranged from .75 to .96 • r^2 values ranged from .57 to .92

Table 14: A summary of the results of each research question and hypothesis

Research questions	Hypotheses	Results
3) Is there a correlation between teaching presence, as measured by the Teaching Presence Scale, and student satisfaction?	H_6: There is a correlation between teaching presence, as measured by the Teaching Presence Scale, and student satisfaction.	Null hypothesis rejected. Strongest relationship was between direct instruction and satisfaction with facilitators: r (649) = .754, r^2 = .57, p < .001; followed by facilitating discourse and satisfaction with facilitators: r (649) = .752, r^2 = .57, p < .001; and instructional design and organization with satisfaction with facilitators: r (649) = .664, r^2 = .44, p < .001 Relationships between teaching presence factors and satisfaction with the course were not quite as strong, but still statistically significant, with direct instruction relating most strongly with satisfaction with the course: r (649) = .585, r^2 = .34, p < .001; followed by the relationship between facilitating discourse and satisfaction with the course: r (649) = .55, r^2 = .30, p < .001: and between instructional design and organization and satisfaction with the course: r (649) = .503, r^2 = .25, p < .001 Shared variance between all of these variables was greater than 25%, generally interpreted to be large effects (Cohen, 1988)

Chapter Summary

This chapter contained information on how the data were analyzed, including descriptions of the hypothesized model, the sample, the data screening procedures used, and the results of the analysis for each research question. In addition, results of ancillary analysis were provided as a measure of further exploration into model fit. In the next chapter, these results will be discussed in detail along with their limitations, implications for practice, and implications for future research.

CHAPTER 5: DISCUSSION

This chapter contains a discussion of the findings presented in chapter 4. It will begin by briefly revisiting the theoretical foundations and conceptual framework outlined in chapter 2, and then transition to discussing the findings for each research question and hypothesis, noting how these findings relate to the literature review and previous research in the field. This chapter will then conclude with a discussion of implications for practice and for future research.

Theoretical Foundations and Conceptual Framework

As established in the previous chapters, online education is an increasingly prevalent instructional delivery option throughout higher education, the military, the corporate world, and even K-12 education (McMurray, 2007; Strother, 2002). This is true for reasons ranging from cost effectiveness to increased access to training and educational opportunities. And while courses containing varying amounts of online components are used more and more frequently to supplement or replace traditional, face-to-face learning interactions, it is worth noting that there are both differences and similarities between online instruction and face-to-face instruction.

Differences: Interpersonal Communication

In designing effective online educational and training programs, it is important to recognize what makes online experiences different from face-to-face experiences. Communication is different: in online learning experiences one cannot partake in the exchange of nonverbal cues. One is unable to use facial expressions and body language to facilitate meaning. Making oneself properly understood can also be challenging if one is unable to engage

in the audio aspects of real-time conversation, including the nuances conveyed by tone of voice and volume or pace of speech. It is because of differences like these that researchers have proposed models to analyze, classify, and explain individual and interpersonal behaviors that are unique to online learning experiences.

The Community of Inquiry (COI) is one such model, as it exists to help provide insight into three types of online interaction constructs: cognitive presence, social presence, and teaching presence (Garrison et al., 2001). The COI was developed as researchers sought to devise a coding scheme to classify different types of online education interactions, and examine the ways that they contribute to the uniqueness of this learning medium. The COI model seeks to explain phenomena inherent to asynchronous online communications. Despite marked differences between traditional, face-to-face instruction and modern online learning systems, however, there are also a number of similarities.

Similarities: Principles of Effective Learning

Similarities can be seen in the teaching presence component of the Community of Inquiry. Teaching presence elaborates on the role of the instructor in asynchronous, online learning experiences. It is, "the design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson et al., 2001, p. 5). In exploring the construct of teaching presence, it is possible to see principles of effective learning that transcend the medium of delivery; principles that are equally important online as they are face-to-face, and as relevant in professional development settings as they are in higher education.

Included in such principles are those presented by Bransford et al. (2000) and Chickering and Gamson (1987). Bransford et al. (2000) proposed that effective learning environments are learner centered, knowledge centered, and assessment centered. Chickering and Gamson (1987) offered seven characteristics of effective learning experiences, including "encouraging contact between students and faculty, developing reciprocity and cooperation among students, encouraging active learning, giving prompt feedback, emphasizing time on task, communicating high expectations, and respecting diverse talents and ways of learning" (p. 3).

Graham et al. (2001) stated that these principles transcend the instructional delivery medium, and that the habits of effective online instructors stem from these best practices established for traditional, face-to-face educators. Sieber (2005, p. 330) went a step further to acknowledge characteristics unique to online learners which helped define the role of online instructors: being a "consultant, guide, and resource provider" instead of an "oracle and lecturer"; being an "expert questioner" rather than a "provider of answers"; being a "designer of students' learning experiences" instead of a "provider of content"; being a "member of the learning team" instead of occupying a "solitary role"; and "working with tasks that students help to construct" rather than having "sole autonomy" over the learning tasks.

Online Students and Adult Learning Theory

Gibbons and Wentworth (2001) noted similar features of the online learning environment, and drew connections to adult learning theory and practice – andragogy – as proposed by Knowles (1980). They observed that online learners need to be self-directed, task-oriented, and intrinsically motivated. They also proposed that online instructors need to expect

students to work both independently and as a community, sharing knowledge and building upon their own rich life experience throughout the learning process. This is again a departure from the more traditional role of instructor as the sole purveyor of knowledge, and a move toward a highly student-centered approach.

Characteristics of Participants in Professional Development

This student-centered approach described by adult learning theory is particularly effective when used with students in professional development settings like the Florida Online Reading Professional Development (FOR-PD) program where the current research was conducted. Professional development is, by definition, geared toward adult learners, and the application of andragogical principles is appropriate for the learner population. And as previously stated, these principles have also been shown to be qualities that make up ideal online educational experiences (Chickering & Gamson, 1987; Garrison et al., 2000; Gibbons & Wentworth, 2001; Graham et al., 2001). The emphasis on self-directed learning, intrinsic motivation, need for relevance of instruction to real life situations, and a problem-centered approach to learning are applicable to the needs and characteristics of the FOR-PD participants.

Additionally, stakes are high for FOR-PD students, and much rests on their ability to acquire high-demand work skills. At no time in history has the need been greater for teachers to have highly honed, research-based skills for teaching reading (FLDOE, 2009; NAEP, 2005; NAEP, 2007a; NAEP, 2007b). FOR-PD offers one path for teachers to acquire skills that may help them keep stable employment in a time of economic unrest and layoffs in the education sector. But while FOR-PD offers participants the opportunity to enhance their professional

credentials, participants are adult learners for whom the educational experience is not compulsory. These students can choose to pursue other avenues of professional development, so it is prudent to consider their satisfaction with the educational experience as a goal at or near the same level of importance as their achievement of learning gains.

In online education experiences with adult learners, like those at FOR-PD, student satisfaction is defined by the following characteristics: (a) "immediacy in interaction" (Wise et al., 2004, p. 248); (b) inclusion within social community (DeShields et al., 2005); (c) "convenience and flexibility" of instruction (Johnston et al., 2005, p. 4); (d) "contact and interaction with instructor," including high quality feedback (Johnston et al., 2005, p. 4); (e) applicability of learning experience to solving real world problems (Bolton, 2006); and (f) ease of use of the online course technology (Summers et al., 2005).

