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SOCIAL PRESENCE IN ONLINE GRADUATE DENTAL HYGIENE EDUCATION

by

LaNae Rodgerson

A thesis

submitted in partial fulfillment

of the requirements for the degree of

Master of Science in Dental Hygiene

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Committee Approval

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Sincerely,

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Table of Contents

List of Tables.	ix
List of Appendices	x
Abstract	xi
SECTION I: Thesis Proposal.	1
Chapter 1: Introduction.	1
Background.	1
Statement of Problem	4
Purpose of study.	5
Professional Significance of Study	5
Research Questions/Hypotheses	7
Definitions	8
Summary	10
Chapter 2: Review of the Literature	12
Introduction.	12
Theoretical Framework.	13
Social Presence.	15
Perceived Learning and Satisfaction	20
Online Dental Hygiene Education	31
Summary.	34
Chapter 3: Methodology.	36
Design	36
Description of Setting	38

Research Participants.	38
Data Collection	40
Limitations	47
Statistical Analysis	48
Summary.	52
References	54
Appendices	69
SECTION II: Publishable Manuscript	100
Title Page	100
Abstract	101
Key Words	102
Introduction	103
Methods	106
Results.	109
Discussion	111
Conclusion	115
References	117
Tables	121

List of Tables

Table 1. Social Presence Scale	43
Table 2. Satisfaction Scale	44
Table 3. Perceived Learning Scale	45
Table 4. Social Presence Subscales	49
Table 5. Satisfaction Subscales	51
Table 6. Perceived Learning Subscales	52

List of Appendices

Appendix A. Permission to Use Social Presence Scale and Satisfaction Scale	69
Appendix B. Initial e-mail Correspondence to Program Directors	71
Appendix C. Initial Participant Consent Letter	72
Appendix D. Survey (Study Instrument)	74
Appendix E. Second e-mail Correspondence to Program Directors	79
Appendix F. Second Participant Consent Letter	80
Appendix G. Third e-mail Correspondence to Program Directors	82
Appendix H. Third Request to Students.	83
Appendix I. Final Request to Classmates	84
Appendix J. Journal of Dental Education Manuscript Submission Guidelines	86

Abstract

The concept of social presence is a component of interaction and relationships and has been studied in online education. It has been shown to affect student satisfaction and perceived learning.

The purpose of this study was to describe social presence, satisfaction, and perceived learning among graduate students in online dental hygiene courses, and determine relationships between social presence and satisfaction; social presence and perceived learning; and satisfaction and perceived learning. This study also evaluated relationships between students' characteristics and social presence, satisfaction, and perceived learning.

A Web-based survey was used to gather quantitative, self-reported data from students enrolled in online graduate level dental hygiene courses in the U.S. Descriptive statistics were used to summarize general characteristics of the data. Correlation analysis was used in comparing social presence to satisfaction; social presence to perceived learning; satisfaction to perceived learning; and student characteristics to social presence, satisfaction, and perceived learning.

Chapter 1 Introduction

Background

Online education in the United States (U.S.) has been growing exponentially over the past decade and has become an acceptable means of delivering quality, accessible education to students in many different disciplines (Ahn, 2012; Allen & Seaman, 2014; Bolliger & Halupa, 2012). Over 7.1million students in higher education enrolled in at least one online course during 2013, an increase of nearly 411,000 students over the previous year (Allen & Seaman, 2014). The use of online instruction has become increasingly important as an educational resource and delivery format for schools of dentistry and dental hygiene (Debate, Cragun, Severson, Shaw, et al., 2011; Fried, 2007; Olmstead, 2010a, 2010b; Pyle, 2012). Online dental hygiene education programs serve a crucial need by increasing access for adult working students and students in remote areas who might not be able to, or desire to, attend class in a traditional classroom setting. These programs also can address the barrier of proximity to advanced education and provide opportunities for more dental hygienists to receive advanced degrees, thus helping reduce the critical shortage of qualified dental hygiene educators (Barnes, 2007; Bray, Gadbury-Amyot, Mitchel, 2006; Carr, Ennis, & Baus, 2010; Coplen, 2010; Coplen, Klausner, & Taichman 2011; Schonwetter, 2010). While the development of online education has been progressing rapidly, further research is needed to understand the experiences of students enrolled in these programs (Cobb, 2008, 2009) and to identify teaching strategies that address issues related to online learning in dental and dental hygiene education (Olmstead, 2010a, 2010b; Stegeman & Zydney, 2010).

Research supports the claim that dental hygiene students can learn effectively via education delivered by distance technology, such as the internet (Bearden, Robinson, & Deis, 2002; Gadbury-Amyot, Overman, & Crain, 2009; Garland, 2010; Grimes, 2002b; Olmstead, 2007, 2008, 2010a). The growth of online education has led to increased emphasis on assessment of learning outcomes in this teaching and learning format by accrediting bodies, commissions on higher education, academic institutions, schools of dentistry and dental hygiene, employers, students, and faculty (Schonwetter, 2010). In a report by the Sloan Consortium, 77% of academic leaders surveyed in 2011 rated learning outcomes in online education as the same or better than those in face-to-face settings (Allen & Seaman, 2013). Other studies also have shown that online-learning outcomes are equal to, or superior to, those achieved in traditional classroom settings (Bearden, Robinson, & Deis, 2002; Gallagher, Dobroielski-Vergona, Wingward, & Williams, 2005; Garland, 2010; Grimes, 2002b; Olmstead, 2008, 2010a).

While studies support that effective learning occurs in web-based environments, results related to student satisfaction with online education in dental hygiene, as well as other disciplines, have been varied (Ahn, 2012; Bolliger & Halupa, 2012; Dziuban, 2007; McCann, Schniederman, & Hinton, 2010; Mitchell, Gadbury-Amyot, Bray, & Simmer-Beck, 2007; Tsokris, 2011). Although an indirect measure of learning outcomes, student satisfaction has been identified as an important outcome in education, in both traditional educational formats and in web-based courses (Bollinger & Halupa, 2012; Palmer & Holt, 2009). Frith and Kee (2003) emphasized the importance of student satisfaction as a critical outcome for evaluating the effectiveness of online learning and noted that existing study findings have been mixed in regards to the degree of satisfaction and correlating

factors. Social presence, "the degree to which a person is perceived as 'real' in mediated communication," (Gunawardena & Zittle, 1997, p. 9) is one factor that has been shown to affect student satisfaction in face to face settings as well as in online education settings (Cobb, 2008, 2011). In fact, social presence has been identified as being key to the level of learner participation and success of online collaboration (Cobb, 2008, 2011; Mayne & Wu, 2011; Swan, 2005; Swan & Shih, 2005).

Online education is gaining momentum as a major educational format, not just as a supplement or second-best to traditional, face-to-face education. While online instruction has been adopted by educational institutions, there is need for further evaluation of the quality and efficacy of this instruction, as well as more theory-based research in this area (Cobb, 2008; Olmstead, 2010b). The literature indicates there is little to no difference in whether students can learn, and to what degree, between online and traditional education; however, there are major differences in what students experience. Further research is needed to understand the specifics of the online educational experience in order to provide the highest quality online education for students.

Studies on satisfaction with online education have focused on overall satisfaction or convenience and flexibility as outcomes (Ahn, 2012; Bolliger & Halupa, 2012; Dziuban, 2007; Palmer & Holt, 2009). While online courses can be a satisfactory means for dental hygienists to pursue continuing education, due to the convenience and flexibility of this educational format (Bray, Gadbury-Amyot, & Mitchell, 2006; Fehrenbach, Baker-Eveleth, & Bell, 2001; Grimes, 2002b; Mitchell, Gadbury-Amyot, Bray, & Simmer-Beck, 2007), studies regarding the experiences of dental hygiene students with online learning are limited. Few studies have focused on identifying factors

related to the quality of the online education experience for these students and specific factors correlating with satisfaction and learning (Mitchell, Gadbury-Amyot, Bray, & Simmer-Beck, 2007).

Interaction of students with faculty and other students is one factor that has been identified as being important to satisfaction and perceived learning (Kang & Im, 2013). Interaction has been identified as a component of overall satisfaction, and social interaction in particular can add to the quality of the online educational experience and enhance learning (Ahn, 2012; Lowenthal, 2010). Communication and interaction are different in an online environment as compared to face-to-face settings (Gunawardena & Zittle, 1997). Hence, increased feelings of isolation among students, reduced satisfaction, poor academic performance, and increased attrition might occur if dynamics between communication and interaction are not recognized in online education instruction (Woods & Baker, 2004).

According to Woods and Baker (2004), student perception of quality interaction might be more important to satisfaction with the online educational experience than the quantity of interaction. Sufficient levels of interaction can create a sense of personalization, decrease feelings of remoteness, and enhance a sense of community (Rovai, 2001, 2002). Despite this emphasis on the importance of interaction to the online educational experience, few studies exist that analyze interaction within online dental hygiene education (Rogo & Portillo, 2014).

Statement of the Problem

The concept of social presence has been studied in relation to communication media and is a component of interaction and relationships. Social presence has been

studied in computer mediated conferences (Gunawardena, 1997) and in asynchronous online learning (Cobb, 2008, 2009, 2011; Hostetter & Busch, 2006; Mayne & Wu, 2011; Richardson & Swan, 2003; Swan & Shih, 2005). However, studies examining social presence in online dental hygiene courses are not well documented in the literature. This study sought to examine social presence in online dental hygiene courses and its relation to learner satisfaction and perceived learning.

Purpose of the Study

The purpose of this study was to describe social presence, satisfaction, and perceived learning among graduate degree seeking students in online dental hygiene courses. Additionally, the investigation determined relationships between social presence and satisfaction; between social presence and perceived learning; and between satisfaction and perceived learning among graduate dental hygiene students. This study also evaluated relationships between the graduate dental hygiene students' characteristics and social presence, satisfaction, and perceived learning.

Professional Significance of the Study

Online courses are a global phenomenon, and students worldwide are now able to participate in courses offered in their own as well as other countries. With 33.5% of all higher education students in the U.S. taking at least one online course in 2013 (Allen & Seaman, 2014), it can reasonably be expected that the number of dental hygiene students taking courses online will continue to grow. Reports from the American Dental Education Association (ADEA) (Debate et al., 2011) have strongly encouraged incorporation of web-based learning into the dental curriculum. According to Debate et

al. (2011), web-based courses are being used in dental and dental hygiene education more now than in the past and are expected to be used more in the future.

A Master of Science in Dental Hygiene (MSDH) sample was chosen for this study because there is a need for more registered dental hygienists to obtain a graduate level education. Advanced degrees in dental hygiene are needed to meet society's changing oral health care needs, educate future dental hygienists, and lead the profession into the future (Barnes, 2007; Boyleston & Collins, 2012). Online programs can help meet this need. The use of technology has been identified as one immediate solution to increase the capacity of faculty to deliver educational coursework and help fill the shortage of oral health care providers needed to provide care to the underserved. Web-based programs can help extend the reach of faculty, provide access to graduate level education for working dental hygienists, and provide an educational foundation for future dental hygiene educators (Barnes, 2007; Carr et al., 2010; Coplen, Klausner & Taichman, 2011; Gwozdek, Springfield, Peet, & Kerschbaum, 2011).

This study contributes to the body of knowledge regarding the experiences of advanced degree seeking students in online dental hygiene courses and the effective use of online instruction in advanced level dental hygiene education. Educators need to be aware of the experiences of graduate dental hygiene students with online courses, including factors related to satisfaction, interaction, social presence, learning, and learner characteristics, in order to develop online educational experiences that meet the needs of the students and foster learning and professional development. Information on factors related to the quality of the online learning experience can assist dental hygiene educators in developing effective online communities of learning in dental hygiene programs.

With the increased emphasis on learning outcomes (Gwozdek, 2011; Portillo, Rogo, Calley, & Cellucci, 2012), this study contributes to knowledge in this area in relation to online teaching and learning. It provides needed information on the role of social presence in online dental hygiene courses, a hypothesized key component of learner satisfaction (Cobb, 2008, 2009, 2011; Hostetter & Busch, 2006; Myne & Wu, 2011; Richardson & Swan, 2003; Swan & Shih, 2005). This study adds to the body of knowledge in dental hygiene education by providing a better understanding of social presence, satisfaction, and perceived learning, and the interaction of these three important variables in online dental hygiene courses.

Additionally, this study contributes to the professional education and development objectives of the American Dental Hygienist's Association's (ADHA) National Dental Hygiene Research Agenda (NDHRA), which includes studies concerned with educational methods and graduate level education (ADHA, 2007). Furthermore, incorporation of web-based learning into the dental and dental hygiene curriculum has been strongly encouraged by the American Dental Education Association (ADEA), which recommends the use of online learning to create new opportunities for distance learning in dental education and to use information technology to enrich student learning (Debate et al., 2011).

Research Questions

1. What is the social presence, satisfaction, and perceived learning of graduate students enrolled in online dental hygiene courses?
2. What is the relationship of social presence to satisfaction among graduate students enrolled in online dental hygiene courses?

3. What is the relationship of social presence to perceived learning among graduate students enrolled in online dental hygiene courses?
4. What is the relationship of satisfaction to perceived learning among graduate students enrolled in online dental hygiene courses?
5. What is the relationship between student characteristics and social presence, satisfaction, and perceived leaning?

Hypotheses

1. There is no statistically significant relationship between social presence and satisfaction among graduate students enrolled in online dental hygiene courses.
2. There is no statistically significant relationship between social presence and perceived learning among graduate students enrolled in online dental hygiene courses.
3. There is no statistically significant relationship between satisfaction and perceived learning among graduate students enrolled in online dental hygiene courses.
4. There is no statistically significant relationship between student characteristics and social presence, satisfaction, and perceived leaning.

Conceptual Definitions

Social presence. "The degree to which a person is perceived as being real and being there in mediated communication" (Gunawardena & Zittle, 1997; Lowenthal, 2009, p. 9).

Satisfaction.

Satisfaction is defined as affect or feeling or emotion resulting from one's evaluation of the situation. As affect, the concept of satisfaction includes both positive affect (satisfaction) and negative affect (dissatisfaction). Satisfaction is

determined by the point of view of the individual, which is one's positive affective response to a situation (Ahn, 2012, p.12).

Perceived learning. "The amount of knowledge that students think they are learning as opposed to learning measured by grades, assessments, or test results" (Wighting, 2011, p. 4).

Online course. "A course where most or all of the content ($\geq 80\%$) is delivered online " (Allen & Seaman, 2007, p. 4).

Online learning is defined as using Internet technology to deliver course content. Online courses can be either "asynchronous" (interacting at different times) or "synchronous" (interaction at the same time) in the classroom (Farahani, 2003). In fully online courses all learning material and course communication are delivered using the Internet. (Berge, Collins, & Dougherty, 2000 as cited in Ahn, 2012, p.12)

For the purpose of this study, the terms web-based course and online course will be used synonymously. The courses in this study are *primarily* asynchronous, text-based, online courses, but might also include synchronous chats, video streaming, or audio enhancement.

Operational Definitions

Social presence. Measured by the Social Presence Scale (Gunawardena & Zittle, 1997) consisting of fourteen items scored on a Likert scale of 1-5. A score of 1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, and 5=strongly agree. The social presence scores range from 14-70. A score of 14-34 indicates low social presence, 35-55 moderate social presence, and 56-70 high social presence.

Satisfaction. Measured by the Satisfaction Scale (Gunawardena & Zittle, 1997) consisting of nine items scored on a Likert scale of 1-5. A score of 1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, and 5=strongly agree. The satisfaction scores range from 9-45. A score of 9-20 indicates low satisfaction, 21-32 moderate satisfaction, and 33-45 high satisfaction.

Perceived learning. Measured by the Perceived Learning Scale (Rovai, Whiting, Baker, & Grooms, 2009) consisting of six items scored on a Likert scale of 1-5. A score of 1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, and 5=strongly agree. The perceived learning scores range from 6-30. A score of 6-14 indicates low satisfaction, 15-23 moderate satisfaction, and 24-30 high satisfaction.

Student characteristics. Obtained through a researcher-created Student Characteristic Questionnaire. Characteristics included: age, gender, number of years as a licensed dental hygienist, name of the dental hygiene program attended by each student, number of online courses completed in the program, and number of online courses completed prior to entering the program. Students were also asked to comment on their experiences related to social presence, satisfaction, and learning in the online program.

Summary

Despite the extraordinary growth and prevalence of online education in many disciplines, insufficient research exists on the experiences of graduate degree seeking dental hygiene students with this educational format. In order to provide opportunities for these students to succeed, further research is necessary to identify specific factors that affect learning outcomes and satisfaction with online courses. Social presence has been identified as a component of interaction and has been shown to affect learning and

satisfaction in online courses, yet this concept has not been studied in online dental hygiene education.

The purpose of this study was to describe social presence, satisfaction, and perceived learning among graduate degree seeking students in online dental hygiene courses. It determined relationships between social presence and satisfaction; social presence and perceived learning; and satisfaction and perceived learning among graduate dental hygiene students. In addition, relationships between student characteristics and social presence, satisfaction, and perceived learning were evaluated. This information gained from this study will ultimately assist dental hygiene educators in developing effective online communities of learning in order to provide dental hygiene students the best possible online learning experience.

