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The Effect of Classmate Photographs on Online Community and Connectedness

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THE EFFECT OF CLASSMATE PHOTOGRAPHS ON ONLINE COMMUNITY AND CONNECTEDNESS

by

Ellen McPeek Glisan

A DISSERTATION

Presented to the Faculty of

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THE EFFECT OF CLASSMATE PHOTOGRAPHS ON ONLINE COMMUNITY AND CONNECTEDNESS

Ellen McPeek Glisan, Ph.D.

University of Nebraska, 2008

Adviser: Allen L. Steckelberg

The purposes of this quantitative study were to explore the effects that classmate photographs have on the level of online community and connectedness experienced by online graduate students and by students who take only online-only courses vs. those who have an on-campus presence. Control and treatment groups were used to compare the levels of community and connectedness between graduate students who repeatedly viewed photographs of their online classmates and graduate students who saw no photographs of their online classmates.

Students in 18 online graduate courses at one central U.S. university were surveyed to determine if a relationships existed between repeatedly viewing classmate photographs and online community and connectedness. Rovai's *Classroom Community Scale* (CCS) (2002b) and the *Online Community and Connectedness Survey* (OCCS) (Glisan, 2006), which was developed for this study, were used concurrently. The CCS provided a measure of online community and connectedness and the OCCS added insights through a collection of student opinions.

Study results included detailed descriptive data to provide an overview of student opinions and a series of ANOVAs comparing CCS scores according to photos, on-campus presence, online-only presence, age, gender, and length of experience with online

classes. The measured community and connectedness did not show significant differences in community and connectedness due to the viewing of classmate photos nor due to on-campus vs. online-only student presence. However, results suggested that students in the treatment classes held the opinion that they had a higher level of community and connectedness. The opinions that were gathered using the OCCS also showed that the majority of subjects felt they had more community and connectedness in face-to-face classes than in online classes.

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Chapter One

Introduction

Would you wear a blindfold to a face-to-face class? You might if you were trying to simulate the one-sense social aspect of an online class. What do you think the effect would be if we were to remove the "blindfolds" that online students are typically forced to wear? Would having visuals of online classmates increase students' sense of community and connectedness in online classes?

Many researchers are interested in finding ways to improve community and connectedness in online courses because, as many researchers, including Miltiadou and McIsaac (2000) and Tu (2000) have shown, community and connectedness is an essential component of successful online classes.

Successful online classes are becoming increasingly important to education as evidenced by the fact that online education in the U.S. grew 95% (from 93 programs to 2000) between 1993 and 1999 (Miltiadou & McIsaac ,2000), and U.S. online education continues to grow at a rate of about 20% a year (Moore and Kearsley, 2005). Unlike any form of distance education in the past, online education has become a significant method of education with the potential to become increasingly more significant. In fact, as of 2005, 90% of public universities offered online courses (Moore and Kearsley, 2005).

However, amidst all of this growth, theories relating to online education are just now being developed (Carey 2001). In fact, as Kazmer (2000) reminds the learning community, due to the newness of online education, teachers and administrators are relatively inexperienced with the process of teaching online. Also, due to the relative

newness of online teaching, it is logical that educational theory that explains and impacts online education is also in its infancy.

Theoretical Base

As researchers work to develop educational theories for online education, they often apply existing theories or begin with existing theories and adapt as shown in Figure 1.1. Social Presence Theory, developed in 1976 by Short, Williams, and Christy to explore the importance of social issues in face-to-face classes and distance courses that were audio-based and closed-circuit television, applies very well to online education since the social aspect of education is so important in online situations. Applying social presence to the online environment, Russo (2000) explained social presence as the degree to which online classmates seem real, and Tu and McIsaac (2002) defined it as the sense of being connected by computer-mediated communication to another intelligent being. Tu (2000) addressed the issue of how the original social presence theory relates to online education. In a mixed-methods study involving 50 Arizona State University students in a graduate-level online course that included both real-time chat and asynchronous discussions, Tu found that students felt more social presence when the communication had a more private nature, such as e-mail with one person as opposed to open discussions. Also, the research showed that informal talk, short messages, use of humor, use of emoticons, inviting tone, and use of slang were all more conducive to social presence and preferred by students. Tu's research showed that social presence is every bit as important in online classes as in other types of education.