These characteristics were chosen, in part, due to the difficulty of finding a single, all-inclusive definition of student satisfaction. Although there are numerous studies exploring student satisfaction, the definition of the term is frequently assumed to be common knowledge. The literature cited in the previous paragraph touched on aspects of student satisfaction that helped to define it precisely for the purposes of the current study. It may be noted that many of these characteristics relate to previous discussions of the characteristics of teaching presence and andragogy. For example, (a) "immediacy in interaction" (Wise et al., 2004, p. 248), (c) "convenience and flexibility" of instruction (Johnston et al., 2005, p. 4), and (e) applicability of learning experience to solving real world problems (Bolton, 2006) are reflective of certain needs particular to adult learners, as addressed by andragogy.

Additionally, (b) inclusion within social community (DeShields et al., 2005) is a need that can be addressed by the facilitating discourse component of teaching presence; (d) "contact and interaction with instructor," including high quality feedback (Johnston et al., 2005, p. 4) is a need covered by the direct instruction component of teaching presence; and (f) ease of use of the online course technology (Summers et al., 2005) is an andragogical need that can be addressed by the instructional design and organization component of teaching presence.

As student satisfaction is one of the most commonly used measures of online course success (Berge & Myers, 2001; Coppola et al., 2004), it is a worthwhile construct to further examine. As a state-funded organization with a strong focus on quality assurance, FOR-PD, like many providers of online education, seeks feedback from its participants in the form of student satisfaction surveys. Questions derived from these surveys were used in the current study to gauge FOR-PD participants' sense of student satisfaction in relation to their sense of teaching presence in the course.

Coming Full Circle: Teaching Presence and Student Satisfaction

Acknowledging both the similarities and differences between online learning and traditional, face-to-face instruction, Garrison, Anderson, and Archer (2001) developed their Community of Inquiry model to classify educational interactions in asynchronous online learning environments. From this model, Shae et al. (2003a) developed the Teaching Presence Scale to measure the impact of effective teaching presence behaviors and validated its use in higher education at the State University of New York Learning Network (SLN).

It is on the teaching presence component of the Community of Inquiry model, the use of the TPS in a professional development setting, and the examination of the relationship between teaching presence and student satisfaction that the research questions and hypotheses in this dissertation study are based. In the following sections, the results of the data analysis for each of these research questions and hypotheses will be discussed and related back to their theoretical foundations and previous research on teaching presence.

Research Questions and Hypotheses: Findings of the Data Analysis

Teaching Presence Scale Questions and Hypotheses

As the first two research questions and their corresponding hypotheses relate to the TPS and the teaching presence model, the results of the analysis for both questions and their hypotheses will be discussed together.

1) Does the Teaching Presence Scale measure the teaching presence construct as intended in a professional development setting?

H_1: The Teaching Presence Scale does measure the teaching presence construct as intended in a professional development setting.

2) Does the factor structure of "teaching presence" for teachers completing an online professional development program fit the original three-factor model of teaching presence proposed for use in higher education?

H_2: There are three distinct factors inherent within teaching presence, including instructional design and organization, facilitating discourse, and direct instruction.

H_3: TPS items 1-6 will load on the instructional design and organization factor.

H_4: TPS items 7-18 will load on the facilitating discourse factor.

H_5: TPS items 19-28 will load on the direct instruction factor.

As defined by Garrison et al. (2001), teaching presence is the component of the Community of Inquiry model that discusses the behaviors and functions of an online instructor or facilitator. Garrison et al. (2001) presented teaching presence as broken down into three constructs: instructional design and organization, facilitating discourse, and direct instruction. These three factors were represented in the initial validation of the Teaching Presence Scale (Shae et al., 2003a). Exploratory factor analysis led Shae et al. (2005) to propose a different structure for teaching presence. Instead of the three factors presented by Garrison et al. (2001), the analysis performed by Shae et al. (2005) seemed to support a two-factor model, combining facilitating discourse and direct instruction into a single factor that they called directed facilitation. A confirmatory factor analysis by Arbaugh and Hwang (2006), on the other hand, found support for the original three-factor model.

Although these researchers found divergent evidence of the teaching presence factor structure, they found that the TPS items loaded more effectively as valid measures of teaching presence when items measuring teaching presence behaviors among participants in the course were excluded from the analysis.

It was with this research history in mind that the initial and ancillary analyses were conducted in the current research study.

Initial Analysis

The confirmatory factor analysis first tested the original, three-factor model (including instructional design and organization, facilitating discourse, and direct instruction as three distinct constructs) with all original 28 TPS items used as variables. There were six items measuring instructional design and organization, 12 items measuring facilitating discourse, and 10 items measuring direct instruction.

As mentioned in previous chapters, facilitating discourse and direct instruction were measured for both instructors and students. In other words, each item measuring an instructor's facilitating discourse or direct instruction behaviors was duplicated to also measure participants' facilitating discourse or direct instruction behaviors toward each other (Shae et al., 2003b). In these cases, the two items were worded identically, except that one asked the respondent to evaluate the teaching presence behavior of the instructor, and the other asked the respondent to evaluate the same teaching presence behavior among other course participants (e.g., "Overall, the instructor for this course were helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn" and "Overall, other participants for this course were helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn"). There were therefore six facilitating discourse items pertaining to instructors' behaviors, and six pertaining to students' behaviors. There were five direct instruction items pertaining to

instructors' behaviors, and five pertaining to students' behaviors. The initial confirmatory factor analysis included all of these items.

All 28 items loaded successfully on their intended constructs, with factor loadings ranging from .56 to .96 and r^2 values ranging from .56 to .92, indicating that 56% to 92% of the score variance could be attributed to the items' ability to measure the latent constructs. This showed some support for hypothesis #1 in this study (that the Teaching Presence Scale does measure the teaching presence construct as intended in a professional development setting), as well as for hypothesis #2 (that teaching presence does consist of three distinct factors), and for hypotheses #3 through #5 (that the items loaded as proposed on the three latent factors). The stronger loadings were all on the items designed to measure only the teaching presence behaviors of the facilitator, however, while the weaker ones were on the items designed to measure teaching presence behaviors among the participants.

In terms of model fit, fit indices for this three-factor, 28-item model were found to be contradictory and therefore somewhat weak. Chi-square values were all statistically significant, showing poor model fit; however, the chi-square corrected for non-normality was less than two times the model degrees of freedom, providing some indication of goodness-of-fit (Tabachnick & Fidell, 2001). Other fit indices were examined as well, and although some (CFI = .97, NNFI = .97) provided support for the goodness-of-fit, others (SRMR = .093, RMSEA = .13) clearly did not.

The analysis of the original teaching presence model showed support for a three-factor model, but it did not show solid evidence that the model is generalizable to the population at large. Because of the lack of such evidence, and because of the existence of two other models in

the literature, ancillary analyses were conducted to re-assess the factor structure, factor loadings, and model fit.

Ancillary Analysis #1: A Three-Factor Model with 17 Items

Factor Loadings

The first ancillary model explored was based on one proposed by Shae et al. (2005) and validated by Arbaugh and Hwang (2006). In both of these studies, the authors found evidence to support the elimination of items 8, 10, 12, 14, 16, and 18 from the analysis of the facilitating discourse factor, and items 20, 22, 24, 26, and 28 from the analysis of the direct instruction factor. These items were the ones whose wording focused them on the teaching presence behaviors of the participants (e.g., "Overall, other participants for this course were helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn"), as opposed to the odd-numbered questions that pertained to the teaching presence behaviors of the facilitators (e.g., "Overall, the instructor for this course was helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn").

The present study also found that the items pertaining to participants' teaching presence behaviors had factor loadings consistently lower than those of the items pertaining to facilitators' teaching presence behaviors. Thus, the CFA was re-run after eliminating all of the items designed to measure the participants' behaviors.