Chapter 2 Review of the Literature

Introduction

Online education has developed rapidly in the past decade. To ensure optimal learning outcomes from this method of educational delivery, students' experiences in online courses need to be studied. One concept that has been explored in relation to the quality of students' online education experiences is social presence. The purpose of this review was to study existing research on social presence in online education and in online dental hygiene education and identify knowledge gaps.

To provide an empirical context for this investigation, a search was conducted of PubMed, EBSCOhost, Cochrane Library, ProQuest Dissertations and Theses, Google Scholar, and Google data bases using the search terms: social presence, satisfaction, student satisfaction, student retention, perceived learning, dental hygiene education, distance learning, distance education, e-learning, online, online education, Internet, and World Wide Web. Articles retrieved for this review met the following inclusion criteria: articles/publications in English, and articles/publications that discussed online education and satisfaction, perceived learning, social presence, or other outcomes and variables related to experiences of students with online education.

The review of the literature that follows was organized to present the theoretical model chosen as the framework for this research study. The concept of social presence in online learning and its effect on student satisfaction and perceived learning was explored, followed by an exploration of these concepts in online dental hygiene education.

Theoretical Framework

Constructivism refers to theories of learning that pose humans are active participants in building knowledge and meaning through interaction between their experiences and their ideas (Kraiger, 2008; Lourenco, 2012; Powell & Kalina, 1999; Schreiber & Valle, 2013; Swan, 2005). Constructivists believe all learning involves mental construction, all learning occurs in our minds as internal mental structures are created in response to change, all learning is unique to the individual, and all learning is tied to experience and context no matter how or where the learning takes place (Swan, 2005). According to Swan, Garrison, and Richardson (2009), "higher education has traditionally emphasized constructivist approaches to learning in the sense of individual students taking responsibility for making sense of their educational experiences" (p. 3).

There are two major theories of constructivism: cognitive and social. Both theories share common assumptions regarding the construction of knowledge and the nature of learning, yet they are fundamentally different in their focus (Powell & Kalina, 1999; Swan, 2005). Cognitive constructivism asserts that individual learners build knowledge and skills through a personal, individual process. Social constructivism, however, is grounded in the theory that ideas and knowledge are constructed through social interactions (Kraiger, 2008; Lourenco, 2012; Philpott & Batty, 2009; Powell & Kalina, 2008; Schreiber & Valle, 2013; Swan, 2005).

Research on knowledge and learning shows the importance of social interaction between learner and instructor, as well as between learner and peers (Kraiger, 2008). Hiltz (1994), (as cited in Kraiger, 2008, p. 22) stated, "the social process of developing shared understanding through interaction is the 'natural' way for people to learn." Social

constructivists have proposed that the goal of instruction should be to create interactive learning environments in which students learn from instructors, students learn from each other, and instructors learn from the students (Kraiger, 2008; Philpott & Batty, 2009; Schreiber & Valle, 2013).

The social constructivist method of teaching and learning can be applied to online education (Swan, 2005). According to Kraiger (2008), web-based instruction is well suited to fostering interaction among peers in online courses, and social interaction has been shown to be greater in online learning environments than in traditional face-to-face classrooms for three reasons. First, in web-based instruction, the instructor has diminished presence. Although the instructor is known and available to all participants, learning can occur outside the immediate presence of the instructor. Learners have the opportunity to seek knowledge through peers, consult outside experts, or ask the instructor through outside social networking avenues (Kraiger, 2008; Swan, 2005). Second, peers have multiple methods in which to interact in an online course. Students are provided a variety of avenues to communicate and often opportunities for learner-learner interaction are built into the online course such as chat rooms, group projects, threaded discussions, file sharing, course postings, and video or audio conferencing (Rachtham, Kaewkitipong, & Firpo, 2012). Last, online instruction has been shown to change individuals' motivation to participate. There is evidence to suggest that socially mediated interactions are more common and easier among some students because the social hierarchy is often altered in an online learning environment. Within chat rooms or threaded discussions, individuals contribute without socially defined markers and are thus evaluated on the quality of their contribution, not their social status. Additionally, less

confident participants can use asynchronous online communication to their advantage by taking time to form opinions or craft answers (Kraiger, 2008).

Swan (2005) summarized why social constructivism is important for online learning practices: “[s]ocial constructivism reminds us that learning is essentially a social activity, that meaning is constructed through communication, collaborative activity, and interactions with others. It highlights the role of social interactions in meaning making ... [and] knowledge construction” (p. 5). Social presence has been found to support the formation of relationships and construction of knowledge within an online learning environment (Cobb, 2008, 2009, 2011; Gunawardena & Zittle, 1997; Kreijns, Kirschner, Jochems, & van Buuren, 2010; Lowenthal, 2009, 2010). Constructivism can foster an understanding of social presence as a mediator of this interaction. When social constructivism is applied as a theoretical framework, social presence connects individuals in an online learning environment; it motivates them to take an active role in the learning process and construction of knowledge (Oztok & Brett, 2011).

Social Presence

Social presence is "perhaps the most popular construct used to describe and understand how people socially interact in online learning environments" (Lowenthal, 2009, p. 3). The concept of social presence is complex; it has evolved over the years and has become an increasingly multi-faceted construct (Cui, Lockee, & Meng, 2013; Lowenthal, 2010; Oztok & Brett, 2011).

Definition and history. According to many authors, social presence is not easily defined. There is not one, clear, agreed upon definition of social presence (Cui et al., 2013, Lowenthal, 2010; Oztok & Brett, 2011; Picciano, 2002; Tu, 2002). Lowenthal

(2010) stated that, for researchers of social presence and online learning, definitions of social presence fall on a continuum. At one end of the continuum social presence is conceptualized as the degree to which a person is perceived as being "real" or being "present;" while the focus of the opposite end of the continuum is on interpersonal, emotional connections between communicators (Lowenthal, 2010). Lowenthal (2010) claimed the majority of definitions stand in the middle of the continuum.

The study of social presence originally evolved from the use of telecommunications. It was further developed with the wide adoption of computer mediated communication, and has since progressed with the advancements in online education and technology (Cui et al., 2013). Authors have categorized the evolution of social presence into three eras, or phases; the 1970s-1980s, 1990-1999, and 2000-present (Cui et al., 2013; Oztok & Brett, 2011). Oztok and Brett (2011) explained that each era is not separate or distinct from one another; they each build upon those before in the construction of our current understanding of the concept of social presence.

The first era of social presence research (1970s-1980s) was characterized by the capacity of a communication medium to convey social information. Short, Williams, and Christie (as cited in Cobb, 2008; Cui, et al., 2013; Gunawardena & Zittle, 1997; Kreijns et al., 2010; Lowenthal, 2010; Oztok & Brett, 2011; Sung & Mayer, 2012; Swan & Shih, 2005; Wei, Chen, & Kinshuk, 2012) were the first researchers to identify social presence as an important factor of a communication medium. Short et al. (as cited in Wei et al., 2012, p. 530) defined social presence as "the degree of salience of the other person in a mediated communication and the consequent salience of their interpersonal interactions." The research by Short et al. is widely cited as the initial investigation of social presence.

Their research examined people's attitudes toward different communication media and suggested that communication media differ in their degree of social presence and affect the way people interact and communicate. They suggested the communication medium's capacity to transmit information about non-verbal cues and facial expression contributes to its degree of social presence (Cobb, 2008; Cui et al., 2013; Gunawardena & Zittle, 1997; Kreijns et al., 2010; Lowenthal, 2010; Oztok & Brett, 2011; Sung & Mayer, 2012; Swan & Shih, 2005). For example, video would be perceived to have a higher level of social presence, while the social presence of audio media would be perceived to be lower (Lowenthal, 2009, 2010).

Although the theory by Short et al. recognized the significance of social presence in the relationship between two parties in interaction, their notion that social presence was based only on the medium's ability to transmit social cues was challenged by researchers in the field who argued social presence was also a matter of individual perceptions (Cui et al., 2013; Swan & Shih, 2005). Thus began the second era of social presence research (1990-1999). Gunawardena (1995) refined social presence as "the degree to which a person is perceived as a 'real person' in mediated communication" (p. 151). Her research suggested social presence can be "cultured" among participants in computer mediated communication (CMC). Gunawardena (1995) reported on two studies of student perceptions of CMC in computer conferences. The first study sample consisted of graduate students (n=90) from four universities in the U.S. Students were asked to rate their perceptions of CMC in the conference. The second study compared two student groups (n=70) at one university that participated in two separate computer conferences. Results from both studies showed CMC was perceived as interactive, active,

interesting, and stimulating. Techniques related to building social presence in online communities were identified, and Gunawardena (1995) argued "it is these techniques, rather than the medium, that will ultimately impact students' perception of interaction and social presence" (p. 165).

Subsequently, the recognition of a perceptual component of social presence led researchers to further redefine the concept. Research was extended to capture insights of individuals, and studies explained social presence as the nature of individuals' perception (Oztok & Brett, 2011). Definitions included: "the ability of learners to project themselves socially and affectively into a community of inquiry" (Rourke, Anderson, Garrison, & Archer, 1999, p. 51); and "the feeling one has that other persons are involved in a communication exchange" (Walther, 1995, p. 188). These researchers showed that, in CMC, an individual's perception of presence was just as important as the medium's ability to transmit that presence, individuals could overcome a communication medium's limitations, and CMC could be social and personal (Lowenthal, 2009, 2010).

The turn of the century marked the third era of social presence research (2000-present). Use of the internet, advances in online education, and increased opportunities to interact and socialize led researchers to investigate online learning communities as an important new dimension of social presence (Oztok & Brett, 2011). Garrison, Anderson, and Archer (2000) identified social presence as one of the three interacting elements within the Community of Inquiry (COI) that promotes deep and meaningful learning. Garrison et al. (2000) defined social presence as "the ability of participants in the COI to project their personal characteristics into the community, thereby presenting themselves to others as 'real people'" (p. 89). Tu and McIssac (2002) also redefined social presence

for online learning environments as "a measure of the feeling of community that a learner experiences in an online environment" (p. 131).

This era of social presence research also explored individuals' interactions with their online peers. Garrison (2009) examined whether individuals can develop interpersonal relationships within an online learning community through purposeful communication in a trusting environment. Other studies focused on individuals' perceptions of their peers and instructors in online courses (LaPointe & Gunawardena, 2004; Picciano, 2002; Richardson & Swan, 2003; Rourke & Anderson, 2002; Russo & Benson, 2005) and how they project themselves emotionally and socially in an online community (Kehrwald, 2008; Sung & Mayer, 2012; Swan & Shih, 2005).

In summary, research in the 1970s-1980s was characterized by the conceptualization of social presence as a property of a medium, where the emphasis was on the capacity of communication media to convey nonverbal information. Social presence studies changed in the 1990s to focus on the perceptions of individuals. Researchers began to conduct their studies on people versus the attributes of media to convey social presence. Currently, the trend in social presence research is on the development of online learning communities and interactive learning activities. Although there is not one universally agreed upon definition of social presence, the one most commonly cited and referred to in the literature is "the degree to which a person is perceived as being real and being there in mediated communication" (Lowenthal, 2009, p. 9). Additionally, researchers have come to agree that social presence is an important construct in the development of relationships and construction of knowledge within an

online learning environment, and should continue to be studied in these settings (Cobb, 2009; Gunawardena & Zittle, 1997; Kreijns et al., 2010; Lowenthal, 2009, 2010).

Perceived Learning and Satisfaction

According to Aragon (2003), the goal for creating social presence in a learning environment" is to create a level of comfort in which people feel at ease around the instructor and other participants" (p. 60). When social presence is lacking in a learning environment, participants see it as impersonal, the amount of information shared decreases, and the learning experience can turn to one that is not fulfilling or successful (Aragon, 2003). In an effort to understand the outcomes of social presence, researchers have focused on how students' success is related to their perception of social presence (Cobb 2011). They have examined the relationship between social presence and students' satisfaction and students' perceived learning. Oztok and Brett (2011) pointed out the importance of recognizing that these studies examined an indirect measure of learning. This is especially true in studies on the relationship between social presence and students' success; as explained by Rourke and Kanuka (2009), "learning was operationalized as perceived learning [and was] measured through self-reports with survey items" (p. 26). Perceived learning was defined by Wighting (2011) as "the amount of knowledge that students think they are learning as opposed to learning measured by grades, assessments, or test results" (p. 4).

Picciano (2002) studied the relationship between social presence and student performance. Using survey items he measured perceived social presence, interactivity, and learning among students in an online graduate course. Results of his study indicated positive social presence is significantly correlated with positive perceptions of students'

learning. Picciano (2002) further explored these findings by dividing the students into groups perceiving low, medium, and high social presence. Interactions with each other and with student participation in online discussions were compared within each group. The results showed the students who perceived social presence to be high performed significantly better than the students in groups that perceived social presence to be medium or low.

The effects of interaction on learning, satisfaction, participation, and attitude toward online learning were assessed by Jung, Choi, Lim, and Leem (2002). Three types of interaction were studied: academic, collaborative, and social. Of the three groups studied, social interaction was found to be most significant in enhancing learning and active participation in online discussion. The findings of Jung et al. (2002) are consistent with the Picciano (2002) study in that students with a higher degree of social presence were found to outperform those with a lower degree.

Additionally, Swan, Polhemus, Shih, and Rogers (2001) found that students who tend to contribute more to discussions were also perceived to have high degrees of social presence. Similarly, Akyol, and Garrison (2008) and Shea, Li, and Pickett (2006) explored students' perceived learning in online environments by conducting surveys. The surveys explored the students' perceived learning by asking them directly whether they learned in the online course. Both studies reported a significant positive correlation between perceived learning and high social presence.

Along with perceived learning, scholars have examined students' satisfaction with online courses in relation to the degree of perceived social presence. Gunawardena and Zittle (1997) investigated the influence of social presence on overall learner satisfaction

in the CMC context. They conducted a follow-up study based on an inter-university "GlobalEd" computer conference. The conference provided a computer mediated forum in which graduate students in distance education could share and discuss research and their experiences in distance education. The subjects were 50 graduate students in distance education from five universities in the U.S. Online communication was asynchronous and text-based. The instrument used in the study was developed by Gunawardena and Zittle (1997) and was based on the GlobalEd questionnaire used at that time. A total of 52 five-point Likert-scale items were used from the original 61-item GlobalEd questionnaire with a focus on nine areas that included: social presence, active participation in the conference, attitude toward CMC, barriers to participation, confidence in mastering CMC, perception of having equal opportunity to participate in the conference, adequate training in CMC, technical skills and experience using CMC, and overall satisfaction with the GlobalEd conference. Among the 52 items, 14 items were used specifically to assess social presence (Social Presence Scale), and 10 items were used to assess students' overall satisfaction (Satisfaction Scale). The questionnaire developed by Gunawardena and Zittle (1997) also blended semantic differential scales used by Short, Williams, and Christie to assess intimacy and immediacy, two concepts that have been found to enhance social presence. The investigators adopted 17 five-point bi-polar scales including personal/impersonal, immediate/non-immediate, interactive/non-interactive, sensitive/insensitive, social/unsociable, and colorful/colorless, that solicited students' reactions on a range of feelings toward the use of CMC. A stepwise regression procedure was used to examine the relation between social presence and overall satisfaction.

In order to ensure the validity of this social presence measure, Gunawardena and Zittle (1997) only used six items from the original 17 five-point bi-polar instrument to specifically measure the social aspect of the medium. The new social measure was further validated with strong, positive correlations between bi-polar social indicators and social presence. To ensure the reliability of the measure, a stepwise regression procedure was used twice on different predictors, and social presence was consistently found to contribute to a large proportion of the variance. Hence, social presence was found to be a strong predictor of student satisfaction.

Though the Gunawardena and Zittle (1997) instrument used both bi-polar scales and Likert-scale items to measure social presence, Tu (as cited in Cui et al., 2013) argued the instrument was not able to capture a thorough perception of social presence because it did not measure social presence variables such as privacy, recipients, and topics; nor were the questions created for general students. Despite Tu's argument, the Social Presence Scale developed by Gunawardena and Zittle (1997) has been widely adopted by other researchers, including: Skiba, Holloway, and Springer (2000); Richardson and Swan (2003); Swan and Shih (2005); Hostetter and Busch (2006); Cobb (2008); Tao (2009); Mayne and Wu (2011); Leafman and Mathieson (2014); and Leafman, Mathieson, and Ewing (2013), who have studied social presence in a variety of online learning environments.