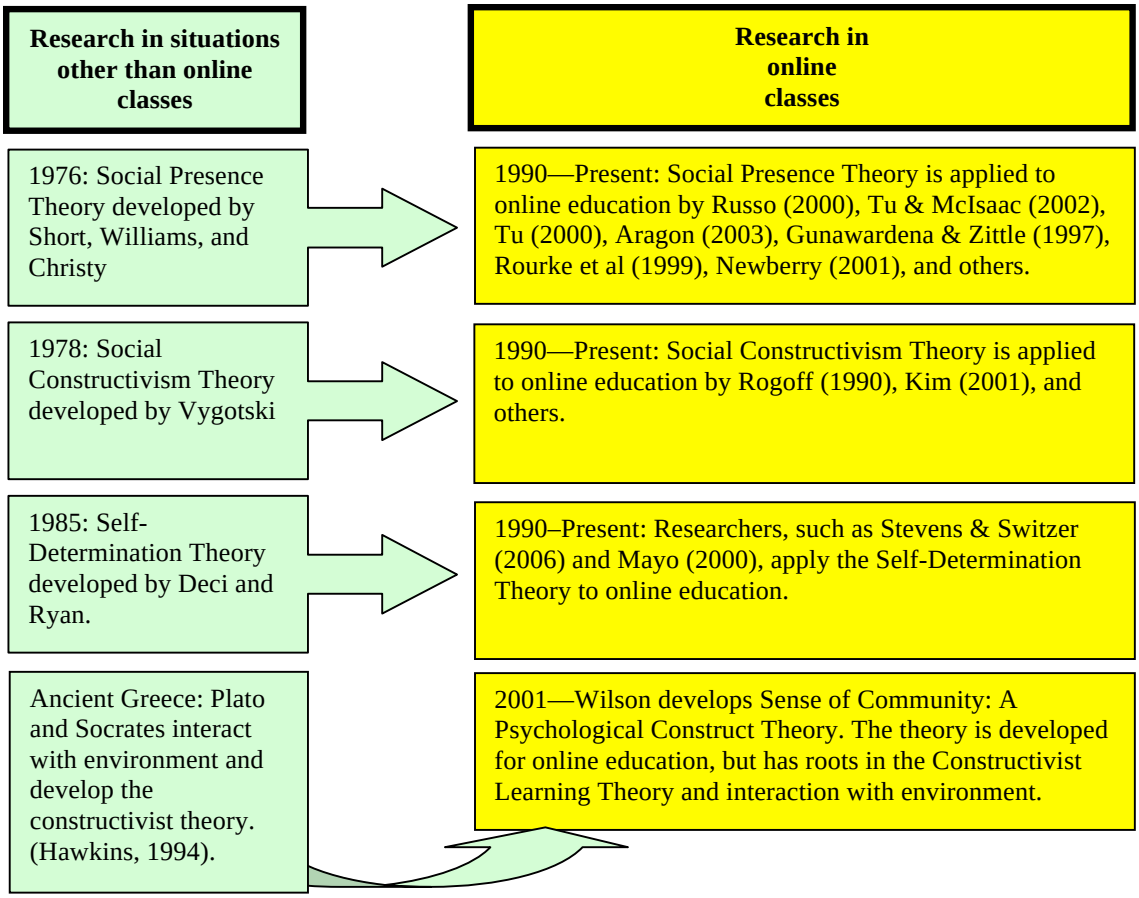


Figure 1.1. A visual look at the adaptation and new development process of educational theory related to online learning and to this study