The results of this change to 17, facilitator-focused variables showed a substantial improvement in model fit. As with the initial analysis, all items loaded successfully on the three factors they were designed to measure. With the elimination of the weaker, participant-focused

variables, r^2 values for the factor loadings were all within .81 to .93, meaning 81% to 93% of the score variance could be attributed to the items' ability to measure the latent constructs. This was an improvement of 25% on the lower end of the r^2 value range. Additionally, fit indices improved to show almost universal support for the model's goodness-of-fit. While chi-square values were still statistically significant (which is not surprising given the relatively large sample size, n = 718) other fit indices showed clear and consistent strength (CFI = .999, NNFI = .999, SRMR = .02, and RMSEA = .03). This ancillary analysis provided stronger support for each of the first five hypotheses, as the model fit improved for the three-factor model, the items (with those pertaining to participants' behaviors eliminated) were clearly shown to be valid measures of the teaching presence construct, and the items (with those pertaining to participants' behaviors eliminated) loading strongly on their proposed factors.

The improvement brought about by the elimination of items pertaining to participants' behaviors is interesting in light of the role that peers are expected to play in the learning process, as proposed by such learning theorists as Vygotsky, Piaget and Bandura (Tudge, 1992; Tudge & Winterhoff, 1993; Vygotsky, 1962). Vygotsky (1962) argued that people learn through collaboration with peers (e.g., classmates) or superiors (e.g., teachers) possessing greater levels of competence, with the more competent assisting the less competent through the learning process. Piaget also acknowledged the role of peer interaction in learning, and Bandura concluded that people tend to learn largely through observation and "cognitively active" imitation of social role models (Tudge & Winterhoff, 1993, p. 64). Bandura also advocated a model of bidirectional reciprocation in learning, replacing behaviorist models based on

"unidirectional stimulus-response connections" and placing emphasis on the importance of community interactions and mutual learning experiences (Tudge & Winterhoff, 1993, p. 65).

While the two previously-described confirmatory factor analyses of the TPS show that the facilitator-oriented items are strong and valid measures of teaching presence, the participant-oriented items were much weaker representations of the construct in this study. This could indicate that peer collaboration is a stronger part of the learning process as described by the other parts of the Community of Inquiry (social presence and cognitive presence).

Social presence and cognitive presence are, by definition, the components of the Community of Inquiry that describe student-to-student behaviors and interactions. Social presence is defined by Garrison et al. as "the ability of participants in a Community of Inquiry to project themselves socially and emotionally, as 'real' people (i.e., their full personality), through the medium of communication being used," particularly in the medium of computer-mediated communication (2000, p. 94). Cognitive presence is defined as "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical Community of Inquiry" (Garrison et al., 2001, p. 11). The results of the current CFA seem to indicate that participant behaviors should be left within these two student-oriented components, rather than examined within the teaching presence component.

The weakness of the participant-oriented TPS items compared to the facilitator-oriented items may also shed light on student perceptions of the role of the facilitator (i.e., that the facilitator is at the center of the learning process, and that students are recipients of knowledge rather than co-instructors). Although the role of instructor in an online educational setting is ideally one of guide and collaborative member of the learning team, rather than oracle and

lecturer (Sieber, 2005), students still seem to perceive a reasonably strong characterization of the instructor/facilitator as the figure in charge of the learning process. This perception seems to have held true across educational settings, from undergraduate higher education (Shae et al., 2003a; Shae et al., 2006; Shae et al., 2003b; Shae et al., 2005) to graduate higher education (Arbaugh & Hwang, 2006) to professional development at FOR-PD of adult students possessing at least a bachelor's degree.

It may seem understandable that in-service teachers like those at FOR-PD would see the instructor/facilitator as the true leader of the learning process. These participants could have a teacher-centered perspective on the learning process because they are all educators themselves. However, the participants in Arbaugh and Hwang's (2006) study were students in a graduate business management education program, and the participants in the various studies conducted at the SUNY Learning Network were undergraduate students in a variety of different programs of study (Shae et al., 2003a; Shae et al., 2006; Shae et al., 2003b; Shae et al., 2005). The participants in these studies were not pulled from populations of teachers like those from FOR-PD. It may be, then, that the common thread among all of the participants in these teaching presence studies is that their view of instructor behaviors stems from their own schooling experiences, in which traditional pedagogy emphasized teacher-centered over student-centered learning environments.

Thus, it could be that even with the recommendation of student-centered approaches for optimal learning (Bransford et al., 2000; Chickering & Gamson, 1987; Garrison et al., 2000; Graham et al., 2001; Shae et al., 2003a; Shae et al., 2006; Shae et al., 2003b; Shae et al., 2005; Sieber, 2005), there are societal norms that still place the teacher at the center of the learning

process. Or that even with student-centered approaches being considered ideal for online and adult education, real-life practice still keeps the teacher as the dominant force in learning and interactions.

Model Fit

The analysis of this 17-item, three-factor model indicated much stronger goodness-of-fit than that of the original 28-item, three-factor model. Fit indices designed to serve as model fit criteria (chi-square, SRMR, RMSEA) and as model comparison criteria (CRI, NNFI) were, with the exception of chi-square, well within acceptable levels (X^2 [116, N = 718] = 115.56, $p < .05$; SRMR = .02; RMSEA = .03; CFI = .999; NNFI = .999). These criteria are important because they give an indication of how generalizable the results of the analysis are to the larger population outside of that used in the study, by comparing the fit of the model in the study to that of a perfect, saturated model. These fit indices seem to offer support to the idea that teaching presence, which is a model based upon good, general principles of learning, is as useful for describing phenomena in online professional development as it is for describing those in optimal online higher educational experiences. Certainly, the continued use of a three-factor structure of teaching presence, including instructional design and organization, facilitating discourse, and direct instruction, was supported.

Ancillary Analysis #2: A Two-Factor Model with 17 Items

Factor Loadings

The second ancillary analysis conducted tested the goodness-of-fit of the two-factor model of teaching presence proposed by Shae et al. (2005) after exploratory factor analysis conducted on TPS results at the SUNY Learning Network showed the 17 items loading on two factors, instead of three. These two factors were called (a) instructional design and organization, which included TPS items 1 through 5; and (b) directed facilitation, which included TPS items 6, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, and 27. It is interesting to note that item 6, which was originally written to be a measure of instructional design and organization (Shae et al., 2003a), loaded on the directed facilitation factor instead (Shae et al., 2005).

When this two-factor model was tested using the data generated at FOR-PD, it was found via confirmatory factor analysis that the items listed above did load on the two factors. The r^2 values for all items ranged from .76 to .93, indicating that 76% to 93% of the score variance could be attributed to the items' ability to measure the two proposed latent constructs. It is worth noting that the value at the bottom of this range dropped by 5%, from the 81% that was the low end of the range for the first ancillary analysis (three-factor, 17-item). This is due to the movement of item #6 ("Overall, the instructor for this course helped students to understand and practice the kinds of behaviors acceptable in online learning environments") from the instructional design and organization factor to the directed facilitation factor. When designated as an indicator of directed facilitation, this item's path coefficient, though still statistically significant (t = 48.19), dropped to .87 from the .90 seen in the first ancillary analysis. Its uniqueness value rose from .19 in the first ancillary analysis to .24 in the second ancillary

analysis, indicating a rise in the amount of the variance attributable to things other than its ability to measure the construct. And while these differences in r^2, uniqueness, and path coefficient values between the first (three-factor, 17-item) ancillary analysis and second (two-factor, 17-item) ancillary analysis may seem small, they do stand out among the more positive values associated with the other items.