Skiba, Holloway, and Springer (2000) evaluated social presence in a web-based international nursing informatics pilot course. Eleven students participated in the evaluation of the course. Forty-nine closed-ended questions, as well as three open-ended questions, were selected for the study from the Best Practices in Teaching and Learning

in Web-Based Nursing Courses evaluation tool. The 14-item Social Presence Scale created by Gunawardena and Zittle (1997) was used to assess social presence. The evaluation also included a qualitative component in which students were interviewed regarding their real life experiences with online learning and education. For each SP item an average mean score was reported; however, mean overall SP scores were not reported, nor were correlations made between SP and other variables. Fifty-four percent of the students indicated they were more likely to enjoy learning via electronic communication verses face-to-face instruction. Additionally, 54% of the students felt electronic communication decreased feelings of isolation from other students and the instructor as compared to face-to-face discussions. Students expressed a universal theme of building social presence through online education, and indicated the most frequent barrier to social presence was lack of student participation. Strategies suggested for enhancement of social presence included providing team building activities, posting biographies, and including project presentations.

In a study of mostly non-traditional aged students (N=97) participating in several all online courses during one term at a college, Richardson and Swan (2003) used a correlational design to examine the relationship of social presence, perceived learning, and satisfaction between students and the instructor. The survey consisted of a modified version of the Social Presence Scale (Gunawardena and Zittle, 1997). General demographics were collected and students reported on their overall perceptions of the course. Individual course activities including: notes and reading assignments; lectures; individual projects; written assignments; group projects; and self-tests, module tests, and the final exam were evaluated by the researchers. Positive correlations were found with

perceptions of social presence and perceived learning and perceived satisfaction with the instructor. Students' perceptions of social presence were found to be a predictor of perceived learning. Age or amount of college experience were not found to be correlated to students' perception of social presence, yet gender accounted for 5% of the variability in students' overall social presence scores. Results showed women to have higher perceived social presence. A significant correlation was found between social presence and perceived learning in the analysis of individual course activities. The strongest correlation was in class discussions and question and answer areas, followed by group projects. The investigators believed the findings show a key component of the online educational experience was the degree of social presence of the instructor and of the other students in the course. Additionally, the investigators claimed social presence can occur in learning activities that are traditionally thought of as individual in nature.

Swan and Shih (2005) completed a mixed methods study of graduate students (N=51) who participated in four online educational technology courses in one semester at a public university. An online questionnaire adapted from the study by Richardson and Swan (2003) (a modified version of the Gunawardena and Zittle (1997) Social Presence Scale), was used to gather demographic and experiential information about the respondents, and to obtain rankings of their perceptions of the social presence of peers and instructors; their satisfaction with the instructors; their perceived learning from online discussions; and their perceptions of interaction among discussion participants on 5-point Likert scales. Additionally, five respondents with the highest ratings and five respondents with the lowest ratings of perceived social presence were identified, and their postings were captured and coded for social presence. Each of these students also were

interviewed by email and phone concerning their perceptions of, and experiences in, online discussions. Analysis found all variables to be highly correlated, indicating a significant relationship between social presence and satisfaction with online discussions. Specifically, very strong relationships were found between the perceived social presence of peers and that of instructors, and between the perceived social presence of peers and instructors and perceived learning. Additionally, relationships between all variables and perceived interaction were found to be significant, indicating "that the social aspects of online discussion are even more important to students than the interactive ones" (Swan & Shih, 2005, p.129).

Hostetter and Busch (2006) used Richardson and Swan's (2003) modified version of Gunawardena and Zittle's (1997) Social Presence Scale to examine students' perceptions of social presence in a course offered both online and face-to-face. Ten questions, using Likert-scale responses, asked about students' perceptions of the course and their expectations for learning. Students were asked to report the number of online courses they had taken. The survey also contained questions about specific course activities and presented 12 open-ended questions about students' satisfaction, learning, and feelings of community; however, this information was not presented in the results. One hundred twelve traditionally-aged undergraduate students participated in the survey; 80 online, and 32 in face-to-face classes. Factor analysis was performed to determine the factors underlying the ten item scale; two factors, social presence and learner satisfaction, were identified. In prior studies, Gunawardena and Zittle (1997) and Richardson and Swan (2003) did not use factor analysis to identify underlying themes in the instrument, instead survey items were combined to achieve mean social presence and satisfaction

scores. In this study, students' perceptions of social presence predicted their learner satisfaction scores, and were similar in the online and face-to-face sections (Hostetter & Busch, 2006). Also, students' perceptions of social presence were significantly affected by prior experience in online courses, yet students' social presence scores did not have a statistically significant effect on their learning outcomes. This result stands in contrast to the Picciano (2002) study in which social presence was found to be a predictor of learning outcomes.

Social presence in online nursing courses and its relationship to student satisfaction and perceived learning were studied by Cobb (2008). Subjects included 128 students in an online RN-to-BSN program at a public college in the U.S. who were taking an online nursing course during the term of the study. The instrument used was a 34 item survey administered via the internet. It consisted of the Social Presence and Satisfaction Scales by Gunawardena and Zittle (1997), as well as demographic questions. Factor analysis was used to identify four sub-domains of social presence: overall comfort with online and CMC; communication with CMC and the online environment; comfort and community of the CMC/online environment; and attitudes toward CMC/online environment. Four sub-domains of satisfaction also were identified: general satisfaction; usefulness of the course; learning from the course; and stimulation and ongoing learning. All sub-domains of social presence correlated highly with the satisfaction sub-domains except the communication factor, which correlated to a lesser degree. There was a strong relationship between perceived learning and social presence, and with comfort with the online course. Overall instructor performance, social presence, and the sub-domains of social presence predicted a significant amount of total variance in overall satisfaction and

perceived learning. No significant relationships were found between the demographic factors and perceived learning or overall social presence. Females had significantly higher scores on the communication factor, and subjects with more online course experience found the course more useful.

Tao (2009) also used the Social Presence Scale (Gunawardena and Zittle, 1997) in his study of student motivation. The purpose of the study was to investigate the relationship between perceived online social presence in an online course and the level of student motivation. The study was conducted during the Fall semester at a university in the U.S. Data were collected from participating students (N=74) enrolled in three online sections of an educational technology course. Three instruments were used in the study to measure students' feelings of social presence, students' motivation levels, and instructors' verbal immediacy behaviors, as well as to obtain students' demographic information. Repeated measure and multiple linear regression analyses were used to analyze data. Results suggested students' level of online social presence increased significantly from the beginning of the semester to midterm and then dropped back to the original level from midterm to the end of the semester. However, the level of student motivation significantly increased only from the beginning of the semester to midterm and remained at the same level for the rest of the semester. These findings indicated significant correlations between online social presence and student motivation across the semester.

Using a two-group comparison design, Mayne and Wu (2011) examined the outcomes of integrating social presence strategies into an online nursing course. The survey instrument used included items from the Social Presence Scale, a self-report classroom community scale, and demographic questions. During enrollment, students

were divided into two sections of the same course: the social presence section and the control section. Twenty-six students participated in the survey; 16 in the social presence section, and 10 in the control section. Data indicated no significant differences between the groups on age, gender, or online course experience. The social presence group scores indicated significantly greater perceptions that expectations for online learning were met, as well as likelihood of continuing with online courses. Although the sample size was small, the results demonstrated that purposeful incorporation of specific social presence techniques by the instructor in online courses had a positive impact on student perceptions of social presence and group interactions, as well as desire to continue learning in an online format.

More recently, Leafman, Mathieson, and Ewing (2013) used the Social Presence Scale (Gunawardena & Zittle, 1997) and the social presence section of the Community of Inquiry measure by Arbaugh et al. (2008) in their descriptive, cross-sectional survey of 138 students participating in a doctoral degree program for health professionals. The coursework occurred 95% online, and 5% during a one-week, on-site institute. The purpose of the study was to evaluate students' perceptions of social presence in a learning management system (LMS), such as Blackboard, and their willingness to use a social media tool outside the LMS to increase social presence. The mean social presence score indicated that social presence was generally perceived as high, and 43% of the students indicated they would be willing to use a social media tool if one was offered outside the LMS. Results of the study indicated exploration of adding social media tools to online learning environments to increase social presence is warranted.

Another study conducted by Leafman and Mathieson (2014) used the SPS (Gunawardena & Zittle, 1997) and the social presence section of the Community of Inquiry measure by Arbaugh et al. (2008) to compare student and instructor perceptions of social presence in a learning management system (LMS). Willingness of students and instructors to use social media to increase SP was also evaluated. Students and instructors were recruited from a health sciences university with a diverse population. Entry-level, professional, residential, and distance students were represented. Participants included 282 students and 92 instructors from eight exclusively online degree programs and two primarily online degree programs. They completed an anonymous, cross-sectional survey. Students and instructors reported high levels of overall perceived social presence, however students' perceptions were significantly lower (median 3.53) than instructors' perceptions (median 3.70, $p=.001$). Additionally, students reported less desire for social connections and reported having less time for such connections. Over one-third of instructors and students were willing to use social media outside the LMS, which may have implications for efforts to increase SP in online learning environments.

As indicated by these studies, social presence is a key influential component of student satisfaction of the online learning experience (Cobb, 2008; Gunawardena & Zittle, 1997; Hostetter & Busch, 2006; Leafman & Mathieson, 2014; Leafman, Mathieson, & Ewing, 2013; Mayne & Wu, 2011; Richardson & Swan, 2003; Skiba, Holloway, & Springer, 2000; Swan & Shih, 2005; Tao, 2009). The results of these studies demonstrate that "the Social Presence Scale developed by Gunawardena and Zittle (1997) remains a reliable research instrument and should continue to be used in

research studies related to online education" (Cobb, 2009, p. 251). Additionally, according to Cobb (2009),

the Satisfaction Scale (Gunawardena and Zittle, 1997) is a reliable means of measuring satisfaction in online courses. Rather than constantly developing new ways to measure satisfaction, researchers could use these scales more so that study findings can more easily be compared. (p. 252)

The literature suggests social presence has a positive influence on students' perception of their learning and satisfaction in an online environment. However, because of the variety in the way researchers conceptualize and define learning and social presence, the ways in which the relationships between these concepts are examined are affected. Despite differences in definitions and investigations, Oztock & Brett (2011) argue:

that social presence is an important construct for understanding students' online behaviors that can be used to explain why some individuals interact more and, in return, obtain more knowledge while some others simply do not participate and do not share within the same environment. (Social Presence and Success and Satisfaction section, para. 4)

Online Dental Hygiene Education

Although dental hygiene education has not been at the forefront of online education (Grimes, 2002a), its implementation and use in advanced dental hygiene degree programs is becoming more prevalent (Debate et al., 2011; Mitchell, Gadbury-Amyot, Bray, & Simmer-Beck, 2007; Olmstead, 2010). A study by Grimes (2002a) reported, of 255 degree granting dental hygiene programs in the U.S., only 22% reported

participating in some form of distance education in 2002. The most commonly used type of distance education delivery, 62%, was asynchronous computer-based distance (online) education. Of the 22% offering distance education opportunities, five programs offered bachelor's degree completion courses, with the number of courses offered through distance education ranging from one course to the entire degree completion program. One program offered a master's degree in dental hygiene and provided five courses through distance education, and another offered three courses (Grimes, 2002a).

Currently, according to the American Dental Hygienists' Association (2014a), 335 entry level dental hygiene programs exist in the United States today. Fifty-five schools offer bachelor's degree completion programs (BDCP), with 44 of the 55 programs offered online. The majority of the BDCP curriculum is 100% online. Currently, 21 Master of Science degrees in dental hygiene or related disciplines are offered in the U.S. Of the 21 programs, eight offer 100% of the master's degree curriculum online, seven offer 76-99% online, one offers less than 25% online, and six do not offer online courses for the master's degree program (ADHA, 2014b).

Studies of online dental hygiene education have assessed the quality of education in an online format (Gallagher, Dobrosielski-Vergona, Wingard, & Williams, 2005; Grimes 2002b; Hanson, 2011; Moore, 2007; Olmstead, 2007, 2010b; Tsokris, 2011; Yoshida et al., 2012), compared student performance in online verses traditional formats (Bearden et al., 2002; Gallagher, et al., 2005; Garland, 2010; Olmstead, 2010a; Stegeman, & Zydney, 2010; Tsokris, 2011), assessed students' preference for online education delivery (Grimes, 2002a; McAnn et al., 2010; Mitchell et al., 2007; Tsokris, 2011), investigated student satisfaction and perceived learning of online education

(Ferhenbach et al., 2005; Mitchell et al., 2007; Tsokris, 2011), and studied undergraduate online degree completion programs (Gancarz-Gojgini & Barnes, 2007; Mitchell et al., 2007; Monson, & Engeswick, 2007; Moore, 2007; Portillo et al., 2013; Tsokris, 2011).

Additionally, researchers have suggested online dental hygiene education can help address the need for advanced dental hygiene degrees (Boyleston, & Collins, 2012; Monson & Engeswick, 2007; Pyle, 2012), curricular changes in dental hygiene education (Albino, Inglehart, & Tedesco, 2012; Bray et al., 2006; Debate et al., 2011; Fehrenbach et al., 2001; Fried, 2007; Gadbury-Amyot et al., 2009; Gwozdek et al., 2011; McAnn et al., 2010; Phillips & Berge, 2009; Pyle, 2012; Schonwetter, 2010; Stanley, Kinney, & Gwozdek, 2011; Woolfork & Price, 2012), and the shortage of dental hygiene educators (Barnes, 2007; Bray, et al., 2010; Coplen 2010; Gadbury-Amyot et al., 2006; Monson & Engeswick, 2007; Schonwetter, 2010).

Although these studies address important issues in online dental hygiene education, they focus mainly on undergraduate level education. A comprehensive search of the literature revealed few studies on graduate level dental hygiene education. Boyd and Bailey (2011) studied dental hygienists' perceptions of barriers to graduate education. Other literature explored the need for graduate level dental hygienists (Darby, 2009; Kerschbaum, 2013).

Rogo and Portillo (2014) completed a qualitative study of dental hygiene students (N=17) in an online graduate dental hygiene program at a northwestern university in the U.S. The purpose of the study was to establish "what experiences promote or impede the sustainability of online learning communities" (p. 215). Semi-structured personal interviews were used to gather information from enrolled students and graduates. The

online program used an asynchronous format. Characteristics of an online learning community were defined by participants of the study as "a complex synergistic network of interconnected people who create positive energy" (p. 213). Specific categories of experiences that influenced the development and sustainability of online communities within the program were identified. Categories included: program, course design, learners, and faculty influences. Furthermore, it was found that "establishing commonality was important for creating a personal and professional identity to develop social presence" (p. 227). Besides the Rogo and Portillo (2014) study, literature on the experiences of graduate degree seeking dental hygiene students with online education, including social presence, satisfaction, and perceived learning, is not well documented.

Summary

Numerous social presence studies have been conducted in the past thirty years, yet the literature review reveals some areas for further research. For instance, while researchers agree social presence is a critical concept in online education and the development of communities of learning, the definition of social presence still lacks clarity. Lowenthal (2010) stated "it is often hard to distinguish between whether someone is talking about social interaction, immediacy, intimacy, emotion, and/or connectedness when they talk about social presence" (p.125). In addition to the diversity in defining social presence, the relationships between social presence and learning and satisfaction are significant issues yet to be agreed upon.

Student satisfaction and perceived learning have been explored in online undergraduate dental hygiene education, however, social presence has not. Additionally, the concept of social presence and its relation to student satisfaction and perceived

learning in graduate level dental hygiene education have not been explored. This study seeks to examine social presence among graduate degree seeking students in online dental hygiene courses and its relationship to student satisfaction and perceived learning.

Chapter 3 Methodology

Design

Overview of study. The purpose of this study was to describe social presence, satisfaction, and perceived learning among graduate level degree seeking students enrolled in online dental hygiene courses. Additionally, this investigation determined relationships between social presence and satisfaction; between social presence and perceived learning; and between satisfaction and perceived learning among graduate degree seeking dental hygiene students. It also evaluated relationships between participants' characteristics and social presence, satisfaction, and perceived learning. Chapters one and two present the problem statement, significance of the study, purpose of the study, research questions, and a review of the literature. This chapter describes the methodology used for the study including the research design, sample, procedure for the protection of human participants, description of the instruments, and procedure for data collection and analysis.

Research questions. The following research questions were addressed through the assessment of online education in graduate level dental hygiene courses.

1. What is the social presence, satisfaction, and perceived learning of graduate students enrolled in online dental hygiene courses?
2. What is the relationship of social presence to satisfaction among graduate students enrolled in online dental hygiene courses?
3. What is the relationship of social presence to perceived learning among graduate students enrolled in online dental hygiene courses?

4. What is the relationship of satisfaction to perceived learning among graduate students enrolled in online dental hygiene courses?
5. What is the relationship between student characteristics and social presence, satisfaction, and perceived learning?

Hypotheses.

1. There is no statistically significant relationship between social presence and satisfaction among graduate students enrolled in online dental hygiene courses.
2. There is no statistically significant relationship between social presence and perceived learning among graduate students enrolled in online dental hygiene courses.
3. There is no statistically significant relationship between satisfaction and perceived learning among graduate students enrolled in online dental hygiene courses.
4. There is no statistically significant relationship between student characteristics and social presence, satisfaction, and perceived learning.

Research Method. This study used a descriptive, correlational research design with a self-administered questionnaire via an internet survey. Descriptive statistics were used to describe social presence, satisfaction, and perceived learning among graduate degree-seeking students in online dental hygiene courses. The use of correlation statistics determined whether there was a relationship between social presence and satisfaction; between social presence and perceived learning; between satisfaction and perceived learning among the students; and between participants' characteristics and social presence, satisfaction, and perceived learning.