Aragon (2003) notes that social presence theory states that when students feel a sense of connectedness with the instructor and fellow students, they are more likely to have increased participation and thus increased learning. He points out, therefore, that the impact of social presence goes beyond student satisfaction to affect student success and learning, thus making social presence a critical aspect of online courses, and as such, an issue that demands attention from instructors and instructional designers. He continues by suggesting these methods for increasing social presence in online courses: use welcome messages, include student profiles, incorporate audio, keep classes small, include small-

group activities, include instructor participation in discussions, provide frequent and timely feedback, have personal conversations, share personal experiences, use humor, interject emoticons, address each other by first name, clarify names students are to use to talk to instructor, and require students to participate in discussions. Given that social presence relates directly to student success, all online instructors need to look for ways to optimize the chances for social presence in their online classes.

According to Rourke, Anderson, Garrison, and Archer (1999), the social presence theory is directly applicable to online education, since students who feel social presence help to elevate online courses into experiences that are pleasant, engaging, and meaningful. Gunawardena and Zittle (1997) indicate that students help to develop social presence in online courses when they become involved with the course and with fellow students. Becoming involved enough to develop social presence is critical, since as Newberry (2001) determined with his study, social presence may contribute to students' determination of level of quality for online courses and as Gunawardena and Zittle (1997) found, social presence is a strong predictor of student satisfaction with their level of learning in online courses.

These researchers and others cite the Social Presence Theory as background to clarify the importance of community and connectedness in successful online courses. In fact, the amount of research involving the Social Presence Theory and online courses is so extensive and supportive of the importance of social presence in online education that it follows to think of it as the Online Social Presence Theory separate from the original Social Presence Theory.

Wilson (2001) presents a new theory developed directly for online education—Sense of Community: A Psychological Construct. This theory, although developed to explain aspects of online education, has its roots in the Constructivist Learning Theory (see Figure 1.1). Wilson's Sense of Community theory postulates that students in an online course can develop a sense of community and connectedness that benefits their learning and includes belonging, trust, expected learning, and obligation and that the success of an online class depends on the sense of community and connectedness between the class participants. Many research studies support Wilson's theory, including Mackie and Gutierrez (2004-2005); Allen (2006); Hill, Raven, and Han (2002); Russo (2000); Hara and Kling (2000); Jung, Choi, Cheolil, and Leem (2002); Rovai (2001); Wegerif (1998); Herod (1999); Rogers and Laws (1997); Brook and Oliver (2002); Stelzer and Vogelzangs (1995); Bibeau (2001); Kim (2001); Gunawardena and Zittle (1997); and Tu and McIsaac (2002).

The social constructivist theory (Kim, 2001; Rogoff, 1990; Vygotski, 1978) is well-grounded in educational research and provides a sound background for this study due to a central axiom of the theory that states that learning is a social process and that social aspects of education are critical to student success. In accordance with this view, social presence and connectedness is a necessary step to benefit from a social learning environment. Three basic assumptions underlie the social constructivist theory of learning: 1–Reality is constructed by human activity; 2–Knowledge is socially and culturally constructed; and 3– Learning is a social process that requires that students involve in social activities (Kim, 2001; Rogoff, 1990). Kim (2001) adds that it is easier

for students to learn new information when they connect to other students to form a community. Hence, online community and connectedness is important to the online learning environment.

Since education is inherently a social process, and since online community and connectedness is a social aspect of education, it is not surprising that online community and connectedness would relate to many socially-based theories. This connection is especially strong in regards to the Self-Determination Theory, which Ryan and Deci (2000) describe as incorporating three basic psychological needs that are essential to healthy human psychological development: autonomy, competence, and relatedness. Although a case could be made for relating any of the three needs to online education, it is the relatedness need that is most significant in regards to online community and connectedness. Relatedness, defined as having a warm and caring connection with others, very much parallels the concept of online community and connectedness. Ryan and Deci (2000) note that, when one or more of the three basic needs are not met, people begin to lose motivation. They, along with many other researchers, also relate the theory to a variety of aspects of life, indicating that the theory is flexible enough to apply to human behavior in varying situations, including online education.