Model Fit

As with the first ancillary analysis, the model fit indices for the analysis of this two-factor model show a much better fit than did the initial analysis of the three-factor, 28-item model. Fit indices designed to serve as model fit criteria (chi-square, SRMR, RMSEA) and as model comparison criteria (CRI, NNFI) were again, with the exception of chi-square, well within acceptable levels (X^2 [116, N = 718] = 128.36, $p < .05$; SRMR = .02; RMSEA = .04; CFI = .998; NNFI = .998). While very close to the goodness-of-fit shown in the first ancillary analysis, these fit indices are slightly weaker, with the chi-square and RMSEA rising a bit and the CFI and NNFI falling a small amount.

In all, the results of both ancillary analyses were stronger than those of the initial analysis. This provides solid support for the elimination of the participant-focused items. And while the indicators did load with statistical significance on the two-factor model, both the slight decrease in model fit and the fact that one item (#6) seemed not to fit as well on its new factor (directed facilitation) made the second ancillary model a poorer fit than the first ancillary model. This supports the results of the analysis performed by Arbaugh and Hwang (2006) more so than those of the analysis performed by Shae et al. (2005). Garrison (2007) proposed that the

discrepancies in model fit (two-factor versus three-factor) could possibly be explained by the differences in study participants between the two, with those in the analysis by Shae et al. (2005) being undergraduate students, and those in the analysis by Arbaugh and Hwang (2006) being graduate students with more experience in higher educational settings. Garrison (2007) suggested that the graduate students might have a better-developed ability to observe subtle distinctions in the behavior patterns of their online instructors, leading to their support of the three-factor model.

It is also possible that older students like those in the study by Arbaugh and Hwang (2006) and those in the current study at FOR-PD possess greater concentrations of the characteristics of adult learners discussed earlier (Gibbons & Wentworth, 2001; Knowles, 1980; Knowles et al., 2006). It is possible that the additional life experience and/or work experience they have gained since completing their undergraduate education, plus the additional maturity that may develop as they get older, may make them a substantively different group of learners than their younger, less experienced counterparts in undergraduate online education.

This makes sense, intuitively, as many undergraduate students are transitioning from the pedagogy they have known throughout primary and secondary school to the andragogical principles that are supposed to be most effective in online education (Gibbons & Wentworth, 2001).

In traditional pedagogy, the student is viewed as a dependent personality and the instructor's role is to build upon the student's experience. Traditional pedagogy regards students' readiness to learn as being developmentally-based and age-based. It emphasizes a subject-

centered orientation to learning, and extrinsic motivation to learn, based on a system of rewards and punishment.

In andragogy, by contrast, the emphasis is on the student as increasingly self-directed. The instructor's role is to tap into the learner's existing life experience as a rich resource for the entire learning community. Students' readiness to learn is seen as based upon life work and problems rather than age and development. A task-centered or problem-centered orientation to learning takes the place of the subject-orientation found in traditional pedagogy, and motivation to learn is viewed as intrinsic, based on internal curiosity or the need to solve problems (Gibbons & Wentworth, 2001).

It is possible that the different students in the graduate study sample and the professional development sample have made the transition from traditional pedagogy to the andragogy seen in online learning experiences more completely than the undergraduate students, leading to the different results obtained in the three analyses. The older, more experienced students may have different perspectives and perceptions of the role of the instructor than do the younger undergraduates.

Correlation of Teaching Presence and Student Satisfaction Question and Hypothesis

3) Is there a correlation between teaching presence, as measured by the Teaching Presence Scale, and student satisfaction?

H_6: There is a correlation between teaching presence, as measured by the Teaching Presence Scale, and student satisfaction.

The first ancillary analysis, featuring the three-factor, 17-item model in which item #6 remained a measure of instructional design and organization, was deemed to be the model of best fit. It was therefore the model whose results were used to assess the amount and nature of relationship between teaching presence and student satisfaction. The scores for the items for each of the three teaching presence factors (instructional design and organization, facilitating discourse, and direct instruction) were converted into composite variables, and were then set aside for later use in the correlation with student satisfaction variables.

The student satisfaction variables were taken from surveys provided by FOR-PD. These items were presented as items 34 through 40 and 41 through 50 on the survey instrument used in the current study. As reported in the previous chapter, exploratory factor analysis (EFA) was used to determine whether items 34 through 40 did, in fact, measure student satisfaction with the FOR-PD facilitator, and whether items 41 through 50 measured student satisfaction with the FOR-PD course. Eigenvalues and correlation coefficients offered clear support for the proposed two-factor structure of student satisfaction, so these items were converted into composite variables representing student satisfaction with facilitators and student satisfaction with the course.

A Pearson correlation was conducted to determine the extent and direction of relationships between the three teaching presence composite variables (instructional design and organization, facilitating discourse, and direct instruction) and the two student satisfaction composite variables (satisfaction with facilitators and satisfaction with the course). For the most part, the results indicated positive and moderate to strong relationships between these variables.

As a participant's sense of teaching presence moves in a positive direction, so does his feeling of satisfaction with both the course and the facilitator.

Again, this would seem to support the appropriateness of the application of principles of andragogy to a learner population made up of adult professionals (Gibbons & Wentworth, 2001; Knowles, 1980). Not only did the FOR-PD students rate their instructors' teaching presence behaviors quite highly (so highly, in fact, as to create issues with normality stemming from a very positively skewed curve of responses), their reported sense of satisfaction with the facilitators and the course was also quite high and was highly correlated with their acknowledgment of teaching presence behaviors.

As reported in chapter 4, the teaching presence-student satisfaction relationships were strongest between direct instruction and satisfaction with facilitators, followed by facilitating discourse and satisfaction with facilitators, and instructional design and organization with satisfaction with facilitators. It is interesting to note that the two factors (facilitating discourse and direct instruction) for which Shae et al. (2005) found evidence to support creating one combined factor (directed facilitation) had the strongest correlations with student satisfaction. In the current study, there seemed to be little ambiguity about students' ability to recognize and appreciate the two distinct factors; again, this could be attributable to the differences between the characteristics and motivations of the different study samples (Garrison, 2007).

There were also moderate to strong correlations between direct instruction and satisfaction with the course, followed by facilitating discourse and satisfaction with the course, and finally by instructional design and organization and satisfaction with the course. It is again noteworthy that although the correlations between teaching presence and student satisfaction

with the course were slightly weaker, they followed the same pattern with direct instruction having the greatest impact, then facilitating discourse, then instructional design and organization.

Both in terms of the participants' perceptions of their facilitators and of their experience with the course, direct instruction had the strongest influence on students' feelings of satisfaction. When considering the principles of effective adult online education proposed by Gibbons and Wentworth (2001), it would seem that in spite of the self-directedness, independence, and intrinsic motivation shared by these students, they still place great value on the leadership of a high-quality instructor/facilitator.

It also seems that participants in the FOR-PD setting saw a clear distinction between the roles of their facilitator and the roles of other participants. Even though both participants and FOR-PD facilitators are all technically professional peers from the same industry, the facilitators were valued most for being directors/leaders of the learning experience, more than for facilitating discourse (guiding and collaborating in the learning interactions) or for their instructional design and organization capabilities. FOR-PD participants expected their facilitator to be a teacher/leader/mentor first, a referee of interpersonal communications second, and a curriculum designer and maintainer third. And in spite of the theoretical value of collaboration with peers throughout the learning process (Tudge, 1992; Tudge & Winterhoff, 1993; Vygotsky, 1962), there was evidence to support the notion that the participants in this study placed more value on guidance received from their facilitators than from their fellow students.

Summary of the Discussion of Results

Initial and ancillary analysis found that the teaching presence model, with three factors (direct instruction, facilitating discourse, and instructional design and organization) is a valid model of the learning experience in a professional development setting, and that the Teaching Presence Scale is a valid measure of this construct in such a setting.