Studies have shown survey research to be an important form of scientific inquiry (Braithwaite, Emery, De Lusignan, & Sutton 2003; Burns et al., 2008; Cho, Johnson,

&Vangeest, 2013). The aim of a survey is to gather reliable and unbiased data from a representative sample of respondents. Questionnaires can be descriptive or exploratory, can investigate several constructs at a time, and are amenable to quantitative analysis (Burns et al., 2008). The use of descriptive and correlation statistics to evaluate the self-administered online survey were used to answer this study's research questions and test the hypotheses.

Variables. In this study, the variables of social presence, satisfaction, perceived learning, and student characteristics were examined in web-based, graduate level dental hygiene courses.

Description of Setting

The study was facilitated through Idaho State University (ISU) Department of Dental Hygiene. Students from 12 graduate level dental hygiene programs in the U.S. were invited to participate in an online survey. Participants completed the self-administered questionnaire electronically using devices with access to the internet.

Research Participants

Sample description. Potential subjects were students enrolled in a graduate level dental hygiene program in the U.S. At the time of the study, 21 graduate programs were available to licensed dental hygienists in the U.S. Nine of the 21 programs were not chosen for participation because less than 76% of the program curriculum was available to be completed online, or a MSDH or MDH degree was not offered. Twelve programs were included in the study. The 12 programs offered a graduate level degree with 76-100% of the program curriculum available to be completed online (ADHA, 2014b). The degrees offered were either the Master of Science in Dental Hygiene (MSDH) or Master

of Dental Hygiene (MDH). Programs meeting these criteria included: University of Bridgeport (MSDH), Idaho State University (MSDH), Forsyth School of Dental Hygiene (MSDH), University of Michigan (MSDH), University of Missouri-Kansas City (MSDH), University of New Mexico (MSDH), Ohio State University (MDH), Old Dominion University (MSDH), University of Texas (MSDH), University of Tennessee (MDH), University of Minnesota (MSDH), and Eastern Washington University (MSDH) (ADHA, 2014b). As of March 2014, 248 students were enrolled in these programs (M. Smith, personal communication, August 16, 2014).

Potential subjects were graduate level students who were enrolled in one of the 12 selected graduate dental hygiene programs, and had completed any of the online, graduate level dental hygiene courses offered at these institutions. Participation in the study was on a voluntary basis. Inclusion criteria were that subjects must be licensed dental hygienists, enrolled in one of the 12 graduate programs, and have completed at least one web-based dental hygiene course in the graduate curriculum.

Human subjects protection. The Idaho State University Institutional Review Board (IRB) reviewed the proposal prior to initiation of the study. Exempt status was granted from the Human Subjects Committee (HSC study number IRB-FY2015-26). The study was explained to all potential subjects via an email attachment sent from the researcher through the participating schools' graduate dental hygiene program director. The letter was sent after IRB approval was obtained. The letter notified the potential subjects of the study and the opportunity to participate in the study survey.

The letter explained the study and subjects' rights. It contained a link to the web-based survey, and explained that participation was voluntary and submission of the

completed survey online signified informed consent. Subjects were provided a contact phone number and email address for the researcher for any questions related to the study. There were no anticipated risks with this study. No identifying information was collected when participants completed the online survey, thus allowing confidentiality and anonymity of the participants to be maintained throughout the study. Data retrieved from the survey were retained in secure internet and personal computer files so only the researcher, thesis committee chair, and the statistical consultant had access to the information. Upon completion of the study, data will be stored in a locked cabinet in the Department of Dental Hygiene at ISU for seven years, and then destroyed.

Data Collection

Instruments. Four survey instruments were used in this study, the Social Presence Scale (SPS), the Satisfaction Scale (SS) (Gunawardena & Zittle, 1997), the Perceived Learning Scale (PLS) (Rovai et al., 2009), and a researcher developed student characteristic questionnaire. The Social Presence Scale was used to measure social presence. The Satisfaction Scale was used to measure satisfaction. The Perceived Learning Scale was used to evaluate perceived learning. The student characteristic questionnaire was used to gather student demographic information. All four instruments were combined into one survey tool.

The Social Presence Scale and the Satisfaction Scale are subscales of the GlobalEd Questionnaire developed to evaluate the educational experiences and assess student responses to CMC in a multi-university conference. The GlobalEd Questionnaire used five point Likert scale items to measure the following items: social presence, active participation, confidence in mastering CMC, perception of having equal opportunity to

participate, adequate training in CMC at the participants site, technical skills and experience using CMC, and overall satisfaction with the course. The sub-scales, Social Presence Scale and the Satisfaction Scale, were developed by Gunawardena and Zittle (1997) to study the effectiveness of social presence in predicting satisfaction in a computer-mediated conferencing environment. Permission for use and modification of the Social Presence and Satisfaction Scales was obtained (Appendix A) (C. N. Gunawardena, personal communication, October 15, 2013).

The Perceived Learning Scale is a modification of the Cognitive, Affective, Psychomotor (CAP) Perceived Learning Scale created by Rovai et al. (2009). The nine-item, self-reported CAP Perceived Learning Scale instrument is composed of three CAP subscales that evaluate perceived cognitive (three questions), affective (three questions), and psychomotor (three questions) learning; the scores range from a low of 0 to a high of 18. The total CAP scores combine cognitive, affective, and psychomotor subscale learning scores having a total minimum and maximum perceived learning scale of 0-54. Higher total CAP scores are interpreted as indications of higher perceptions of total learning.

The CAP Perceived Learning Scale has been shown to be a valid and reliable instrument to measure perceived cognitive, affective, and psychomotor learning in traditional and virtual higher education classroom settings (Wighting, 2011). Because the scale "was developed and tested with students enrolled in both online and campus courses, it has utility across the entire delivery spectrum from fully online and blended courses to web-enhanced and fully face-to-face instruction" (Rovai et al., 2009, p. 11). The instrument is valuable because it is useful in "studying the effectiveness of different

online learning theories, techniques, and models" (Rovai et al., 2009, p. 11), and has been used in several multidisciplinary studies (Araiza, Kutugata, & Dorfer, 2012; Baturay, 2011; Kyuatt & Baker, 2014; Nisbet, Wighting, & Rockinson-Szapkiw, 2013; Wighting, 2011). Permission for use and modification of the CAP Perceived Learning Scale is granted on the following website: <http://www.alfredrovai.com/cap-perceived-learning-scale/>.

Social presence scale. The SPS (Gunawardena & Zittle, 1997), as shown in Table 1, has been used in several studies of online courses with undergraduate and graduate students from various disciplines (Cobb, 2009; Hostetter & Busch, 2006; Mayne & Wu, 2011; Richardson & Swan, 2003; Skiba, Holloway, & Springer, 2000; Swan & Shih, 2005; Tao, 2009). The scale consists of fourteen Likert scale items with scores ranging from 1-5. A score of 1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, and 5=strongly agree. The maximum score possible is 70. Slight modification to the wording of the scale was made as appropriate for a web-based dental hygiene course. The word "GlobalEd" was replaced on the scale with "online dental hygiene course" or "course" to better reflect the online courses in which the dental hygiene students will be participating. No other adjustments to the scale were made.

Content validity of the Social Presence Scale was assessed by Gunawardena and Zittle (1997) through a bivariate correlational analysis comparing it with six selected bi-polar social indicators to measure the concept of "immediacy" in mediated communication. The positive polar ends of the social indicators were: immediate, interactive, personal, sensitive, social, and warm. Gunawardena and Zittle (1997) reported correlation coefficients of 0.52-0.87 between the bi-polar items and the Social

Presence Scale, "suggesting that the Social Presence Scale used in this study may be thought to accurately measure the intended social presence parameters" (p. 17). Factorial validity was established by Cobb's (2008) study. Four factors were identified that explained 58% of the total variation in the data. Reliability was reported as Cronbach's Alpha of 0.88 (Gunawardena & Zittle, 1997).

Table 1

Social Presence Scale

Item
1. Messages in the online dental hygiene course were impersonal.
2. Computer -mediated communication (CMC) is an excellent medium for social interaction.
3. I felt comfortable conversing through this text-based medium.
4. I felt comfortable introducing myself in the online dental hygiene course.
5. The introductions enabled me to form a sense of online community.
6. I felt comfortable participating in the course discussions.
7. The instructor(s) created a feeling of an online community.
8. The instructor(s) facilitated discussions in the course.
9. Discussions using the medium CMC tend to be more impersonal than face-to-face discussions.
10. CMC discussions are more impersonal than audio teleconference discussions.
11. CMC discussions are more impersonal than video teleconference discussions
12. I felt comfortable interacting with other participants in the online course.
13. I felt that my point of view was acknowledged by other participants in the course.
14. I was able to form distinct individual impressions of some course participants even though we communicated only via a text-based medium.

Satisfaction scale. The SS (Gunawardena & Zittle, 1997), as shown in Table 2, consists of ten items scored on a Likert scale of 1-5, as in the Social Presence Scale. A score of 1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, 5=strongly agree. Reliability was reported as 0.87 using Cronbach's alpha (Gunawardena & Zittle, 1997). Factorial validity was established by Cobb's (2008) study. Four factors were identified that explained 68% of the total variation in the data. For the purposes of this study, one item on the initial scale specific to the GlobalEd conference ("Projects like GlobalEd enhance face-to-face on-campus courses") was deleted, as it is not relative to web-based dental hygiene courses in this study. The maximum possible score for this scale in this study is 45. The word "GlobalEd" was replaced on the scale with "online" or "online dental hygiene course." No other adjustments to the scale were made.

Table 2

Satisfaction Scale

Item
1. I was able to learn from the online discussions.
2. I was stimulated to do additional reading or research on topics discussed in the online dental hygiene course.
3. I learned to value other points of view.
4. As a result of my experience with the online dental hygiene course, I would like to participate in another online course in the future.
5. The online course was a useful learning experience.
6. As a result of my participation in the online course, I made acquaintances electronically in other parts of the country/world.
7. The diversity of topics in the online course prompted me to participate in the discussions.
8. I put a great deal of effort to learn the CMC system to participate in the online course.

Perceived learning scale. The PLS, as shown in Table 3, consists of 6 items scored on a Likert scale of 1-5. A score of 1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, 5=strongly agree. The maximum possible score for this scale is 30. Reliability was reported as 0.79 using Cronbach's alpha (Rovai et al., 2009). Factorial validity was established by the Rovai et al. (2009) study. Three factors were identified that explained 68% of the total variation in the data. For the purposes of this study, modifications were made to the original CAP Perceived Learning Scale. Three items on CAP Scale were deleted ("I am able to use physical skills learned in this course outside of class, I have not expanded my physical skills as a result of this course, I can demonstrate to others the physical skills learned in this course") as they are not relative to web-based dental hygiene courses in this study. The word "cannot" in item two of the original scale was replaced with the word "can." Additionally, the Likert scale used in the original instrument was changed from seven points (0-6) to five (1-5), to accommodate statistical analysis of this study. No other adjustments were made.

Table 3

Perceived Learning Scale

Item

1. I can organize course material into a logical structure.
2. I can produce a course study guide for future students.
3. I have changed my attitudes about the course subject matter as a result of this course.
4. I can intelligently critique the texts used in this course.
5. I feel more self-reliant as the result of the content learned in this course.
6. I feel that I am a more sophisticated thinker as a result of this course.

Student characteristic questionnaire. The student characteristic questionnaire is a researcher developed tool created for the purpose of obtaining student demographic information and data related to students' experience with online education. Items included on the questionnaire are: age, gender, number of years as a licensed dental hygienist, name of the dental hygiene program student is currently attending, number of online courses completed in the program, and number of online courses completed prior to entering the program. Students were also asked to comment on their experiences related to social presence, satisfaction, and learning in the online program.

Procedure and protocol. Potential subjects were recruited via email to enrolled MSDH/MDH students at selected universities throughout the U.S. Following IRB approval a letter (Appendix B) from the researcher was sent, via email, to program directors of twelve graduate level dental hygiene programs. Program director email information was obtained from the ADHA (2014b) publication, Online Programs: Master of Science Degree in Dental Hygiene or Related Disciplines. The letter provided general information about the study and requested the program directors' assistance in disseminating the Participant Consent Letter (Appendix C) to students. The email included contact information had the students or program directors any questions regarding the study.

The Participant Consent Letter contained information regarding the purpose of the study, confidentiality of participants and data, procedures for data collection, security of the website, and reporting of data. It included a link to the web-based survey (Appendix D). Qualtrics® was the online survey tool used for the study. Additionally, the Participant Consent Letter offered students the opportunity to enter a drawing for two \$50.00 VISA®

gift cards as incentive to participate and two awards were sent to two randomly selected participants. Email addresses were separated from the survey and destroyed after the drawing was completed. The survey was available to participants for six weeks, and four email reminders were sent (Appendices E, F, G, H, I) to allow those who had not previously completed the survey an opportunity to do so.

A self-administered internet questionnaire was selected as the data collection format for this study due to the cost effectiveness and the anonymity self-administered surveys can provide. The anonymity of self-administered questionnaires can enhance objective responses by participants. Interviewer bias also is avoided by use of this collection format. Use of the Internet to administer surveys allows for data to be collected directly via the Web in a form amenable to analysis (Evans & Mather, 2005). Email and web-based questionnaires are used frequently in allied health education and are a common method of choice for administering surveys (Cobb, 2008; Conley, 2007).

Limitations

There are some limitations inherent in the methods of this research. The first is the utilization of purposive sampling, a nonprobability sampling technique. This limitation will restrict generalizations of the research outcomes to other populations. Even more, those students who volunteer to participate in this research of online dental hygiene education might have a special interest in answering the study survey, and therefore might not truly represent the population of interest. Additionally, the self-report nature of the questionnaires employed in this study is a limitation. It is recognized that subjects taking part in research studies involving self-report instruments are often reluctant to report negative experiences (Wighting, 2011).

Another limitation of this research is the use of an internet survey as the data collection instrument. A potential weakness of internet surveys is low response rate. Fricker and Schonlau (2002) stated there is limited evidence in the literature that online surveys generally obtain higher response rates than do other survey types. The majority of reported results show online surveys to attain response rates either equal to, or worse than, other modes of data collection. These authors suggested the reasons for this merit more study. Other studies found participants' perception of the survey as junk mail, technological variations such as system incompatibility and spam filters, and unclear answering instructions can affect survey response rates (Evans & Mather, 2005; Hartford, Carey, & Mendonca, 2007).

Statistical Analysis

Survey data were entered automatically into a database through the internet survey software, Qualtrics®. Data were exported from Qualtrics® for import into the Statistical Package for Social Sciences (SPSS). Overall social presence, satisfaction, and perceived learning scores were calculated. The Social Presence and Satisfaction Scales, as well as the Perceived Learning Scale, were divided into subscales for analysis. As determined by factor analysis (Cobb, 2008), subscales of the Social Presence Scale, as shown in Table 4, included: Overall Comfort with Online and CMC (items 4, 5, 6, 12); Communication with CMC and the Online Environment (items 9, 10, 11); Comfort and Community of the CMC/Online Environment (items 5, 6, 7, 8, 13); and Attitudes Toward CMC/Online Environment (items 2, 3, 6, 9, 12). Subscales of the Satisfaction survey, as shown in Table 5, included: Usefulness of the Course (items 1, 5, 6, 8, 9); Learning from the Course (items 2, 4, 6); and Stimulation and Ongoing Learning (items 2, 3, 4, 6, 8).

(Cobb, 2008). Perceived learning sub-categories developed by Rovai et al. (2009), as shown in Table 6, included items associated with the cognitive domain of learning (items 1, 2, 4), and items associated with the affective domain of learning (items 3, 5, 6).

Table 4

<i>Social Presence Subscales</i>	
Subscale	Item
Overall Comfort With Online CMC	4. I felt comfortable introducing myself in the online dental hygiene course.
	5. The introductions enabled me to form a sense of online community.
	6. I felt comfortable participating in the course discussions.
	12. I felt comfortable interacting with other participants in the online course.
Communication with CMC and Online Environment	9. Discussions using the medium CMC tend to be more impersonal than face-to-face discussions.
	10. CMC discussions are more impersonal than audio teleconference discussions.
	11. CMC discussions are more impersonal than video teleconference discussions
Comfort and Community of CMC/Online Environment	5. The introductions enabled me to form a sense of online community.
	6. I felt comfortable participating in the course discussions.
	7. The instructor(s) created a feeling of an online community.
	8. The instructor(s) facilitated discussions in the course.
	13. I felt that my point of view was acknowledged by other participants in the course.