Problem Statement

In the quest for more successes in online classes, two aspects of online education that require attention are visual and social connections.

Referring to the social aspect of online classes, Palloff and Pratt (2004) noted, “The online environment can be a lonely place. Students and faculty alike report feelings

of isolation when working online," and they suggest that the sense of isolation might be because "the people with whom one is interacting are represented by words on a screen" (p. 1).

Miltiadou and McIsaac (2000) indicate that developing online community and connectedness is vital to the success of online classes. Tu (2000) endorsed this idea with his research findings that online community and connectedness is one of the most influential components of effective online instruction and therefore is "one of the most significant factors in Distance Education" (p. 1663).

According to L. Silverman (2006), two-thirds of the population shows a preference for visual methods of intaking information. In addition, Silverman reported that a subgroup that showed even a higher preference for visual methods was gifted people. He noted that a large percentage of gifted people pursue various college degrees and, therefore, may take online graduate courses and appreciate visual components in these online courses. Although all people logically use a variety of learning methods, Silverman's research emphasizes the importance of visual components in education and clarifies that learning in a visual vacuum is not exemplary. The need for visual input is not just limited to educational materials. According to Nielsen (2006), it also applies to the social side of communicating online. He notes that people are more able to relate to others when they have a visual of them. He suggests that visuals help people connect their virtual and physical worlds and that faces simply work better for some people than do names. Lomas and Oblinger (2006) and Gee (2006) concur that visual connections

with people are important both in absorbing information and in getting to know people in online situations.

Bibeau (2001) and Russo (2000) both concur that visual components are important in online learning situations, and specifically suggest that the use of classmate photos in online classes would help to address the social aspects of online courses. Russo also suggests that pictures would give students concrete references to each other, which might help to raise online community and connectedness. Another point Russo makes is that technology has advanced to the point where adding photos to online courses would not be a technical problem. In addition, Bibeau (2001) cites studies that found students experiencing social isolation in online classes (Kraut, Lundmark, Patterson, Kiesler, Mukopadhyay, & Scherlis, 1998; Nie & Erbing, 2000), that suggest that use of photos might help decrease a student's sense of isolation (Berge & Collins, 1995) and that suggest that social connections in online classes increase student satisfaction and success rates (Rourke et al., 1999). In one of the few studies that researched the effect of participants' pictures in a synchronous online environment, Mackie and Gutierrez (2004–2005) found that the pictures helped create online community and connectedness.

Given that students sometimes feel isolated in online classes, that visual input is important to learning, and that online community and connectedness is important to online class success, it is possible that adding photographs of online students to class sites will help develop online community and connectedness, which will enhance successes in online classes. Due to the newness of online education and the technology issues with photographs until just recently, the effect of classmate photos on students' senses of

online community and connectedness has not been established through adequate research. This researcher chose to explore this important area of online education.

Of main interest was the effect that photos of online classmates have on students' levels of community and connectedness. Also of interest was whether or not there was a difference in community and connectedness between students who have an on-campus presence and thus could choose to meet with instructors and classmates in person and students who lived at such a distance so as to preclude in-person contacts. This differentiation was important, since these two groups of students might have greatly differing community and connectedness needs. Finally, participants' opinions about the importance and presence of community and connectedness and their opinions about the use of photographs in online classes were considered relevant and meaningful as a way of providing a follow-up overview.

Purpose Statement

The purposes of this study were to explore the effect that seeing photos of online classmates has on students' levels of community and connectedness and to compare the effect of seeing classmate photos on the levels of community and connectedness experienced by "online-only students'," and "on-campus-presence students'" in online classes.

Research Questions

1. Does repeated viewing of classmate photos make a difference in the measured sense of community in online graduate courses as measured with the *Classroom Community Scale* (Rovai, 2002b)?