It was also ascertained that a three-factor model of teaching presence using only those 17 TPS items pertaining to the facilitator's behaviors had the strongest fit indices and path coefficients – more so than the original three-factor, 28-item model or the ancillary two-factor, 17-item model. This supported the three-factor model as originally proposed by Garrison et al. (2000), then later tested by Shae et al. (2003a; , 2003b) and confirmed by Arbaugh and Hwang (2006).

In fact, more support was found for the three-factor model in the current analysis than for the two-factor model validated by Shae et al. (2005) with their sample of undergraduate university students. As stated by Garrison (2007), this could be due to differences in the characteristics inherent to the different study samples. The students in both the Arbaugh and Hwang (2006) study and the current study are arguably older, have had more educational experiences, and have spent more time building their careers than those in the studies at the SUNY Learning Network (Shae et al., 2003a; Shae et al., 2006; Shae et al., 2003b; Shae et al., 2005).

In addition to the fit of the three-factor model, analysis revealed that items pertaining to instructors' teaching presence behaviors were more valid indicators of the construct than were the items pertaining to participants' teaching presence behaviors. It was posited that in spite of

the role that participants may play in facilitating the learning process (Tudge, 1992; Tudge & Winterhoff, 1993; Vygotsky, 1962), they tend to view the instructor/facilitator as the main director of learning, instead of crediting their peer interactions with that role. This could be because the participants, though they are adults now, grew up experiencing traditional pedagogy in which education is very teacher-centered. Although they respond positively to the principles of andragogy used in the Florida Online Reading Professional Development program, as shown by the moderate to strong positive correlations between teaching presence and student satisfaction, they see the experience and the roles therein through the lens of a more traditional approach to education.

This explanation was supported by the fact that the strongest correlations were between student satisfaction items and the direct instruction component of teaching presence; facilitators were most valued for their leadership of the learning process, and less so for their ability to facilitate communication or for their instructional design and organization capabilities.

Limitations

There are several limitations inherent to this confirmatory factor analysis study. This study only includes participants who were enrolled in and completed the FOR-PD course during the spring of 2009. It was assumed that non-completers chose to leave the course for a variety of reasons, the full range of which is unknown to the researcher. As non-completers of a course do not have the same course experience (at least in terms of duration and completeness, and possibly in terms of other affective factors as well), they were eliminated from the study in the interest of working with the most homogeneous sample as possible.

Additionally, the TPS relies on self-report. As indicated above, this self-report is given only by participants who are nearing completion of the FOR-PD course. Because respondents are successful completers of the course, by nature of the end-of-course survey administration, data from less successful or less satisfied (non-completing) participants are lacking from the analysis. This may present a view of teaching presence that is not generalizable to all participants.

As discussed previously in this study, the fact that the TPS relies on learner perceptions of teaching presence instead of direct observations of teaching behaviors by neutral parties could present a similar limitation. One disadvantage of evaluating online learning experiences using learner perceptions is the rather shallow nature of the data obtained. If one considers Kirkpatrick's four levels of evaluation, level one is reaction (e.g., data obtained from student satisfaction surveys), level two is learning (e.g., evaluation of students' grades, pre- and post-tests to determine learning gains, or rubrics for qualitative analysis of student course work and interactions), level three is behavior (e.g., observation of students' application of what they have learned to real life settings, outside of the course), and level four is results (e.g., measuring ways the students' learning gains have generated results at an organizational level) (Berge & Myers, 2001). Higher-level applications of learning are more difficult and expensive to evaluate, which helps account for the prevalence of level one evaluations, i.e., student reports of course satisfaction (Berge & Myers, 2001).

The problem with evaluations conducted at this level is that student reactions may not always be a valid measure of a teacher's effectiveness within the learning experience. Shelvin, Banyard, Davies, and Griffiths (2000) studied the use of student satisfaction surveys to evaluate university professors' teaching effectiveness. They found that the charisma of the instructor, as

rated by students, accounted for a greater variance in student satisfaction than did the instructors' perceived teaching abilities or course design. In other words, the positive or negative student perceptions of instructors' personalities outweighed their perceptions of instructors' teaching abilities. Yet the results of such end-of-course student satisfaction surveys are routinely used as measures of online and face-to-face instructors' teaching effectiveness (Shelvin et al., 2000). While learner perceptions are important, their objectivity may be challenged by experiences or feelings unrelated to the teaching presence construct being measured.

Implications for Practice

The implications for practice that result from the findings of this study center mostly on how enhanced knowledge of teaching presence may be used to develop instructor/facilitators as online educators of adults. It is important that such instructors have a solid knowledge base in their field, as well as knowledge and experience with andragogy. They should be taught the differences between pedagogy and andragogy, so that they clearly understand the teaching and learning principles that are most appropriate for students in the unique online setting. This is particularly true for those online instructors in professional development situations, in which learners are all adults who have accumulated substantial life and work experience, expect education to be relevant to their needs and interests, adopt a problem-solving approach toward learning, and tend to be independent, self-directed, intrinsically motivated learners (Gibbons & Wentworth, 2001; Knowles, 1980).

The results of this study also indicate that it would be worthwhile to educate instructor/facilitators on the tenets of teaching presence, so that they have a model for optimal

online learning interactions that is grounded in theory. In all, it would be ideal to combine explicit instruction on andragogy with explicit instruction on teaching presence, and perhaps the other components of the Community of Inquiry (i.e., cognitive presence and social presence) although these were outside of the scope of this study), to optimize online learning experiences in a variety of educational settings.

Another possible application of the information gained in this study is toward the development of an assessment tool for online educators that is not based solely on student report. Student "course satisfaction" reports make up the majority of such assessments, but they have been deemed relatively shallow and unreliable as analysis tools (Berge & Myers, 2001; Coppola et al., 2004; Shelvin et al., 2000). It may be worthwhile to use teaching presence principles and andragogical principles to create a more objective assessment tool to be used by online program administrators, principle investigators, and/or instructors themselves to gauge the effectiveness of online educational experiences.

Implications for Further Research

In addition to implications for practice, the results of this study imply various directions for future research. First, as teaching presence and the instrument designed to measure it (TPS), have been shown to be appropriate for students in a professional development setting, it would be worthwhile to see if this extends to a wider variety of online educational settings. Alternative online settings could include other corporate areas outside of the field of education, or the military, or even in online secondary education. It could be particularly interesting to explore this last setting, as andragogical principles inherent to any distance learning/online educational

experience are in effect (Gibbons & Wentworth, 2001), but the students themselves are younger, less mature, less experienced with life, work, and education, and more accustomed to instructors using pedagogical principles in their educational experience.

It could also be interesting to study teaching presence and the use of the TPS in professional development settings in which the stakes are not as high as those for the participants at FOR-PD. The participants in the current study are under unprecedented pressure to acquire high-quality skills for teaching reading, due to their students' struggles on reading tests mandated by the No Child Left Behind Act of 2001 (FLDOE, 2009; NAEP, 2005; NAEP, 2007b). To stay in demand as teachers, ensuring their marketability during economic times in which school districts are cutting expenses and laying off teachers, the participants at FOR-PD may have unusually high levels of motivation to succeed in their professional development. It would be worth studying the use of the TPS and the correlation of teaching presence and student satisfaction in a setting where the students are perhaps not as motivated to succeed, or are not as reliant on their professional development success for career advancement or stability.

It may also be worthwhile to study teaching presence in conjunction with the other two components of the Community of Inquiry (social presence and cognitive presence). The fact that the results of this study indicated a weakness of participant-focused TPS items as measures of teaching presence could mean that they are, in fact, better measures of social presence or cognitive presence within the learning experience. It would be interesting to learn whether an instrument developed to measure all three Community of Inquiry components would shed additional light on the role of peer interactions in the learning process, and how these interactions work in a variety of different online educational settings.