Attitudes Toward CMC/Online
Communication

2. CMC is an excellent medium for social interaction.
 3. I felt comfortable conversing through this text-based medium.
 6. I felt comfortable participating in the course discussions.
 9. Discussions using the medium CMC tend to be more impersonal than face-to-face discussions.
 12. I felt comfortable interacting with other participants in the online course.
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Table 5

Satisfaction Subscales

Subscale	Item
Usefulness of Course	1. I was able to learn through the medium of CMC.
	5. As a result of my experience with the online dental hygiene course, I would like to participate in another online course in the future.
	6. The online course was a useful learning experience.
	8. The diversity of topics in the online course prompted me to participate in the discussions.
	9. I put a great deal of effort to learn the CMC system to participate in the online course.
Learning From Course	2. I was able to learn from the online discussions.
	4. I learned to value other points of view.
	6. The online course was a useful learning experience.
Stimulation and Ongoing Learning	2. I was able to learn from the online discussions.
	3. I was stimulated to do additional reading or research on topics discussed in the online dental hygiene course.
	4. I learned to value other points of view.
	6. The online course was a useful learning experience.
	8. The diversity of topics in the online course prompted me to participate in the discussions.

Table 6

Perceived Learning Subscales

Subscale	Item
Cognitive Domain	1. I can organize course material into a logical structure.
	2. I can produce a course study guide for future students.
	4. I can intelligently critique the texts used in this course.
Affective Domain	3. I have changed my attitudes about the course subject matter as a result of this course.
	5. I feel more self-reliant as the result of the content learned in this course.
	6. I feel that I am a more sophisticated thinker as a result of this course.

Cronbach's alpha was calculated for each scale and subscale. General characteristics of the data set were determined by calculating the descriptive statistics of each response. Correlation and other bivariate tests were used in comparing social presence to satisfaction, social presence to perceived learning, and satisfaction to perceived learning. Spearman's rho was used at the 0.05 level of significance.

Summary

The study used a descriptive, correlational design with self-administered questionnaires delivered via email with a link to a web-based survey housed on a secure website. Subjects were MSDH/MDH students who have experience with online graduate level dental hygiene courses. There were no anticipated risks. The survey instruments used were a modified version of the Satisfaction Scale, the Social Presence Scale (Gunawardena & Zittle, 1997), the CAP Perceived Learning Scale (Rovai et al., 2009),

and a researcher created student characteristic questionnaire. Data analysis consisted of descriptive statistics and analysis of responses to five research questions using appropriate statistical techniques. Following data collection and analysis, a manuscript was prepared for submission to the *Journal of Dental Education* (Appendix K).

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Appendix A

Permission to Use the Social Presence Scale and the Satisfaction Scale

From: Lani Gunawardena [mailto:lanigun@unm.edu]

Sent: Tuesday, October 15, 2013 10:36 PM

To: LaNae Rodgerson

Subject: Re: Permission

You have my permission to use the social presence scale. Do share the results when you are done.

Best wishes

Charlotte

Charlotte Nirmalani (Lani) Gunawardena, Ph.D.

Regents' Professor

Organizational Learning and Instructional Technology Program

MSC 05 3020

1 University of New Mexico

Albuquerque, NM 87131-0001, USA

Phone: 505-277-5046

e-mail: <lanigun@unm.edu>

From: LaNae Rodgerson <lanae@seanrodderson.com>

To: lanigun@unm.edu

Sent: Saturday, October 12, 2013 9:52 AM

Subject: Permission

Dr. Gunawardena,

My name is LaNae Rodgerson. I am a graduate student in the Dental Hygiene program at Idaho State University.

I am writing to ask your permission to use the Social Presence Scale and the Satisfaction Scale from the GlobalEd Questionnaire in my thesis, and to make minor modifications to the wording of the scales to be suitable to the online dental hygiene courses I am studying.

I plan to replace "GlobalEd" with "course" or "online dental hygiene course" on the Social Presence Scale. "GlobalEd" would be replaced with "course" or "online dental hygiene course" and "computer conference" with "online course" on the Satisfaction Scale. I also plan to delete item number 7 on the Satisfaction Scale as it is not relevant to the courses I am studying.

Thank you for your assistance.

LaNae Rodgerson

From: Lani Gunawardena [mailto:lanigun@unm.edu]

Sent: Saturday, October 26, 2013 9:51 PM

To: LaNae Rodgerson

Subject: Re: Permission

Yes, I give you permission to use the Satisfaction scale as well.

Charlotte Nirmalani (Lani) Gunawardena, Ph.D.
Regents' Professor
Organizational Learning and Instructional Technology Program

MSC 05 3020
1 University of New Mexico
Albuquerque, NM 87131-0001, USA
Phone: 505-277-5046
e-mail: <lan@unm.edu>

From: LaNae Rodgerson <lan@seanrodgerson.com>

To: 'Lani Gunawardena' <lan@unm.edu>

Sent: Saturday, October 26, 2013 9:50 PM

Subject: RE: Permission

Dr. Gunawardena,

Thank you for allowing me to use the Social Presence Scale in my study.

May I also have your permission to use the Satisfaction Scale, and to make minor modifications to the wording of the scales to be suitable to the online dental hygiene courses I am studying?

I appreciate your assistance.

LaNae Rodgerson

Appendix B

Initial E-mail Correspondence to Program Directors

Dear Program Directors,

As you know, graduate level education is integral to advancing our profession. Highly educated dental hygienists are needed as future educators, change agents, and leaders in our profession. Technology has provided the opportunity for many dental hygienists to pursue graduate dental hygiene degrees through online education. As an educator, it is important to be aware of the experiences of these students with online courses in order to develop online educational experiences that meet their needs and foster learning and professional development.

The study I am conducting will provide information regarding the experiences of graduate degree seeking students and the effective use of online instruction in advanced level dental hygiene courses. Factors related to satisfaction, perceived learning, social presence, and learner characteristics will be evaluated. This information will be valuable to you in developing online courses and effective online communities of learning.

I am writing to request that you forward the attached consent letter, which contains a link to an online survey, to your graduate students for them to consider participating in the study. The survey should take about thirty minutes to complete. Data will be collected on a secure website. Confidentiality of the participants will be maintained and data will only be reported in the aggregate.

As a token of my appreciation, students who complete the survey and provide their e-mail address will be entered into a drawing for one of two \$50.00 VISA[®] gift cards. Participant's e-mail information will be removed prior to data analysis. Refusal to participate will have no impact on the participant's relationship with Idaho State University or your institution.

Upon completion of the study, results will be presented at national/international meetings and disseminated in publications. I will happy to provide information/results specific to your program, per your request. The information gathered from your students will provide valuable insight into your program and will assist in the development of experiences that will meet your students' needs, support their personal and professional growth, and promote online communities of learning within your program.

Thank you for your support. Please contact me should you have any questions or concerns regarding this study.

Sincerely,
LaNae Rodgers RDH, BS, MS(c)
Idaho State University
rodglana@isu.edu
928-502-2655

Appendix C

Initial Participant Consent Letter

Dear Graduate Student:

I am a student in the graduate dental hygiene program at Idaho State University. I am conducting my thesis study on the experiences of graduate level dental hygiene students with online learning. Factors related to satisfaction, perceived learning, social presence, and learner characteristics will be evaluated.

If you are currently enrolled in a graduate dental hygiene program, and are taking, or have taken, an online graduate level dental hygiene course I am inviting you to participate in this research project. Participation in this study will provide you the opportunity to share your experiences in online education as a graduate learner. This information will provide valuable insight which will assist in the development of online courses and programs that will meet your needs and support your personal and professional growth.

I would greatly appreciate your taking the time to complete a brief survey via the link below. The survey is conducted online through a secure site and should take less than thirty minutes of your time. If you choose to participate, *please do so from a dedicated computer or laptop*, as the survey system will not allow you to complete the survey from a phone or iPad.

Your participation is voluntary. Your name will never appear on any survey or research instruments. No identity will be made in the data analysis. All materials and data will be kept secure. Your response will only appear in statistical summaries. Your submission of the survey implies your consent. You are under no obligation to participate in this study and are free to withdraw your consent to participate at any time. There are no risks of participating in this study. Results will be presented at national/international meetings and disseminated in publications. A summary of the results of this research will be supplied to you, upon request.

Online survey link: https://isudhs.az1.qualtrics.com/SE/?SID=SV_eKXkKBXJWLFIE5v
The survey link will remain active until March 20.

As a token of my appreciation, students who complete the survey and provide their e-mail address will be entered into a drawing for one of two \$50.00 VISA® gift cards. If you choose to do so, your e-mail address will be separated from the responses you provide and destroyed after the drawing has been completed. Refusal to participate will have no impact on the your relationship with Idaho State University or your institution.

If you have any questions regarding participation in this study please contact me, or my thesis advisor, Dr. Joann Gurenlian, Department of Dental Hygiene, Division of Graduate

Studies,
Idaho State University: gurejoan@isu.edu. Thank you so much for your support!

Sincerely,
LaNae Rodgerson RDH, BS, MS(c)
rodglana@isu.edu
928-502-2655

Appendix D

Survey (Study Instrument)

Instructions:

- For this survey the term computer-mediated communication refers to the text - based discussions within the discussion board in the online dental hygiene course.
- If you have taken more than one online dental hygiene course, please choose one course in which you have participated to focus your survey responses on. This should be the course which you feel is most representative of your online experience in the graduate program.

1. Messages in the online course were impersonal.

Strongly disagree Disagree Uncertain Agree Strongly Agree

2. Computer -mediated communication is an excellent medium for social interaction.

Strongly disagree Disagree Uncertain Agree Strongly Agree

3. I felt comfortable conversing through this text-based medium.

Strongly disagree Disagree Uncertain Agree Strongly Agree

4. I felt comfortable introducing myself in the online course.

Strongly disagree Disagree Uncertain Agree Strongly Agree

5. The introductions enabled me to form a sense of online community.

Strongly disagree Disagree Uncertain Agree Strongly Agree

6. I felt comfortable participating in the course discussions.

Strongly disagree Disagree Uncertain Agree Strongly Agree

7. The instructor(s) created a feeling of an online community.

Strongly disagree Disagree Uncertain Agree Strongly Agree

8. The instructor(s) facilitated discussions in the course.

Strongly disagree Disagree Uncertain Agree Strongly Agree

9. Discussions using computer-mediated communication tend to be more impersonal than face-to-face discussions.

Strongly disagree Disagree Uncertain Agree Strongly Agree

10. Computer-mediated communication discussions are more impersonal than audio teleconference discussions.

Strongly disagree Disagree Uncertain Agree Strongly Agree

11. Computer-mediated communication discussions are more impersonal than video teleconference discussions.

Strongly disagree Disagree Uncertain Agree Strongly Agree

12. I felt comfortable interacting with other participants in the online course.

Strongly disagree Disagree Uncertain Agree Strongly Agree

13. I felt that my point of view was acknowledged by other participants in the course.

Strongly disagree Disagree Uncertain Agree Strongly Agree

14. I was able to form distinct individual impressions of some course participants even though we communicated only via a text-based medium.

Strongly disagree Disagree Uncertain Agree Strongly Agree

15. I was able to learn through the medium of computer-mediated communication.

Strongly disagree Disagree Uncertain Agree Strongly Agree

16. I was able to learn from the online discussions.

Strongly disagree Disagree Uncertain Agree Strongly Agree

17. I was stimulated to do additional reading or research on topics discussed in the online course.

Strongly disagree Disagree Uncertain Agree Strongly Agree

18. I learned to value other points of view.

Strongly disagree Disagree Uncertain Agree Strongly Agree

19. As a result of my experience with this course, I would like to participate in another online course in the future.

Strongly disagree Disagree Uncertain Agree Strongly Agree

20. The online course was a useful learning experience.

Strongly disagree Disagree Uncertain Agree Strongly Agree

21. As a result of my participation in the online course, I made acquaintances electronically in other parts of the country/world.

Strongly disagree Disagree Uncertain Agree Strongly Agree

22. The diversity of topics in the online course prompted me to participate in the discussions.

Strongly disagree Disagree Uncertain Agree Strongly Agree

23. I put a great deal of effort to learn the computer-mediated communication system to participate in the online course.

Strongly disagree Disagree Uncertain Agree Strongly Agree

24. I can organize course material into a logical structure.

Strongly disagree Disagree Uncertain Agree Strongly Agree

25. I can produce a course study guide for future students.

Strongly disagree Disagree Uncertain Agree Strongly Agree

26. I have changed my attitudes about the course subject matter as a result of this course.

Strongly disagree Disagree Uncertain Agree Strongly Agree

27. I can intelligently critique the texts used in this course.

Strongly disagree Disagree Uncertain Agree Strongly Agree

28. I feel more self-reliant as the result of the content learned in this course.

Strongly disagree Disagree Uncertain Agree Strongly Agree

29. I feel that I am a more sophisticated thinker as a result of this course.

Strongly disagree Disagree Uncertain Agree Strongly Agree

30. Age (years):

_____ 20-29
_____ 30-39
_____ 40-49
_____ 50-59
_____ 60-69
_____ 70 or over

31. Gender:

_____ Female
_____ Male

32. Number of years as a licensed dental hygienist:

_____ 0-5
_____ 6-10
_____ 11-15
_____ 16-20
_____ 21-25
_____ more than 25

33. Name of the dental hygiene program you are currently attending

34. How many online courses have you completed in this program?

_____ 1-3
_____ 4-6
_____ 7-9
_____ 10-12
_____ more than 12

35. Prior to entering this program, how many online courses have you completed?

_____ 0
_____ 1-3
_____ 4-6
_____ 7-9
_____ 10-12
_____ more than 12

36. Please comment on your experiences with social presence, your satisfaction, and your learning in this online program:

Appendix E

Second E-mail Correspondence to Program Directors

Dear Program Director,

Thank you for forwarding my study information to your dental hygiene graduate students as requested on March 2. To enhance the outcomes of this study, I am requesting that you forward the attached consent form to your dental hygiene graduate students one final time. Doing so will give those who have not yet had a chance to respond the opportunity to do so.

As previously stated, I will happy to provide information/results specific to your program, upon completion of the study. The information gathered from your students will provide valuable insight into your program and will assist in the development of experiences that will meet your students' needs, support their personal and professional growth, and promote online communities of learning within your program.

Thank you so much for your support! I welcome any further discussion on this research study and would be happy to answer any questions you may have.

Sincerely,

LaNae Rodgerson RDH, BS, MS(c)
rodglana@isu.edu
928-502-2655

Appendix F

Second Participant Consent Letter

Dear Graduate Student:

One week ago I requested your participation in my thesis study on the experiences of graduate dental hygiene students with online learning. If you are currently enrolled in a graduate dental hygiene program and are taking, or have taken, an online graduate level dental hygiene course I am inviting you to participate in this research project. **I would greatly appreciate your taking the time to complete a brief survey via the link below.** The survey is conducted online through a secure site and should only take about thirty minutes of your time.

If you have already completed the survey, please accept my **sincere thanks!** If you have not, please remember that the information gathered from this survey will be a benefit to you and to future dental hygiene students. Participation in this study will provide you the opportunity to share your experiences in online education as a graduate learner. This information will provide valuable insight which will assist in the development of online courses and programs that will meet your needs and support your personal and professional growth. Additionally, the field of dental hygiene will benefit from the information attained from this study.

Your participation is voluntary. Your name will never appear on any survey or research instruments. No identity will be made in the data analysis. All materials and data will be kept secure. Your response will only appear in statistical summaries. Your submission of the survey implies your consent. You are under no obligation to participate in this study and are free to withdraw your consent to participate at any time. There are no risks of participating in this study. A summary of the results of this research will be supplied to you, upon request.

Online survey link: https://isudhs.az1.qualtrics.com/SE/?SID=SV_eKXkKBXJWLFIE5v
The survey link will remain active until March 20.

As a token of my appreciation, students who complete the survey and provide their e-mail address will be entered into a drawing for one of two \$50.00 VISA® gift cards. If you choose to do so, your e-mail address will be separated from the responses you provide and destroyed after the drawing has been completed. Refusal to participate will have no impact on your relationship with Idaho State University or your institution.

If you have any questions regarding participation in this study please contact me, or my thesis advisor, Dr. Joann Gurenlian, Department of Dental Hygiene, Division of Graduate Studies,
Idaho State University: gurejoan@isu.edu. Thank you so much for your support!

Sincerely,

LaNae Rodgerson RDH, BS, MS(c)
rodglana@isu.edu
928-502-2655

Appendix G

Third Correspondence to Program Directors

Dear Program Director,

Thank you for forwarding my study information to your dental hygiene graduate students as requested previously this month. To date, only 41 students have participated in the study. To enhance the outcomes of this very important study to our discipline, I am asking that you please forward to your dental hygiene graduate students, one final time, the attached consent form and link to the online survey. Doing so will allow those who have not yet had a chance to respond the opportunity to do so.

I am also requesting that you encourage your students to participate. The study is designed to evaluate graduate dental hygiene students' experiences with online education. The information gathered from your students will provide valuable insight into your program and will assist in the development of experiences that will meet your students' needs, support their personal and professional growth, and promote online communities of learning within your program.

As promised, those who participate, and choose to provide their email address, will be entered into a drawing for one of two \$50.00 Visa gift cards.

Thank you for your support. Please contact me should you have any questions or concerns regarding this study.