2. Does the impact of photos on the sense of community and connectedness differ in on-campus-presence graduate students and online-only graduate students?
3. How do online graduate students feel about (a) personal connections in online courses vs. face-to-face courses, (b) group dynamics in online courses, (c) experiences with online discussions, and (d) classmate photos in online classes?

Research Hypotheses

1. Students in classes where classmate photos are viewed repeatedly will score higher on the Rovai (2002b) *Classroom Community Scale* than will students who are not in classes where photos are viewed repeatedly.
2. Online-only students in classes where they repeatedly view classmate photos will experience higher levels of community and connectedness than will on-campus-presence students who repeatedly view classmate photos.
3. When completing the *Online Community and Connectedness Survey* (OCCS) (Glisan, 2006) that was created by this researcher for this study to gather opinions about (a) personal connections in online courses vs. face-to-face courses, (b) group dynamics in online courses, (c) experiences with online discussions, and (d) interest in having classmate photos in online classes, the opinions of the subjects in the treatment group will be significantly more positive and/or less negative than those of the subjects in the control group.

Method

In this study, 18 online graduate courses from a central U.S. university were utilized (see Figure 1.2.). The 18 courses were be taught by nine instructors, with each instructor teaching two courses. One of each instructor's courses was in the control group and one was in the treatment group. The students in both groups were asked to complete a 5-point Likert-based online community and connectedness survey near the midpoint in the course. This timing was chosen to allow students enough time to develop a sense of community and connectedness. At the beginning of the courses, the students in the treatment group were invited to submit personal photographs that were placed on the Blackboard course site in a Class Photo Album so students had easy access to the photos and could view them on an ongoing basis. The Blackboard monitoring feature was utilized to keep track of how often students accessed the Class Photo Album to verify that students were actually viewing the photos.

Control Classes	Treatment Classes
9 classes at a central U.S. university	9 classes at the same central U.S. university
Taught by instructors 1–9	Taught by instructors 1–9
No photos	Students invited to post photos
Completed survey near midpoint in the semester	Completed survey near midpoint in the semester

Figure 1.2. Study at a glance.

The variables in this study included the following:

- Independent—the presence or absence of classmate photographs and whether or not the students had an on-campus presence
- Dependent—level of online community and connectedness as measured by the *Classroom Community Scale* (Rovai, 2002b).

Two 20-question 5-point Likert scale measuring tools were utilized concurrently: the *Classroom Community Scale* (Rovai, 2002b) to measure the community and connectedness and the *Online Community and Connectedness Survey* (Glisan, 2006) created by this researcher for this study to solicit follow-up information. The survey also included eight demographic questions and two control- vs. treatment-group questions and was presented using the Flashlight online survey tool (Washington State University, 1992).

The following steps were taken to answer the research questions:

- Questions 1 and 2—Using the odd numbered responses from the *Classroom Community Scale*, a two-way ANOVA was calculated using SPSS (SPSS Inc., 2005). Only the odd numbered responses from the *Classroom Community Scale* (Rovai, 2002b) were used since they constitute the community and connectedness survey. The even-numbered questions generate a learning score (Rovai, 2002b). Follow-up one-way ANOVAs were calculated to further explore the results of the ANOVA.
- Question 3—Using responses from the *Online Community and Connectedness Survey* (Glisan, 2006), frequency and percentages were tabulated and chi-

square tests were computed for each of the 20 OCCS questions to compare the treatment and control groups' responses to the individual survey questions.

Definition of Terms

The following definitions are provided to clarify the intended meaning of key terms used in this study.

Online Community and Connectedness—"Online community and connectedness" refers to the extent to which online students are perceived as real and have a sense of person-to-person awareness in an online class. In other words, online community and connectedness is each student's sense of being part of the group and sensing the other people who are part of the group as opposed to feeling isolated and disconnected.