Finally, it could be very illuminating to gauge the ability of the teaching presence construct to predict student outcomes other than student satisfaction. As student satisfaction is not the only desirable outcome of the learning experience, it could be worthwhile to know whether other student outcomes (e.g., learning gains, repeat participation in other online course experiences, indication that students are using what they have learned in real world settings, etc.) can be predicted by teaching presence. One of the challenges inherent to educational research is that students are complex human beings, and the learning process itself is comprised of factors that can be very difficult to determine, describe, and measure. To isolate any of these factors as predictable by teaching presence could be a very useful contribution to the body of knowledge on online teacher effectiveness.

Summary

The Community of Inquiry model provides a framework for recognizing and evaluating interpersonal behaviors in online educational settings. One of its three components, teaching presence, describes those behaviors that are under the auspices of the online instructor. By examining these interactions and behaviors through the theoretical lens provided by teaching presence, and by measuring them with the Teaching Presence Scale (TPS), it may be possible to gain greater understanding of the practices employed most effectively by online instructors.

The significance of this study rests in the fact that teaching presence, as grounded in learning theory, may play a crucial part in explaining how instructors help to facilitate successful learning among students in solely online educational experiences. This could have implications for online instructor training that would lead to increased performance, satisfaction, and learning

gains among students. The optimal online course experience for adult learners is a careful balancing act between building skills, tapping into and enhancing motivation, and providing an educational opportunity in accordance with their unique needs, while recognizing the limitations of a strictly virtual classroom (Gibbons & Wentworth, 2001). The teaching presence model, with its foundations in general and adult learning theory, sheds light on how best to create and measure such an experience.

This dissertation described the background, theoretical and empirical foundations, methods, and results of a study on teaching presence. The purpose of the study was threefold: to validate the use of the TPS in an online professional development setting outside of the higher education context in which it was designed and tested; to confirm the factor composition of teaching presence among facilitators in an online professional development course; and to determine the extent and direction of the relationship between teaching presence and student satisfaction. The three research questions were, in fact, answered in the affirmative, and the six null hypotheses rejected.

The results of this study have the potential to open new windows on teaching presence research, and therefore add to the body of knowledge on effective online teaching practices. This may have implications for development, design, and implementation of online facilitator training geared toward teaching online facilitators how to be better instructors by employing effective teaching presence behaviors. The validation of the TPS in this new context may indicate that it is possible to quantify and measure behaviors then exhibited by the online facilitators after training, noting those areas where teaching presence practices are incorporated effectively as well as those where training has left knowledge or performance gaps. Finally, the strong correlations between

teaching presence and student satisfaction may indicate that teaching presence can serve as a basis for improving the quality of the online learning experience, as perceived by the participant.

APPENDIX A: IRB APPROVAL LETTER

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Notice of Expedited Review and Approval of Requested Addendum/Modification Changes

From: **UCF Institutional Review Board**
FWA00000351, Exp. 10/8/11, IRB00001138

To: **Vassiliki Zygouris-Coe**

Date: **April 13, 2009**

IRB Number: **SBE-06-03846**

Study Title: **Florida Online Reading Professional Development (FOR-PD) Evaluation Research**

Dear Researcher:

Your requested addendum/modification changes to your study noted above which were submitted to the IRB on 04/09/2009 were approved by **expedited** review on 4/13/2009. IRB approval consists of: a new survey for this semester that will be used in place of the existing end of course survey. Data will be used to evaluate the effectiveness of grant efforts and will also be used for a published paper (dissertation) by Melinda Stevenson who is already listed on the existing IRB Application.

Per federal regulations, 45 CFR 46.110, the expeditable modifications were determined to be minor changes in previously approved research during the period for which approval was authorized.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Subjects or their representatives must receive a copy of the consent form(s).

This addendum approval does NOT extend the IRB approval period or replace the Continuing Review form for renewal of the study.

On behalf of Tracy Dietz, Ph.D., IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 04/13/2009 11:05:03 AM EDT

Joanne Muratori

IRB Coordinator

Internal IRB Submission Reference Number: 005840

APPENDIX B: TEACHING PRESENCE SCALE AND STUDENT SATISFACTION SURVEY

Teaching Presence Scale

1. Overall, **the instructor** for this course clearly communicated important course outcomes (for example, provided documentation on course goals).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

2. Overall, **the instructor** for this course clearly communicated important course topics. (For example provided a clear and accurate course overview).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

3. Overall, **the instructor** for this course provided clear instructions on how to participate in course learning activities (e.g., provided clear instructions on how to complete course assignments successfully).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

4. Overall, **the instructor** for this course clearly communicated important due dates/time frames for learning activities that helped me keep pace with the course (for example, provided a clear and accurate course schedule, due dates etc).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

5. Overall, **the instructor** for this course helped me take advantage of the online environment to assist my learning (for example, provided clear instructions on how to participate in online discussion forums).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

6. Overall, **the instructor** for this course helped student to understand and practice the kinds of behaviors acceptable in online learning environments (for example provided documentation on "netiquette" i.e. polite forms of online interaction).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

7. Overall, **the instructor** for this course was helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

8. Overall, **other participants** in this course were helpful in identifying areas of agreement and disagreement on course topics that assisted me to learn.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

9. Overall, **the instructor** for this course was helpful in guiding the class towards agreement/understanding about course topics that assisted me to learn.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

10. Overall, **other participants** in this course were helpful in guiding the class towards agreement/understanding about course topics that assisted me to learn.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

11. Overall, **the instructor** in this course acknowledged student participation in the course (for example replied in a positive, encouraging manner to student submissions).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

12. Overall, **other participants** in this course acknowledged student participation in the course (for example replied in a positive, encouraging manner to student submissions).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

13. Overall, **the instructor** for this course encouraged students to explore concepts in the course (for example, encouraged "thinking out loud" or the exploration of new ideas).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

14. Overall, **other participants** in this course encouraged students to explore concepts in the course (for example, encouraged "thinking out loud" or the exploration of new ideas).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

15. Overall, **the instructor** for this course helped to keep students engaged and participating in productive dialog.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

16. Overall, **other participants** in this course helped to keep students engaged and participating in productive dialog.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

17. Overall, **the instructor** for this course helped keep the participants on task in a way that assisted me to learn.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

18. Overall, **other participants** in this course helped keep us on task in a way that assisted me to learn.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

19. Overall, **the instructor** for this course presented content or questions that helped me to learn.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

20. Overall, **other participants** in this course presented content or questions that helped me to learn.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

21. Overall, **the instructor** for this course helped to focus discussion on relevant issues in a way that assisted me to learn.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

22. Overall, **other participants** in this course helped to focus discussion on relevant issues in a way that assisted me to learn.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

23. Overall, **the instructor** for this course provided explanatory feedback that assisted me to learn (for example responded helpfully to discussion comments or course assignments).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

24. Overall, **other participants** in this course provided explanatory feedback that assisted me to learn (for example responded helpfully to discussion comments or course assignments).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

25. Overall, **the instructor** for this course helped me to revise my thinking (for example – correct misunderstandings) in a way that helped me to learn.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

26. Overall, **other participants** in this course helped me to revise my thinking (for example – correct misunderstandings) in a way that helped me to learn.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

27. Overall, **the instructor** for this course provided useful information from a variety of sources that assisted me to learn (for example references to articles, textbooks, personal experiences or links to relevant external websites).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

28. Overall, **other participants** in this course provided useful information from a variety of sources that assisted me to learn (for example references to articles, textbooks, personal experiences or links to relevant external websites).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