Sincerely,
LaNae Rodgerson RDH, BS, MS(c)
Idaho State University
rodglana@isu.edu
928-502-2655

Appendix H

Third Request to Students

Dear Graduate Student:

Earlier this month I requested your participation in my thesis study on the experiences of graduate dental hygiene students with online learning. If you have already completed the survey, please accept my **sincere thanks!** If you have not, **I am asking that you please consider completing a brief survey via the link below.** Participation will provide you the opportunity to share your experiences in online education as a graduate learner. The information gathered from this survey will be a benefit to you and to future dental hygiene students.

The survey is conducted online through a secure site and should take less than thirty minutes of your time. Your participation is voluntary. Your name will never appear on any survey or research instruments. No identity will be made in the data analysis. All materials and data will be kept secure. Your response will only appear in statistical summaries. Your submission of the survey implies your consent. You are under no obligation to participate in this study and are free to withdraw your consent to participate at any time. There are no risks of participating in this study. A summary of the results of this research will be supplied to you, upon request.

If you choose to participate, *please do so from a dedicated computer or laptop*, as the survey system will not allow you to complete the survey from a phone or iPad.

Online survey link: https://isudhs.az1.qualtrics.com/SE/?SID=SV_eKXkKBXJWLFIE5v
The survey link will remain active until April 4th.

As promised, students who complete the survey and provide their e-mail address will be entered into a drawing for one of two \$50.00 VISA® gift cards.

If you have any questions regarding participation in this study please contact me, or my thesis advisor, Dr. Joann Gurenlian, Department of Dental Hygiene, Division of Graduate Studies,
Idaho State University: gurejoan@isu.edu. Thank you so much for your support!

Sincerely,

LaNae Rodgerson RDH, BS, MS(c)
rodglana@isu.edu
928-502-2655

Appendix I

Final Request to Classmates

Dear Classmates,

I am in need of your help! I have sent several requests asking for your support of my thesis study by completing an online survey. I am very grateful for those of you who have taken the time to do so already. I know you are all VERY busy and I really do appreciate your assistance in this endeavor!! I have had 67 responses thus far, and I need 100. So, I am asking one final time to PLEASE click on the link in the attached letter, if you have not already, and complete the survey. It will take you less than 20 minutes, I promise! EVERY response counts!

THANK YOU!

LaNae

Dear Graduate Student:

Earlier this month I requested your participation in my thesis study on the experiences of graduate dental hygiene students with online learning. If you have already completed the survey, please accept my **sincere thanks!** If you have not, **I am asking that you please consider completing a brief survey via the link below.** Participation will provide you the opportunity to share your experiences in online education as a graduate learner. The information gathered from this survey will be a benefit to you and to future dental hygiene students. In addition, your participation will allow me the opportunity to learn more about this topic, complete my thesis research, and graduate from the Master of Science in Dental Hygiene Program at Idaho State University. ***I truly hope you can help!***

The survey is conducted online through a secure site and should take less than thirty minutes of your time. Your participation is voluntary. Your name will never appear on any survey or research instruments. No identity will be made in the data analysis. All materials and data will be kept secure. Your response will only appear in statistical summaries. Your submission of the survey implies your consent. You are under no obligation to participate in this study and are free to withdraw your consent to participate at any time. There are no risks of participating in this study. A summary of the results of this research will be supplied to you, upon request.

If you choose to participate, *please do so from a dedicated computer or laptop*, as the survey system will not allow you to complete the survey from a phone or iPad.

Online survey link:

https://isudhs.az1.qualtrics.com/SE/?SID=SV_eKXkKBXJWLFIE5v

Please take the time to complete this survey by Monday, April 13th!

As promised, students who complete the survey and provide their e-mail address will be entered into a drawing for one of two \$50.00 VISA® gift cards.

If you have any questions regarding participation in this study please contact me, or my thesis advisor, Dr. Joann Gurenlian, Department of Dental Hygiene, Idaho State University: gurejoan@isu.edu. **Thank you so much for your support!**

Sincerely,

LaNae Rodgers RDH, BS, MS(c)

rodglana@isu.edu

928-502-2655

Appendix J

Journal of Dental Education Manuscript Submission Guidelines

INFORMATION FOR AUTHORS

The *Journal of Dental Education (JDE)* is a peer-reviewed monthly journal that publishes a wide variety of educational and scientific research in dental, allied dental and advanced dental education. Published continuously by the American Dental Education Association since 1936 and internationally recognized as the premier journal for academic dentistry, the *JDE* publishes articles on such topics as curriculum reform, education research methods, innovative educational and assessment methodologies, faculty development, community-based dental education, student recruitment and admissions, professional and educational ethics, dental education around the world and systematic reviews of educational interest. The *JDE* is one of the top scholarly journals publishing the most important work in oral health education today; it celebrated its 75th anniversary in 2011.

I. Types of Manuscripts Considered and Requirements for Each

The Editor will consider the following types of manuscripts for publication:

Submissions for Peer Review:

- Original Articles (see below for categories within this type)
- Review Articles

Solicited or Pre-approved by the Editor:

- Letters to the Editor (solicited or pre-approved by the Editor)
- Guest Editorials (solicited by the Editor)
- Perspectives (pre-approved by the Editor)
- Brief Communications (pre-approved by the Editor)
- Point/Counterpoint (solicited by the Editor)

Special Reports:

- Miscellaneous (submitted by ADEA staff)

Submissions for Peer Review

1. Original Articles

This type of article addresses subject matter in the following categories:

- a. Predoctoral Dental Education

- b. Advanced Dental Education
- c. Allied Dental Education
- d. Interprofessional Education
- e. Community-Based Dental Education
- f. Global Dental Education—Manuscripts pertaining to global health education or issues pertinent to the global dental education community. (Not intended solely for submissions from international authors. International authors should submit manuscripts under pertinent topic areas provided in this section.)
- g. Use of Technology in Dental Education
- h. Assessment
- i. Faculty Issues/Development
- j. Continuing Education

Original Articles should report the results of hypothesis-based research studies and may be either qualitative, quantitative or of a mixed methods nature. Manuscripts must address how the findings advance our understanding of the questions asked in the study and make a novel contribution to the literature. The limitations of the study should also be addressed. Small studies of local relevance/interest, limited to one class/course, or small course/student-based surveys may not meet the criteria to be published as an Original Article.

Original Articles should be no more than 3,500 words, excluding the abstract, illustrations and references. A maximum of six figures and tables can be submitted (the figures can be multi-panel), and the number of references should not exceed 50 (unless the article is a systematic review).

Original Articles should have the following general organization (see “Document Preparation, Organization and Formatting” below for more detailed instructions):

Title: An informative and concise title limited to 15 words with no more than 150 characters.

Abstract: For research studies, a structured abstract of no more than 250 words should be submitted with the following subheads:

Purpose/Objectives: Briefly summarize the issue/problem being addressed.

Methods: Describe how the study was conducted.

Results: Describe the results.

Conclusion(s): Report what can be concluded based on the results, and note implications for dental education.

Abstracts for other types of manuscripts should be in paragraph form, with no subheads.

Introduction: Provide a succinct description of the study's background and significance with references to the appropriate published literature. Detailed literature review/discussion should be reserved for the discussion section. Include a short paragraph outlining the aims of the study.

Materials and Methods: A statement that the study has been approved or exempted from oversight by a committee that reviews, approves and monitors studies involving human subjects **MUST** be provided at the beginning of this section, along with the IRB protocol number.

In this section, provide descriptions of the study design, curriculum design, subjects, procedures and materials used, as well as a description of and rationale for the statistical analysis. If the design of the study is novel, enough detail should be given for other investigators to reproduce the study. References should be given to proprietary information.

Results: The results should be presented in a logical and systematic manner with appropriate reference to tables and figures. Tables and figures should be chosen to illustrate major themes/points without duplicating information available in the text.

Discussion: This section should focus on the main findings in the context of the aims of the study and the published literature. The authors should avoid an extensive review of the literature and focus instead on how the study's findings agree or disagree with the hypotheses addressed and what is known about the subject from other studies. A reflection on new information gained, new hypotheses and limitations of the study should be included, as well as guidance for future research.

Conclusion: The article should end with a short paragraph describing the conclusions derived from the findings and implications of the study for dental education.

Acknowledgments: The acknowledgments should report all funding sources, as well as any other resources used or significant assistance.

Disclosure: Authors must disclose any financial, economic or professional interests that may have influenced the design, execution or presentation of the scholarly work. If there is a disclosure, it will be published with the article.

Clinical Trials: Any educational research studies that are designed as “clinical trials” must register the trial before submitting to the *Journal of Dental Education*. The registration number must be provided in the manuscript.

The studies can be registered at U.S. National Institutes of Health Clinical Trials Registry, EU Clinical Trials Register, or WHO International Clinical Trials Registry Platform.

2. Review Articles

The *JDE* will not consider articles that consist of a general review of topics or published information that is more appropriate for a textbook. However, systematic reviews that focus on trends, issues, new programs or innovations in dental education that are of global interest are welcome. These reviews should not be exhaustive reviews of the literature, but should be concise and address important and relevant questions that affect dental education. Reviews should be presented in a scientific format and use the methods of a systematic review. Authors can refer to the *Cochrane Handbook for Systematic Reviews of Interventions* for more details. In addition, the Editor asks authors of reviews to make sure they follow the PRISMA checklist and flow diagram to ensure the highest quality of systematic reviews and meta-analyses.

For review articles, a structured abstract of 250 words or fewer that addresses the question of interest must precede the review. A brief background and significance section with a review of the literature should be provided. The question being asked and the justification for the review should be addressed. As with any systematic review, the search strategy and the inclusion and exclusion criteria should be outlined. The authors should describe the findings of the search and the quality of the studies retrieved. The discussion section should compare the findings of the study to the literature at large. Limitations and future areas of interest/research should be identified. Review articles should be limited to 3,500 words with no more than 80 references. No more than six tables and figures should be included. Acknowledgments and any conflicts of interest should be documented as described in the Original Article section.

Solicited or Pre-approved by the Editor

1. Guest Editorials

Each issue opens with a “From the Editor” note or a Guest Editorial solicited by the Editor, usually consisting of a short commentary on articles in that issue or on critical topics of interest to readers. The Editor’s annual report about the journal will be published in the January issue.

2. Letters to the Editor

Letters to the Editor should be responses to articles published in the *JDE* in the previous three-month period. They should add to the discussion in a scientific manner, without

being personal reflections or reactions. On occasion, letters that deal with the profession, education and training, as well as issues critical to dental education, will be considered. Letters should be brief, focused on one or a few specific points or concerns, and can be signed by no more than four individuals. The letter should be limited to 400 words and six references in *JDE* format. Authors should submit letters directly to the Editor (JDEeditor@adea.org).

3. Perspectives

Perspectives articles should provide an opinion-based but well-supported commentary on controversies, innovations or emerging trends in dental education. On occasion, manuscripts addressing historical figures/perspectives that are impacting current practices will also be considered. Perspectives articles may also be solicited by the Editor on issues that are critical in dental education. Authors who want to independently submit a commentary should contact the Editor ahead of time by e-mail. These articles will be limited to 2,000 words, no more than 10 references, and no more than two figures and/or tables.

Perspectives articles should consist of a) an introduction that addresses why this topic is of general interest to a North American and/or global audience; b) a main section that contains the information relevant to the area being discussed, the author's perspective on it and the grounds for that perspective; and c) a summary that describes the importance of the commentary/perspective to the current and future status of the topic and recommendations concerning how these items can be addressed.

Authors should submit inquiries for submission of perspectives directly to the Editor (JDEeditor@adea.org).

4. Brief Communications

Brief Communications should be used to inform readers about significant findings in studies based on a limited data set, such as a topic of local relevance/interest or limited to one class/course. These communications will typically contain novel items/findings that are time-sensitive. These articles should include an unstructured abstract of 150 words or fewer. This category of article will be limited to 1,000–1,500 words, no more than 10 references and no more than two tables and/or figures. Authors should submit inquiries for submission of Brief Communications directly to the Editor (JDEeditor@adea.org).

5. Point/Counterpoint

Point/Counterpoint articles will be solicited by the Editor, who will provide those authors with information about required length and format.

Special Reports

In addition to the above types of manuscripts, the *JDE* occasionally publishes several types of articles and reports that fall outside the standard peer-review process. These include Association Reports (which are written by ADEA staff members) and special reports/sections/issues (which are the result of special activities or studies conducted by ADEA or other groups and are considered on a case-by-case basis by the Editor). Each year, the ADEA Annual Proceedings and the abstracts of poster and TechExpo presentations at the ADEA Annual Session & Exhibition are also published in the *JDE*. All these types of documents undergo systematic internal review and selected external review as determined by the Editor.

II. Requirements and Policies for Submitted Manuscripts

The *JDE* considers only manuscripts that are in MS Word and submitted electronically (see “Submission and Production Procedures” below for the submission process). All manuscripts submitted to the journal should follow the “Uniform Requirements for Manuscripts Submitted to Biomedical Journals,” compiled and published by the International Committee of Medical Journal Editors (ICJME). Authors are also encouraged to refer to the code on good publication practice produced by the Committee on Publication Ethics.

No Prior Publication or Duplicate Submissions. Manuscripts are considered for publication only if they are not under consideration by other journals and have not been published previously in the same or substantially similar form. Submitting authors should attest to their compliance with this requirement in their cover letters. Should a prior or duplicate publication be discovered, the Editor will address the matter with the affected author/s and the other journal’s editor following guidelines published by the ICJME and by the Committee on Publication Ethics.

Plagiarism. Plagiarism is a violation of scholarly standards and will not be tolerated. If a case of plagiarism is alleged or discovered, the Editor will address it with the affected author/s, following ICJME guidelines. Authors should exercise extreme care in quoting or paraphrasing material from published sources, so as not to risk plagiarism.

Conflict of Interest. A conflict of interest exists when professional judgment concerning a primary interest may be influenced by secondary interests (professional, personal, financial, etc.). Forms declaring any conflict of interest must be submitted for each author when the manuscript is submitted for consideration. The form can be found on ScholarOne Manuscripts in the upper right-hand corner under “Instructions & Forms.”

Human Subjects. It is the author’s responsibility to obtain approval or exempt status from his or her institution’s Institutional Review Board for studies involving human subjects; this approval or exempt status must be mentioned at the very beginning of the Methods section. Failure to meet these requirements is likely to place the manuscript in jeopardy and lead to a rejection.

Editorial Assistance. Manuscripts considered for submission must be written in standard academic English that is comprehensible to English-speaking readers. The American Medical Writers Association (AMWA) offers a Freelance Directory with contact information for editors who provide assistance in the writing of medical literature, especially for authors whose first language is not English. Please visit their website for further information.

III. Document Preparation, Organization and Formatting

Manuscripts submitted for consideration should be prepared in the following parts, each beginning on a new page:

Title page

Abstract and keywords

Text

Acknowledgments

References

Tables

Figures

Figure titles if figures are provided as images

Blinding. Both blinded and non-blinded manuscripts should be prepared once the original manuscript has been completed. All institutional references should be removed from the body of the manuscript to produce the blinded version; please indicate in the file name which version is blinded.

Document Format. Create the documents on pages with margins of at least 1 inch (25 mm) and left justified with paragraphs indented with the tab key, not the space bar. Use double-spacing throughout and number the pages consecutively. Do not embed tables and figures in the body of the text but place them after the references; include callouts for each table or figure in the text (e.g., see Table 1). Unless tables vary significantly in size, include all in one document. If any figures are large files, submit them as separate documents.

Title Page. The title page should carry 1) the title, which should be concise but descriptive, limited to 15 words and no more than 150 characters; 2) first name, middle initial and last name of each author, with highest academic degrees; 3) an affiliations paragraph with the name of each author or coauthor and his or her job title, department and institution, written in sentence style; 4) disclaimers if any; 5) name, address, phone

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Abstract and Key Words/MeSH terms. The second page should carry the title and an abstract of no more than 250 words. For research studies, the abstract should be in the structured form described above. Abstracts should be written in the third person, and references should not be used in the abstract. The abstract should include the year of the study and, for survey-based research, the response rate. Below the abstract, provide three to five key words or phrases that will assist indexers in cross-indexing the article and will be published with the abstract. At least three terms should come from the Medical Subject Headings listed at the National Library of Medicine. Guidelines for words found in the Medical Subject Headings can be found here. Authors should confirm these terms still exist in the Index Medicus or should search for more accurate terms if not found in our list. **NOTE:** Authors will also be prompted to identify Key Words when submitting their manuscripts in ScholarOne. These Key Words may differ from the items presented here. The Key Words identified in ScholarOne are generated from a list that will best match the submitted manuscript to a Peer Reviewer with expertise in the area(s) identified.

Text. Follow American (rather than British) English spelling and punctuation style. Spell out numbers from one to ninety-nine, with the exception of percentages, fractions, equations, numbered lists and Likert scale numbers. The body of the manuscript should be divided into sections preceded by appropriate subheads. Major subheads should be typed in capital letters at the left-hand margin. Secondary subheads should appear at the left-hand margin, be typed in upper and lower case and be boldfaced. Tertiary subheads should be typed in upper and lower case and be underlined. For authors whose first language is not English, please use a medical writer or a native English-speaking colleague to edit the manuscript prior to final submission. Manuscripts will be rejected prior to peer review if there are numerous usage or grammatical errors.