Level of Online Community and Connectedness—The "level of online community and connectedness" refers to each student's sense of having community and connectedness as determined by responses on Rovai's (2002b) *Classroom Community Scale*.

Online-only students—"Online-only students" refers to graduate students who live far from campus (often in other states and other countries) and have no on-campus presence. For this study, these students are self-identified by noting on the survey that they live too far away to take face-to-face classes.

On-campus-presence students—"On-campus-presence students" refers to online students who have an on-campus presence. These students either live on campus or live close enough to campus that they can meet with instructors and/or classmates if needed. For this study, these students are self-identified by noting on the survey that they also

take face-to-face classes at this university or that they live in the area and can go to campus if needed.

Assumptions

Three assumptions were made within this study:

1. Bias due to instructor differences was minimal since each instructor taught one control class and one treatment class.
2. Students had computer technology that allowed them to view photographs online.
3. Students had a general opinion about face-to-face classes even if they had not recently taken a face-to-face class.

Delimitations

A delimitation of this study was that the unit of analysis was confined to students at one central U.S. university who were taught by nine instructors, were enrolled in 18 selected classes, and were using one online course management system (Blackboard). The levels of online community and connectedness could vary dramatically at another university, with other instructors, with other classes, and/or with different course management software. This study does not account for the levels of community and connectedness for all students.

Limitations

Due to the structure of the Blackboard course management system, photographs cannot accompany each discussion thread so as to create a natural visual each time a

student submits a comment. This technology limitation required this study to utilize a less-natural method of assuring repeated-viewing of classmate photographs.

Creswell (2005) explains that internal validity threats are serious since they can compromise an experiment that is otherwise well-designed. One possible threat to the internal validity of this study is that some students might have reported a higher level of community and connectedness due to having had more experience with online courses. This researcher attempted to control for this threat by including 18 different courses in the study, which increased the possibility that there was a balance of experienced and inexperienced students in control and treatment groups.

A second possible threat to the internal validity of this study is that the dynamics within one class might result in more community and connectedness than the dynamics within another class. This issue may surface due to general differences caused by instructor differences and due to general differences within a given instructor's two classes. This researcher tried to control for this possible threat by including one treatment class and one control class taught by each of the instructors and by including 18 different classes in the research project. In addition, to further control for the potential effect between courses, the treatment or control status was randomly assigned to each instructor's two classes and the class-selection process required that each instructor's two classes have similar structures and similar levels of student discussion.

Creswell (2005) also explains that threats to external validity hamper a researcher's ability to make generalizations to other situations. The fact that this study was conducted within the confines of one traditional central U.S. public university

constitutes an external validity problem that prevented the researcher from generalizing to other persons or settings.

Significance of Study

Specific groups that could benefit from this study include instructional designers, online instructors, institutions that offer online classes, researchers of online teaching and learning methods, and online students. Figure 1.3 shows how these groups affect each other's success. If any part of the cycle fails to succeed, all the other parts of online education could be directly or indirectly affected.