FOR-PD Course Experience

29. Have you dropped out of the course or decided not to complete the course?
    a. Yes
    b. No

30. How did you enroll in the FOR-PD course?
    a. Through my school district
    b. Through open enrollment

31. Why did you enroll in the FOR-PD course? Select one category that best fits your situation. (ALLOW FOR ONE RESPONSE)
    a. Reading Endorsement
    b. CAR-PD
    c. ACP/District
    d. REESOL
    e. Recertification
    f. My own professional development
    g. Other

32. Was this your first attempt at taking FOR-PD?
    a. Yes
    b. No

33. Please rate the pace of the course.
    a. Too fast
    b. Too slow
    c. The course design allowed for an appropriate pace

In questions 34 - 40, please rate the course along the following dimensions:

34. I found the FOR-PD course content met my needs on learning how to integrate literacy into my content area instruction.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

35. The course content increased my knowledge of scientifically-based reading research.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

36. It was easy to navigate through the course.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

37. The assignments were of an appropriate length (not too time-consuming).
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

38. The course in general was of an appropriate length.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

39. The literacy log was helpful for classroom implementation of strategies.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

40. I am comfortable using the reading strategies taught in FOR-PD.
    a. Strongly Disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

In questions 41 - 52, please rate your facilitator along the following dimensions:

41. Feedback concerning your performance in this course was:
    a. Poor
    b. Fair
    c. Good
    d. Excellent

42. The facilitator's interest in your learning was:
    a. Poor
    b. Fair
    c. Good
    d. Excellent

43. The facilitator's assessment of your progress in the course was:
    a. Poor
    b. Fair
    c. Good
    d. Excellent

44. Expression of expectations for performance:
    a. Poor
    b. Fair
    c. Good
    d. Excellent

45. Availability to assist students:
    a. Poor
    b. Fair
    c. Good
    d. Excellent

46. Promptness of facilitator responses in online discussions:
    a. Poor
    b. Fair
    c. Good
    d. Excellent

47. Promptness of facilitator responses in email or course mail:
    a. Poor
    b. Fair
    c. Good
    d. Excellent

48. Respect and concern for students:
    a. Poor
    b. Fair
    c. Good
    d. Excellent

49. Facilitation of learning:
    a. Poor
    b. Fair
    c. Good
    d. Excellent

50. Overall assessment of facilitator:
    a. Poor
    b. Fair
    c. Good
    d. Excellent

51. Rate the frequency of your facilitator's participation in online discussions.
    a. Not at all
    b. Little
    c. Moderate
    d. Frequent
    e. N/A

52. Rate the quality of your facilitator's participation in online discussions.
    a. Needs improvement
    b. Satisfactory
    c. Above satisfactory
    a. N/A

General Information

Please enter or select the best answer for each of the questions that follow (Please select ONLY ONE response for each question unless otherwise noted).

53. Gender:
    a. Male
    b. Female

54. Race:
    a. American Indian or Alaska Native
    b. Asian or Pacific Islander
    c. Black, not of Hispanic or Latino origin
    d. Hispanic or Latino
    e. White, not of Hispanic or Latino origin

55. Age:
    a. under 22
    b. 22 to 25
    c. 26 to 30
    d. 31 to 35
    e. 36 to 40
    f. 41 to 45
    g. 46 to 50
    h. 51 to 55
    i. 56 to 60
    j. 61 to 65
    k. 66 or above

56. Education level(s) completed (please select all that apply):
    a. Bachelor's degree
    b. Certificate program
    c. National Board certification
    d. Master's degree
    e. Educational Specialist degree
    f. Doctoral degree

57. Did you obtain your degree through a college of education or other route? If you have more than one degree and one of them is from a college of education, select "College of Education."
    a. College of Education
    b. Other route

58. How do you classify your current position at your school?
    a. Regular full-time teacher
    b. Regular part-time teacher
    c. Itinerant teacher (i.e., your assignment requires you to provide instruction at more than one school)
    d. Administrator (e.g., principal, assistant principal, director, school head)
    e. Library media specialist or Librarian
    f. Other professional staff (e.g., counselor, curriculum coordinator, social worker)

59. At what school level do you (or do you plan to) work primarily? (ALLOW ONLY ONE RESPONSE)
    a. Public Elementary School (K-2)
    b. Public Elementary School (3-5)
    c. Public Middle School (6-8)
    d. Public High School (9-12)
    e. Public Charter School
    f. Public K-8 School
    g. Public K-12 School
    h. Private
    i. Higher Education
    j. Other

60. How many years of experience do you have in K-12 education?
    a. 0-1
    b. 2-5
    c. 6-10
    d. 11-15
    e. 16-20
    f. 21+

61. Area(s) of Teaching Certification (please select all that apply)
    a. Agriculture
    b. Art
    c. Biology
    d. Business Education
    e. Chemistry
    f. Computer Science
    g. Drama
    h. Earth-Space Science
    i. Educational Media Specialist
    j. Elementary Education
    k. Middle Grades English (5-9)
    l. English (6-12)
    m. English to Speakers of Other Languages
    n. Exceptional Student Education
    o. Family and Consumer Science
    p. Foreign Language
    q. Middle Grades General Science (5-9)
    r. Health
    s. Hearing Impaired
    t. Humanities
    u. Industrial Arts/Technology Education
    v. Journalism
    w. Marketing
    x. Mathematics
    y. Mathematics
    z. Middle Grades Integrated Curriculum
    aa. Music
    bb. Physical Education
    cc. Physics
    dd. Prekindergarten/Primary Education
    ee. Preschool Education
    ff. Social Science
    gg. Speech
    hh. Visually Impaired
    ii. Other (please write in)_____

62. Please describe your level of experience with online courses, this was my...
    a. First online course
    b. Second online course
    c. Third online course
    d. Fourth online course
    e. Fifth online course

63. Based on your experience, would you consider taking other online courses in the future?
    a. Yes, as many as possible.
    b. Yes, some additional courses.
    c. Not sure.
    d. Only if absolutely necessary.
    e. No.
    f. If you answered "no," please explain why not?

    _____
    _____
    _____

APPENDIX C: SURVEY EMAIL SCRIPTS

Subject: FOR-PD Spring 2009 End of Course Evaluation Survey--Please Respond

Dear FOR-PD Participant:

Our records indicate you were enrolled in FOR-PD in the Spring 2009 semester. Please take a few minutes to click on the link below and fill out a course evaluation survey. This information will help us evaluate the usefulness of FOR-PD and help us make improvements to the course. It will also be combined with other data and used to inform the Florida Department of Education, which is funding this project, and used in research reports presented to local, state and national audiences. All the responses will be compiled and reported in aggregate so your responses will be confidential. Your facilitator and all FOR-PD staff will NOT have access to your response. Your name will not be revealed and there will be no benefit or compensation for filling out the survey. All data is stored in a locked file.

If you have any questions about this research either now or at a later time, please contact either me or Vicky Zygouris-Coe, Principal Investigator, at 407-823-0386. Questions or concerns about research participants' rights may be directed to the UCFIRB Office, UCF Office of Research, Orlando Tech Center, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246. The phone is 407-823-2901. There are no anticipated risks or direct benefits to your participation and no compensation will be provided. You must be 18 years of age or older to participate. By submitting this survey you will be authorizing informed consent.

FOR-PD End of Course Evaluation Survey
http://www.zoomerang.com/Survey/?p=WEB2295ZYDXHL8

Please take the survey ONLY once even if you receive the invitation in more than one email.

Thank you for becoming involved with FOR-PD.

Bonnie Swan, Ph.D.
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PEER-Program Evaluation and Educational Research Group
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Subject: FOR-PD Spring 2009 End of Course Evaluation Survey-REMINDER

PLEASE DISREGARD AND THANKS IF YOU HAVE ALREADY RESPONDED.