Please Note: In preparing the main document for submission, save the original file with the word "unblinded" at the end of the file name. Please also remove all author names and affiliated institutions from the original manuscript, and save this version with the word "blinded" at the end of the file name.

References. Number references consecutively in the order in which they are first mentioned in the text. Each source should have one number, so *be careful not to repeat sources in the reference list*. Identify references by Arabic numerals, and place them in

the text as superscript numerals within or at the end of the sentence. Do not enclose the numerals in parentheses, and be sure to follow American rather than British or European style conventions (e.g., the reference number follows rather than precedes commas and periods). Two important reminders: 1) references should not be linked to their numbers as footnotes or endnotes and 2) references to tables and figures should appear as a source note with the table/figure, not numbered consecutively with the references for the article.

Follow the style of these general examples. Titles of journals should be abbreviated according to the Index Medicus style. Do not use italics or boldface anywhere in the references. If the publication has one to four authors, list all of them; if there are more than four authors, list the first three followed by et al.

Book

1. Avery JK. Essentials of oral histology and embryology: a clinical approach. 2nd ed. St. Louis: Mosby, 2000.

Chapter in an Edited Volume

2. Inglehart MR, Filstrup SL, Wandera A. Oral health and quality of life in children. In: Inglehart MR, Bragman RA, eds. Oral health-related quality of life. Chicago: Quintessence Publishing Co., 2002:79-88.

Article in a Journal

3. Seale NS, Casamassimo PS. U.S. predoctoral education in pediatric dentistry: its impact on access to dental care. J Dent Educ 2003;67(1):23-9.

Report

4. Commission on Dental Accreditation. Accreditation standards for dental education programs. Chicago: American Dental Association, 2010.

Web Source

5. American Dental Hygienists' Association. Position paper: access to care. 2001. At: www.adha.org/profissues/access_to_care.htm. Accessed: November 27, 2012.

Figures. Figures may be charts or graphs, photographs, or scientific images; any illustration that consists of text should be called a table (see below). Each figure should have a title, numbered consecutively with Arabic numerals in the order in which they appear in the text. Figures may be provided pasted into an MS Word document or as a separate TIFF or JPEG. Do not put the title on the image itself. Rather, if the image is in a Word document, place the title below the image; if the image is in a TIFF or JPEG, provide the figure titles in a list at the end of the manuscript. For graphs, be sure to label

both axes. Include a key to symbols, patterns or colors in the figure either as a legend on the image or as a note below the figure. Any sources should appear in a Source note below the figure. Remember that the total number of figures and tables submitted with an article must not exceed six.

Figures should be used selectively to illustrate major points that cannot be expressed well in textual format. Authors should be able to articulate (for themselves, not as part of the submission) why a figure is necessary and what it adds to the understanding of the points made in the manuscript. Figures should be of the highest possible quality—typically 1,000 dots per inch (dpi) for monochromatic images and 600 dpi for images including halftones. Illustrations should not exceed 8½ x 11 inches, and all lettering should be at least 1½ mm high. If your article is accepted, we may request illustrations in higher resolution than those you’ve submitted.

Display of Quantitative Information: *JDE* readers expect authors to employ the highest standards of information design to display information in figures. It is recommended to review the seminal work by Edward R. Tufte, “The Visual Display of Quantitative Information,” before designing figures that display quantitative information: Tufte, Edward R., *The visual display of quantitative information*. 2nd ed. Cheshire, Connecticut: Graphics Press; 2001, ISBN-13: 978-0961392147.

Illustrations: Illustrations should be employed to showcase complex relationships that can be explored by the reader to gain additional insight beyond what was already presented in the manuscript. While illustrations are part of the manuscript, they need to fulfill a purpose for themselves and must have value as standalone elements—telling a particular story or showcasing a relationship not easily expressed in words. It is recommended to review works on information design, such as “The Functional Art: an Introduction to Information Graphics and Visualization” by Alberto Cairo, before designing illustrations: PeachPit Press, 2012, ISBN-13: 978-0321834737.

Figure Checklist:

1. Planning:

- Small, noncomparative and highly labeled data sets belong in tables rather than figures.
- Show data variations, not design variations.
- The number of information-carrying (variable) dimensions depicted should not exceed the number of dimensions in the data; i.e., no 3D bars for pocket depths in mm.
- Above all else show the data (data ink) not design variations.
- Range frame should replace non-data-bearing frame.

- The same ink should often serve more than one graphical purpose.
- Organize and order the flow of graphical information presented to the eye.

(adapted from E. Tufte: The visual display of quantitative information.)

2. Design:

- Variations in font size reflect importance and have meaning.
- Data sets are labeled directly, avoiding cognitive overhead for the reader to decode patterns or shades.
- All symbols (*, #, etc.) are explained in the legend.

3. Execution:

- All source files are available on request, and minimal resolution guidelines have been followed.
- If JPEG images or other compressed formats are used, export has been done with maximal quality setting.
- Color is not used.
- Vector graphics are preferred (using drawing or illustration programs such as Adobe Illustrator).

Tables. Each table should have a title, numbered consecutively with Arabic numerals in the order in which they appear in the text. All tables should be in column format. Arrange column headings so that their relation to the data is clear. Indicate explanatory notes to items in the table with symbols or letters (note that asterisks should be used only with p-values) or in a general note below the table. Any sources should appear in a Source note below the table. All percentages in tables should include the % sign.

Note that tables may be uploaded in PDF form for initial consideration and peer review; however, *tables must be uploaded as MS Word documents for final review and, if accepted, for production.* Remember that the total number of figures and tables submitted with an article must not exceed six.

Permissions. Any aspect of the article that is not the author's original work (e.g., figures or tables from other publications) must be fully credited to the original publication. It is the author's responsibility to acquire permission to reprint the material and pay any fees. Evidence of required permissions must be in the author's hands before the article can be published.

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Commercial Products. Do not use brand names within the title or text, unless the paper is comparing two or more products. If identification of a product is needed, a generic term should be used and the brand name, manufacturer and location (city/state/country) mentioned in parentheses.

IV. Submission and Production Procedures

Submissions should be made via the ScholarOne system, following these steps:

1. Launch your web browser and go to the *JDE*'s submission homepage at <http://mc.manuscriptcentral.com/jdentaled>.
2. Log-in, or click the "Register here" option if you are a first-time user of ScholarOne Manuscripts. Follow the instructions to create a new account. If you have forgotten your login details, go to "Password Help" on the journal's ScholarOne Manuscripts homepage and enter your email address. You will be sent instructions on how to reset your password.
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 - a) Separate title page (with all author information/titles as requested)
 - b) Original manuscript (NOTE: MeSH terms must be provided as requested after abstract)
 - c) Blinded version of manuscript as described
 - d) Figures
 - e) Tables
 - f) IRB letter
 - g) Conflict of interest form
4. After logging in, select "Author Center." Click the "Submit a Manuscript" link. Enter data and answer questions as prompted. Click on the "Next" button on each screen to save your work and advance to the next screen. Keep advancing until you reach the "upload" page.
5. To upload your files, click on the "Browse" button, locate the file on your computer and select the appropriate designation. Click the "Upload" button when

all files have been selected. Please review your submission (in both PDF and HTML formats) before sending to the Editor. Click the Submit button.

Review Process. Manuscripts submitted as Original Articles, Perspectives, Brief Communications and Review Articles will be peer-reviewed by individuals, selected by the Editor or Associate Editor, who have expertise and experience pertinent to the topic. The journal follows a blind peer review process. The Editor and/or Associate Editor also review all manuscripts. The review process can take up to four months.

From Review to Acceptance. If the manuscript is accepted or changes are recommended, it will be returned to the author with the reviewers' comments for the author's responses and revisions. After the author has made changes, the manuscript is returned for final review to the Editor. If the Editor finds it acceptable, he notifies the author of its formal acceptance and assigns it to an issue. Currently, the time from acceptance to publication is approximately eight to ten months.

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V. Key Contacts

General questions (not for submission of manuscripts; see below). Contact Dr. Nadeem Karimbux, Editor, *Journal of Dental Education*, Tufts University School of Dental Medicine, One Kneeland St., DHS-15, Boston, MA 02111; JDEeditor@adea.org.

Submission. Direct questions about submission of manuscripts through ScholarOne to Mary E. Lee, Publications Associate, *Journal of Dental Education*, 1400 K Street, NW, Suite 1100, Washington, DC 20005; 202-289-7201 phone; 202-289-7204 fax; leem@adea.org.

Proofs and production. Direct questions about proofs and other matters after article acceptance to Lynn Page Whittaker, Managing Editor, *Journal of Dental Education*, 127 Autumnwood Avenue, Athens, GA 30606; whittakerl@adea.org.

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Social Presence in Online Graduate Dental Hygiene Education

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Social Presence in Online Graduate Dental Hygiene Education

Abstract

Purpose: This study examined relationships between social presence (SP), learner satisfaction (SAT), perceived learning (PL), and student characteristics in online graduate dental hygiene courses.

Methods: In this descriptive, correlational study students from universities that offer online graduate dental hygiene programs (n=248) were invited to complete an online questionnaire. The survey instrument combined modified versions of existing scales: the Social Presence Scale, Satisfaction Scale, and Perceived Learning Scale, to determine overall SP, SAT, and PL. The scales have been used in prior studies and validity and reliability were previously established. Correlations were made between composite measures of SP and SAT, SP and PL, and SAT and PL using Spearman's rho. Scales were divided into subscales and correlation analysis was completed between overall scales and subscales. Relationships between student characteristics and SP, SAT, and PL were examined through correlation between each overall scale and five demographic questions.

Results: A 29 percent (n=73) response rate was obtained. Overall SP, SAT and PL were found to be moderate to high. Results indicate a significant relationship between SP and PL, SAT and PL, and among subscales, but not between SP and SAT. No significant relationships were found between student characteristics and SP, SAT or PL, except between PL and the number of online courses completed in the graduate program ($p=0.03$).

Conclusion: Research is needed to understand the experiences of students enrolled in online graduate dental hygiene programs. This study provides insight to students' online learning experiences that can assist educators in providing optimal online educational opportunities and enhance student learning and satisfaction within the graduate program.

Key Words: dental hygiene/education, education, graduate programs, online learning, social presence, satisfaction, perceived learning

Introduction

Online education is a global phenomenon and has become an effective means of delivering quality, accessible education.¹ The American Dental Education Association (ADEA) has encouraged incorporation of web-based learning into the dental curriculum, and has reported online courses are offered in dental and dental hygiene education more now than in the past and are expected to be offered more in the future.² Online dental hygiene programs serve a crucial need by increasing access for adult working students and students in remote areas who might not be able to participate in a traditional classroom setting.³ These programs also address the barrier of proximity to advanced education and provide opportunities for more dental hygienists to receive advanced degrees, thus helping reduce the critical shortage of qualified dental hygiene educators, meet society's changing oral health care needs, and lead the profession into the future.³

Despite the growth and prevalence of online education, insufficient research exists on the experiences of advanced degree seeking dental hygiene students with this educational format. In order to provide opportunities for these students to succeed, further research is necessary to identify specific factors that affect learning outcomes and satisfaction with online courses. Interaction of students with faculty and peers is one factor that has been identified as important for satisfaction and perceived learning.⁵ Interaction has been identified as a component of overall satisfaction, and social interaction in particular can add to the quality of the online educational experience and enhance learning.⁶ Communication and interaction are different in an online environment as compared to face-to-face settings,⁷ and increased feelings of isolation among students, reduced satisfaction, poor academic performance, and increased attrition might occur if

dynamics between communication and interaction are not recognized in online education instruction.⁸ Some researchers believe student perception of quality interaction might be more important for satisfaction with the online educational experience than the quantity of interaction.⁸ Sufficient levels of interaction can create a sense of personalization, decrease feelings of remoteness, and enhance a sense of community.⁹ Social presence, "the degree to which a person is perceived as 'real' in mediated communication,"⁷ was identified as a component of interaction and has been shown to affect learning, satisfaction, and the development of community in online courses,⁵⁻⁷ yet this concept has not been studied in online dental hygiene education.

Social constructivism is a learning theory that poses ideas and knowledge are constructed through social interactions.¹⁰ Social constructivists have proposed the goal of instruction should be to create interactive learning environments in which students learn from instructors, students learn from each other, and instructors learn from students.¹¹ Social presence has been found to support the formation of relationships and construction of knowledge within online learning environments.^{6-7, 12} When social constructivism is applied as a theoretical framework, social presence connects individuals in an online learning environment; it motivates them to take an active role in the learning process and construction of knowledge.

In an effort to understand the influence of social presence, researchers have focused on examining relationships between social presence and students' learning and students' satisfaction with online courses. Gunawardena and Zittle were among the first to investigate the influence of social presence on overall learner satisfaction in the computer mediated communication (CMC) context.⁷ The instrument used in their study was a

researcher developed 52 item, five-point Likert-scale survey. Among the 52 items, 14 items specifically assessed social presence (Social Presence Scale), and 10 items assessed students' overall satisfaction (Satisfaction Scale). Social presence was found to be a strong predictor of student satisfaction.

The Social Presence and Satisfaction Scales developed by Gunawardena and Zittle have been widely adopted by other researchers who have studied the relationship between social presence and satisfaction in a variety of online learning environments.¹⁴⁻¹⁷ Swan and Shih evaluated graduate students using the scales developed by Gunawardena and Zittle. Results of their study indicated a significant relationship between social presence and satisfaction with online discussions.¹⁴ Cobb used the Social Presence and Satisfaction Scales to assess social presence in online nursing courses. Overall social presence was found to be highly correlated with overall satisfaction.^{5,15} The scales were also used in a study that evaluated a course in the online format as well as the face-to-face format. In this study, students' perceptions of social presence were predictors of their learner satisfaction scores, and were similar in the online and face-to-face sections.¹⁶ These studies suggest social presence has a positive influence on students' satisfaction in an online environment.

Furthermore, social presence has been studied in relation to students' perceived learning. According to Aragon, the goal for creating social presence in a learning environment "is to create a level of comfort in which people feel at ease around the instructor and other participants."¹⁸ When social presence is lacking in a learning environment, participants feel the context is impersonal, the amount of information

shared decreases, and the learning experience can turn to one that is not fulfilling or successful.¹⁸

Picciano¹⁹ studied the relationship between social presence and student performance in a survey that measured perceived social presence, interactivity, and learning among students in an online graduate course. Results indicated positive social presence is significantly correlated with positive perceptions of students' learning. Akyol and Garrison²⁰ and Shea et al.²¹ explored students' perceived learning in online environments by conducting surveys. The questionnaires explored the students' perceived learning by asking them directly whether they learned in the online course. Both studies reported a significant positive correlation between perceived learning and high social presence. In addition, Swan found that students who tend to contribute more to discussions were perceived to have high degrees of social presence.¹⁴ These studies suggest social presence has a positive influence on students' perception of learning in online environments.

The concept of social presence and its relation to student satisfaction and perceived learning in online dental hygiene education has not been explored. One purpose of online education in dental hygiene is to provide a means for dental hygienists to obtain advanced degrees.³ Therefore, this study sought to examine social presence among graduate degree seeking students in online dental hygiene courses and its relationship to student satisfaction and perceived learning.

Methods

This study employed a descriptive, correlational research design with a self-administered questionnaire via an internet survey to test the following null hypotheses.

1. There is no statistically significant relationship between social presence and satisfaction among graduate students enrolled in online dental hygiene courses.
2. There is no statistically significant relationship between social presence and perceived learning among graduate students enrolled in online dental hygiene courses.
3. There is no statistically significant relationship between satisfaction and perceived learning among graduate students enrolled in online dental hygiene courses.
4. There is no statistically significant relationship between student characteristics and social presence, satisfaction, and perceived learning.

After approval from Idaho State University Human Subjects Committee (IRB-FY2015-26), a 36 item survey was administered online through Qualtrics®. Graduate dental hygiene students from 12 programs were invited to participate in the study. The 12 programs chosen for the study offered a Master of Dental Hygiene (MSD) or Master of Science in Dental Hygiene (MSDH) degree with 76-100% of the programs' curricula available to be completed online. Information related to the selection of the graduate programs was obtained from the American Dental Hygienists' Association: Master of Science in Dental Hygiene (MSDH) and Masters' Degree in Related Disciplines.²²

A letter (Participant Consent Letter) requesting student participation in the study was created. The letter explained the study and contained a link to the online survey. To be included in the study, subjects needed to be licensed dental hygienists, enrolled in one of the 12 graduate programs, and have completed at least one web-based dental hygiene course in the graduate curriculum. Participants were asked to choose one course, the one most representative of their online experience in the graduate program, on which to focus

their survey responses. At the time of the study, 248 students were enrolled in the 12 programs.

An email containing the Participant Consent Letter was sent to program directors of the twelve programs. The email requested the program directors' assistance in disseminating the participant consent letter to students, via email. Four email reminders were sent to the directors who were asked to forward each email to the graduate students. The survey was available to participants for six weeks. A drawing for two \$50.00 VISA® gift cards was offered to students as incentive to complete the survey.

Four survey instruments were used in this study: modified versions of the Social Presence Scale (SPS, Table 1) and the Satisfaction Scale (SS, Table 2) created by Gunawardena & Zittle,⁷ a modified version of the Perceived Learning Scale (PLS, Table 3) created by Rovai et al.,²³ and a 7-item researcher developed Student Characteristic Questionnaire. Five items addressed demographic data, plus one item asked students to identify the name of the program they attended and one open-ended item elicited responses on students' online experiences. The SPS (14 items), SS (9 items), and PLS (6 items) were scored on a five point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). All four instruments were combined into one 36-item survey tool. Permission for use and modification of the SPS, SS, and PLS was obtained. The SPS, SS, and PLS instruments were selected for this study because they had been previously researched and validity and reliability had been established.^{5,7,23}

Survey data were entered automatically into a database through the internet survey software Qualtrics®. Data were exported from Qualtrics® into the Statistical Package for Social Sciences, which provided descriptive statistics. Overall Social

Presence, Overall Satisfaction, and Overall Perceived learning scores were calculated and then each further divided into previously established subscales¹² for analysis.

Chronbach's alpha was calculated for each scale. Spearman's rho was used to evaluate relationships between scales, subscales, and student characteristics, at the 0.05 level of significance.

Results

A response rate of 29 percent (n=73) was obtained. Respondents were primarily female between the ages of 40-49, with less than 5 years of experience as a licensed dental hygienist. The majority of respondents had completed 1-3 online courses in the program, and had completed 1-3 online courses prior to entering the graduate program (Table 4). Students from ten of the twelve programs invited to participate in the study completed the survey.

Internal reliability was analyzed for each of the scales. Cronbach's alphas were 0.85, 0.75, and 0.64 for the SPS, SS, and PLS, respectively. Composite measures for each scale were developed and were found to be high. The mean score for Overall Social Presence was 52.86 (maximum score=70), the mean for Overall Satisfaction was 37.75 (maximum score=45), and the mean for Overall Perceived Learning was 24.44 (maximum score=30).

Correlation between composite measures of social presence, satisfaction, and perceived learning was computed using Spearman's rho (Table 5). The correlation between Overall Social Presence and Overall Satisfaction ($r=0.61$) was found to be moderate; however, there was not a statistically significant relationship between Overall Social Presence and Overall Satisfaction ($p=0.38$). Therefore, the null hypothesis was

not rejected. Despite the overall lower correlation between Overall Social Presence and Overall Perceived Learning ($r=0.46$), the relationship was statistically significant ($p=0.04$). Therefore, the null hypothesis was rejected. Overall Satisfaction was moderately correlated with Overall Perceived Learning ($r=0.61$) and was found to be statistically significant ($p<0.001$). Therefore, the null hypothesis was rejected. Correlation between Overall Social Presence, Overall Satisfaction, Overall Perceived Learning, and subscales of each domain were explored (Table 5). Statistically significant relationships were found between each overall scale and some, but not all, subscales.

Relationships between student characteristics and Overall Social Presence, Satisfaction, and Perceived Learning were evaluated. No statistically significant relationships were identified between age, gender, number of years as a licensed dental hygienist, number of online courses completed in the graduate program, or number of online courses completed prior to entering the graduate program, and Overall Social Presence or Overall Satisfaction. No statistically significant relationships were identified between these characteristics and Overall Perceived Learning, except the number of online courses completed in the graduate program ($p=0.03$). Therefore, there was no statistically significant relationship between student characteristics and social presence and satisfaction, and the null hypothesis was not rejected.

In addition to reporting demographic information, participants were asked to comment on their experiences with online learning in the graduate program. Themes among the respondents' comments included, but were not limited to: overall satisfaction with the online experience, development of an online community, learning from peers,

convenience and flexibility, satisfaction with instructor, and synchronous versus asynchronous communication. These themes are summarized in Table 6.

Discussion

The findings of this study showed that graduate degree seeking dental hygiene students demonstrated a moderate to high level of social presence in online courses. They were generally satisfied with their online experiences and their overall perception of learning in this educational format was high. The Overall Social Presence Score in this study ($M=52.86$) is within the same range as the Gunawardena and Zittle⁷ study ($M=49.49$) and the Cobb¹⁵ study ($M=54.69$). In all three studies item number 4 of the Social Presence Scale, indicating comfort introducing self, was one of the three items with the highest average score. Item 12, indicating comfort interacting with other course participants, was also one of the three items with the highest score in this study and the Cobb¹⁵ study. The Comfort Subscales of Social Presence were statistically significantly related to Overall Satisfaction and Overall Perceived Learning. Comments from students support their satisfaction, comfort level and interaction in an online course: "I enjoyed the online learning environment because I was able to interact with people from all over the United States and Canada," as well as "I feel that participating in an online course is more beneficial than sitting in a classroom because more interaction is required, and I am also more comfortable participating in an online setting," and "I find that students seem to be more open and deeper dialogue happens in the online course than in a classroom setting." These statements reinforce that some students feel comfortable participating and interacting in online courses within graduate dental hygiene programs and are satisfied with the online learning environment.

Overall perceptions of satisfaction were found to be high among the graduate students in this study. Of the 56 respondents who commented on their online experiences in the graduate program, 25 reported being very satisfied. Students' comments provide additional evidence that this learning format fulfilled their expectations and provided an enjoyable learning experience: "My satisfaction was met beyond my expectations," "Online learning is amazing," and "I'm highly satisfied with my online class experience." These findings are consistent with studies of undergraduate students in online dental hygiene courses.²⁴⁻²⁷ This study suggests there is a moderate correlation between social presence and student satisfaction, yet results show there is not a statistically significant relationship between the two variables. However, results show a strong correlation between Social Presence and all three Satisfaction Subscales. In addition, two of the three Satisfaction Subscales were significantly related to Overall Social Presence, yet one, Usefulness of the Course, was not. These findings are similar to the Cobb¹⁵ study and suggest the value of course content is less important to perceptions of social presence and satisfaction than other aspects of the course, such as interaction with peers or feedback from the instructor.

Examination of the relationship between Overall Social Presence and Overall Perceived learning was consistent with previous studies in which there was a significant relationship between social presence and perceived learning.^{5,14,19} Overall Perceived Learning was highly correlated with Overall Satisfaction and there was a significant relationship between Overall Perceived Learning and Overall Satisfaction as well as between all Satisfaction Subscales and all Perceived Learning Subscales. These results suggest students who perceived they were learning from the course also perceived the

course to be useful, they were stimulated to seek ongoing learning, and their satisfaction with the course was high.

Correlations between Overall Perceived Learning and the Social Presence

Subscales involving comfort and community of online environments were found to be significant. This finding suggests that establishing comfort and a sense of community within the online course is important to learning. Rogo and Portillo's studies on the development of online learning communities in a graduate dental hygiene program support the theory that social presence is important in establishing communities of learning, and in turn online communities support learning.²⁸⁻²⁹ One student's comment summarizes this concept, "I am extremely satisfied with my learning in this online program. I find the online community with other students and instructors expands the amount of knowledge that is acquired, by sharing experiences, values, visions, beliefs, and perspectives." This comment also supports Rogo and Portillo's finding that online communities create synergistic learning. They defined synergistic learning as "the creation of innovative knowledge unique to a collective group . . . built from intensive interaction of the group to outperform the sum of abilities of each individual member."²⁹ In their study of graduate students in an online dental hygiene program they found "this learning enhanced the level of student performance based on the interaction with synergistic relationships and affective actions."²⁹

Statistically significant relationships were not identified between student characteristics and overall social presence, satisfaction, or perceived learning; yet there was significance between perceived learning and the number of online courses completed in the graduate program. Research has found that gains in perceived satisfaction with

online courses occurred between students' first and second courses, and suggests that satisfaction, as well as perception of the usefulness and other perspectives of the online learning experience, may increase as students gain experience and become more comfortable with online learning.¹⁵ Instructors should recognize that perceptions of online courses may change as students gain experience with the learning format. More support may be needed to enhance social presence and build online communities early in the course, or for students with less online experience.¹⁵

Limitations of this study included a response rate of only 29 percent, and a relatively small sample size (n=73). Although three reminders were sent, notification to participate in the survey was dependent upon program directors' assistance in disseminating the participant consent letter with the attached survey to their graduate students. Additionally, the utilization of purposive sampling and the self-report nature of the study instrument may lend to subjectivity, therefore generalizability of the study is limited. Even more, those students who volunteered to participate in this research of online dental hygiene education might have a special interest in answering the study survey, and therefore might not truly represent the population of interest. Another limitation of this research is the use of an internet survey as the data collection instrument. A potential weakness of internet surveys is low response rate due to participants' perception of the survey as junk mail, technological variations such as system incompatibility and spam filters, and unclear answering instructions.^{15, 30}

The results of the study underscore the importance of creating a sense of social presence in online graduate dental hygiene courses in order to increase student satisfaction and perceived learning. This study extends the literature in dental hygiene by

including social presence as an element that should be recognized and used by educators to influence the quality and outcomes of online learning. Practices facilitating interaction, creating a sense of trust and comfort for students, and establishing online communities of learning should be implemented within online courses. Rogo and Portillo suggested these practices can include: weekly discussion and collaborative activities that actively engage students in learning, communication via small groups, opportunities for informal conversation, and faculty interaction on a regular basis.²⁸

This study also added the dimension of graduate level education in dental hygiene, a topic not yet studied in relation to social presence. More research on graduate level dental hygiene education in general is needed as well as further research into students' experiences within online graduate dental hygiene programs that relates to their satisfaction and learning. Additional research is also needed regarding the relationship of student characteristics to the online program experience.

Conclusion

Online education is an acceptable approach for delivering quality education to college level students, and is an important delivery format for graduate dental hygiene students. However, few studies have focused on factors related to the quality of the online education experience for graduate dental hygiene students particularly with respect to satisfaction and learning. This study demonstrated that overall social presence, satisfaction, and perceived learning in online courses among graduate dental hygiene students were moderate to high. The relationships between overall social presence and perceived learning and between perceived learning and satisfaction were statistically

significant, and statistically significant relationships were found between each domain and certain subscales.

The findings corroborate the importance of the relationships between social presence, satisfaction, and perceived learning in online education, and add to the body of knowledge in online dental hygiene education. Comfort with the online environment and the course is important, and educators need to facilitate activities that will enhance social presence and establish a sense of community that will support student satisfaction and learning.

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Tables

Table 1. Social Presence Scale with Descriptive Statistics

Item	Mean	Median	SD
1. Messages in the online dental hygiene course were impersonal.	2.03	2	1.0
2. Computer -mediated communication (CMC) is an excellent medium for social interaction.	3.59	4	1.04
3. I felt comfortable conversing through this text-based medium.	4.23	4	0.84
4. I felt comfortable introducing myself in the online dental hygiene course.	4.43	5	0.71
5. The introductions enabled me to form a sense of online community.	4.14	4	0.82
6. I felt comfortable participating in the course discussions.	4.43	4	0.64
7. The instructor(s) created a feeling of an online community.	4.07	4	0.98
8. The instructor(s) facilitated discussions in the course.	4.11	4	0.86
9. Discussions using the medium CMC tend to be more impersonal than face-to-face discussions.	3.22	4	1.10
10. CMC discussions are more impersonal than audio teleconference discussions.	2.74	2	1.12
11. CMC discussions are more impersonal than video teleconference discussions	3.12	3	1.12
12. I felt comfortable interacting with other participants in the online course.	4.34	4	0.84
13. I felt that my point of view was acknowledged by other participants in the course.	4.30	4	0.62
14. I was able to form distinct individual impressions of some course participants even though we communicated only via a text-based medium.	4.11	4	0.70

Table 2. Satisfaction Scale with Descriptive Statistics

Item	Mean	Median	SD
1. I was able to learn through the medium of CMC.	4.53	5	0.53
2. I was able to learn from the online discussions.	4.52	5	0.58
3. I was stimulated to do additional reading or research on topics discussed in the online dental hygiene course.	4.08	4	0.92
4. I learned to value other points of view.	4.30	4	0.66
5. As a result of my experience with the online dental hygiene course, I would like to participate in another online course in the future.	4.44	5	0.69
6. The online course was a useful learning experience.	4.58	5	0.52
7. As a result of my participation in the online course, I made acquaintances electronically in other parts of the country/world.	3.96	4	1.12
8. The diversity of topics in the online course prompted me to participate in the discussions.	3.86	4	0.97
9. I put a great deal of effort to learn the CMC system to participate in the online course.	3.48	4	1.27

Table 3. Perceived Learning Scale with Descriptive Statistics

Item	Mean	Median	SD
1. I can organize course material into a logical structure.	4.14	4	0.82
2. I can produce a course study guide for future students.	3.99	4	0.75
3. I have changed my attitudes about the course subject matter as a result of this course.	3.86	4	0.92
4. I can intelligently critique the texts used in this course.	4.10	4	0.63
5. I feel more self-reliant as the result of the content learned in this course.	4.19	4	0.74
6. I feel that I am a more sophisticated thinker as a result of this course.	4.16	4	0.76

Table 4. Characteristics of graduate level dental hygiene students in study by number and percentage of total respondents (n=73)

Characteristic	Number	Percentage
Age		
20-29	20	27%
30-39	19	26%
40-49	23	32%
50-59	9	12%
60-69	1	1%
Non-respondents	1	1%
Gender		
Female	69	95%
Male	3	4%
Non-respondents	1	1%
Number of years as a licensed dental hygienist		
0-5	22	30%
6 to 10	16	22%
11 to 15	12	16%
16-20	8	11%
21-25	6	8%
> 25	6	8%
Non-respondents	3	4%
Online courses completed in the program		
1 to 3	18	25%
4 to 6	11	15%
7 to 9	15	20%
10 to 12	11	15%
> 12	16	22%
Non-respondents	2	3%
Number of online courses completed prior to entering program		
zero	17	23%
1 to 3	19	26%
4 to 6	15	21%
7 to 9	2	3%
10 to 12	6	8%
> 12	13	18%
Non-respondents	1	1%

Table 5. Correlation Between Overall Scales and Subscales	Correlation Coefficient	95% Confidence Interval	p-value
Overall Social Presence with Overall Satisfaction	0.61	(0.43,0.75)	0.38
Overall Social Presence with Overall Perceived Learning	0.46	(0.24, 0.64)	0.04
Overall Satisfaction with Overall Perceived Learning	0.61	(0.43,0.75)	<0.001
Overall Social Presence with Satisfaction Subscales			
SS1: usefulness of course	0.91	(0.85,0.95)	0.2
SS2: learning from course	0.8	(0.71,0.88)	0.02
SS3: stimulation and ongoing learning	0.91	(0.85,0.94)	<0.001
Overall Social Presence with Perceived Learning Subscales			
PLS1: cognitive learning	0.7	(0.51,0.82)	<0.001
PLS2: affective learning	0.9	(0.84,0.94)	0.23
Overall Satisfaction with Social Presence Subscales			
SPS1: overall comfort with online CMC	0.7	(0.53,0.82)	<0.001
SPS2: communication with CMC & online environment	0.32	(0.08,0.52)	0.51
SPS3: comfort & community of CMC/online environment	0.67	(0.50,0.80)	<0.001
SPS4: attitudes toward CMC/online communication	0.45	(0.24,0.63)	0.56
Overall Satisfaction with Perceived Learning Subscales			
PLS1: cognitive learning	0.48	(0.27,0.67)	<0.001
PLS2: affective learning	0.56	(0.33,0.73)	<0.001
Overall Perceived Learning with Social Presence Subscales			
SPS1: overall comfort with online CMC	0.52	(0.32,0.69)	0.02
SPS2: communication with CMC & online environment	0.24	(-0.006,0.49)	0.07
SPS3: comfort & community of CMC/online environment	0.51	(0.29,0.69)	0.001
SPS4: attitudes toward CMC/online communication	0.41	(0.20,0.59)	0.81
Overall Perceived Learning with Satisfaction Subscales			
SS1: usefulness of course	0.58	(0.38,0.73)	<0.001
SS2: learning from course	0.58	(0.42,0.73)	<0.001
SS3: stimulation and ongoing learning	0.64	(0.48,0.75)	<0.001

Table 6. Respondents comments on experiences with online learning. (n=56)

Themes	Number	Percentage
Overall, I am very satisfied with my education via online courses.	25	45%
I was able to complete this program because of the convenience and flexibility the online format offers.	20	36%
Instructor presence, interaction and feedback adds value to the online learning experience.	16	29%
I feel that I have developed a sense of community within my online course/program	8	14%
I struggled with the technology and/or the requirements/demands of the online course	8	14%
I was able to learn from the online discussions with my peers.	6	11%
Synchronous communication (audio or visual) would improve my online learning experience.	6	11%
I felt lonely and isolated/online learning is less personal than face-to-face.	5	1%
I find asynchronous communication (text only) to be difficult.	4	1%
Online learning is just as good as, or better than, traditional courses.	4	1%