Dear FOR-PD Participant:

Our records indicate you were enrolled in FOR-PD in the Spring 2009 semester. Please take a few minutes to click on the link below and fill out a course evaluation survey. This information will help us evaluate the usefulness of FOR-PD and help us make improvements to the course. It will also be combined with other data and used to inform the Florida Department of Education, which is funding this project, and used in research reports presented to local, state and national audiences.

The responses will be compiled and reported in aggregate so your responses will be confidential. Your facilitator and all FOR-PD staff will NOT have access to your response. Your name will not be revealed and there will be no benefit or compensation for filling out the survey. All data is stored in a locked file.

If you have any questions about this research either now or at a later time, please contact either me or Vicky Zygouris-Coe, Principal Investigator, at 407-823-0386. Questions or concerns about research participants' rights may be directed to the UCFIRB Office, UCF Office of Research, Orlando Tech Center, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246. The phone is 407-823-2901. There are no anticipated risks or direct benefits to your participation and no compensation will be provided. You must be 18 years of age or older to participate. By submitting this survey you will be authorizing informed consent.

FOR-PD End of Course Evaluation Survey
http://www.zoomerang.com/Survey/?p=WEB2295ZYDXHL8

Please take the survey ONLY once even if you receive the invitation in more than one email.

Thank you for becoming involved with FOR-PD.

Bonnie Swan, Ph.D.
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APPENDIX D: CORRELATION MATRICES FOR PRIMARY AND ANCILLARY CONFIRMATORY FACTOR ANALYSES

Correlations between Teaching Presence Scale items (N = 718)

TPS Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	---																											
2	.93	---																										
3	.90	.91	---																									
4	.89	.90	.90	---																								
5	.88	.89	.87	.88	---																							
6	.85	.86	.84	.85	.87	---																						
7	.84	.84	.84	.81	.83	.84	---																					
8	.59	.60	.58	.58	.63	.64	.70	---																				
9	.84	.84	.84	.80	.83	.83	.90	.72	---																			
10	.61	.60	.62	.57	.60	.64	.67	.88	.76	---																		
11	.85	.84	.84	.84	.82	.81	.83	.60	.86	.62	---																	
12	.66	.66	.68	.66	.65	.65	.63	.74	.65	.77	.75	---																
13	.84	.83	.83	.80	.81	.81	.83	.65	.88	.67	.87	.70	---															
14	.61	.59	.63	.59	.63	.64	.63	.79	.68	.81	.63	.78	.77	---														
15	.82	.84	.83	.81	.82	.82	.84	.66	.87	.67	.89	.68	.88	.69	---													
16	.59	.60	.59	.58	.63	.65	.63	.83	.68	.84	.64	.81	.70	.85	.75	---												
17	.83	.84	.85	.83	.83	.82	.86	.65	.88	.65	.87	.68	.89	.70	.90	.71	---											
18	.54	.55	.56	.52	.58	.59	.63	.79	.66	.81	.59	.72	.66	.79	.68	.87	.70	---										
19	.81	.85	.84	.80	.82	.80	.84	.67	.88	.68	.82	.65	.84	.64	.86	.68	.90	.65	---									
20	.56	.57	.57	.53	.61	.61	.61	.81	.66	.82	.57	.73	.63	.80	.66	.84	.66	.84	.71	---								
21	.85	.85	.86	.83	.86	.82	.85	.67	.88	.69	.86	.70	.87	.67	.90	.71	.92	.68	.92	.70	---							
22	.62	.63	.63	.57	.63	.63	.64	.82	.67	.83	.62	.74	.66	.80	.69	.87	.69	.86	.71	.88	.75	---						
23	.83	.84	.83	.80	.81	.80	.86	.64	.88	.65	.91	.68	.87	.66	.89	.66	.89	.63	.88	.61	.91	.66	---					
24	.61	.61	.60	.56	.60	.60	.63	.80	.69	.83	.65	.77	.66	.77	.69	.83	.68	.81	.69	.86	.72	.87	.69	---				
25	.78	.79	.81	.75	.76	.75	.83	.64	.84	.66	.83	.67	.85	.66	.87	.67	.87	.67	.87	.64	.89	.66	.90	.69	---			
26	.55	.54	.59	.51	.57	.58	.62	.75	.66	.77	.57	.67	.65	.73	.64	.78	.66	.81	.66	.80	.68	.81	.62	.83	.76	---		
27	.80	.83	.81	.80	.80	.78	.82	.61	.82	.62	.81	.64	.82	.63	.84	.65	.86	.59	.87	.62	.88	.64	.84	.63	.83	.60	---	
28	.54	.55	.58	.51	.57	.60	.62	.78	.66	.79	.60	.73	.64	.79	.68	.83	.67	.80	.66	.81	.67	.82	.62	.81	.67	.83	.67	---

APPENDIX E: LISREL SYNTAX USED FOR PRIMARY AND ANCILLARY CONFIRMATORY FACTOR ANALYSES

LISREL Syntax for Initial Confirmatory Factor Analysis

Confirmatory Factor Analysis
Observed Variables:
Item_1 Item_2 Item_3 Item_4 Item_5 Item_6 Item_7 Item_8 Item_9 Item_10 Item_11 Item_12
Item_13 Item_14 Item_15 Item_16 Item_17 Item_18 Item_19 Item_20 Item_21 Item_22
Item_23 Item_24 Item_25 Item_26 Item_27 Item_28
Correlation matrix from file CFA_090809.PCM
Asymptotic covariance matrix from file CFA_0908109.ACC
Sample size: 718
Latent Variables: InstDesOrg FacDisc DirInst
Relationships:
Item_1 – Item_6 = InstDesOrg
Item_7 – Item_18 = FacDisc
Item_19 – Item_28 = DirInst
Print residuals
Number of Decimals=3
Path Diagram
End of problem

LISREL Syntax for First Ancillary Confirmatory Factor Analysis

Confirmatory Factor Analysis
Observed Variables:
Item_1 Item_2 Item_3 Item_4 Item_5 Item_6 Item_7 Item_9 Item_11 Item_13 Item_15 Item_17
Item_19 Item_21 Item_23 Item_25 Item_27
Correlation matrix from file CFA_090909_A1.PCM
Asymptotic covariance matrix from file CFA_090909_A1.ACC
Sample size: 718
Latent Variables: InstDesOrg FacDisc DirInst
Relationships:
Item_1 Item_2 Item_3 Item_4 Item_5 Item_6 = InstDesOrg
Item_7 Item_9 Item_11 Item_13 Item_15 Item_17 = FacDisc
Item_19 Item_21 Item_23 Item_25 Item_27 = DirInst
Print residuals
Number of Decimals=3
Path Diagram
End of problem

LISREL Syntax for Second Ancillary Confirmatory Factor Analysis

```
Confirmatory Factor Analysis
Observed Variables:
Item_1 Item_2 Item_3 Item_4 Item_5 Item_6 Item_7 Item_9 Item_11 Item_13 Item_15 Item_17
Item_19 Item_21 Item_23 Item_25 Item_27
Correlation matrix from file CFA_091009_A2.PCM
Asymptotic covariance matrix from file CFA_091009_A2.ACC
Sample size: 718
Latent Variables: InstDesOrg DirFac
Relationships:
Item_1 Item_2 Item_3 Item_4 Item_5 = InstDesOrg
Item_6 Item_7 Item_9 Item_11 Item_13 Item_15 Item_17 Item_19 Item_21 Item_23 Item_25
Item_27 = DirFac
Print residuals
Number of Decimals=3
Path Diagram
End of problem
```

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