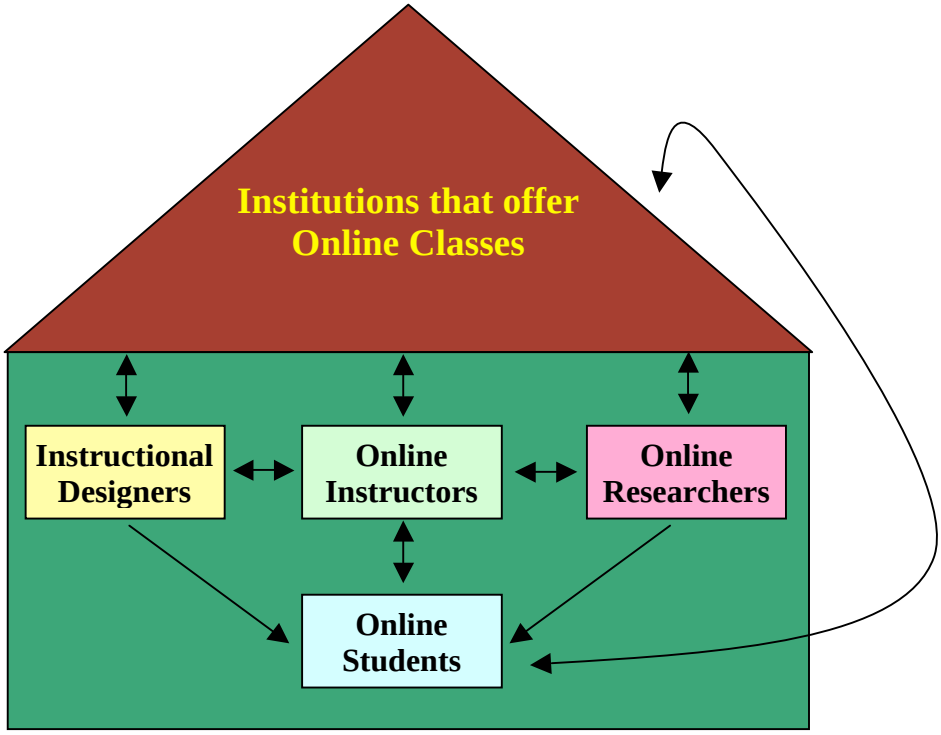


Figure 1.3. Online education success cycle.

Instructional Designers

Instructional designers work in an ever-changing medium. In order to keep up with the ongoing changes in educational understandings about online education, designers must be aware of ongoing research. This study will add to the bank of knowledge that instructional designers can use to help maximize the building of online community within online classes. Today's emerging technology makes the use of photographs feasible in online courses, and if ongoing research shows that photographs have a positive impact on online community and connectedness, instructional designers will need to consider adjusting course management systems to fully incorporate ongoing viewing of classmate photographs.

Online Instructors

Instructors naturally want their online classes to be positive, effective experiences for students. In addition, instructors are accustomed to face-to-face communication with students and communicating with students in the online environment requires a different effort. Since communication between instructors and students is essential to education, it is important to consider methods that might enhance communication. This study allows instructors to get a better understanding of the impact student photographs have on community and connectedness in online classes. If ongoing research shows that photographs have a positive impact on the development of community and connectedness, more instructors would likely consider incorporating photographs in their courses.

Institutions That Offer Online Classes

Institutions that offer online classes definitely care that those classes are successful. Since online classes can only be successful if they are filled with students, and since students are likely to complete online classes and continue taking online classes if they are positive experiences, it is important to the institutions that student-friendly methods are used in online classes. This study provides educational institutions with information about one community and connectedness factor to consider when choosing or creating course management program features. If research begins to show that the use of photographs does make a difference, more institutions might consider experimenting with course management systems that allow for the use of repeatedly-viewed photographs in online classes.

Researchers of Online Teaching and Learning Methods

Online teaching and learning methods are increasingly being studied and documented in the literature. But, by default, the newness of the online education field clarifies that there is much to learn. This study contributes to the understanding of online community and connectedness. In addition, the results of this study may encourage other researchers to further explore this area.

Online Students

Students have a variety of reasons for taking online classes rather than face-to-face classes. Regardless of these reasons, students generally expect that online classes will be meaningful, manageable, and personally satisfying. Often, since most students are familiar with face-to-face classes, online class experiences are compared to face-to-face

class experiences. Students who find online classes to be less meaningful, less manageable, or less personally satisfying than face-to-face classes might not find adequate value in a class and might not complete the class and/or might not take future online classes. Any feature that can enhance the chances for students to have a positive experience with an online class is worthy of study.

Chapter Two

Literature Review

The review of literature includes three sections (see Figure 2.1). The first section provides an overview of community and connectedness. The section begins with a definition and then discusses the relationships between community and connectedness and two important concepts: learning theories and academic performance

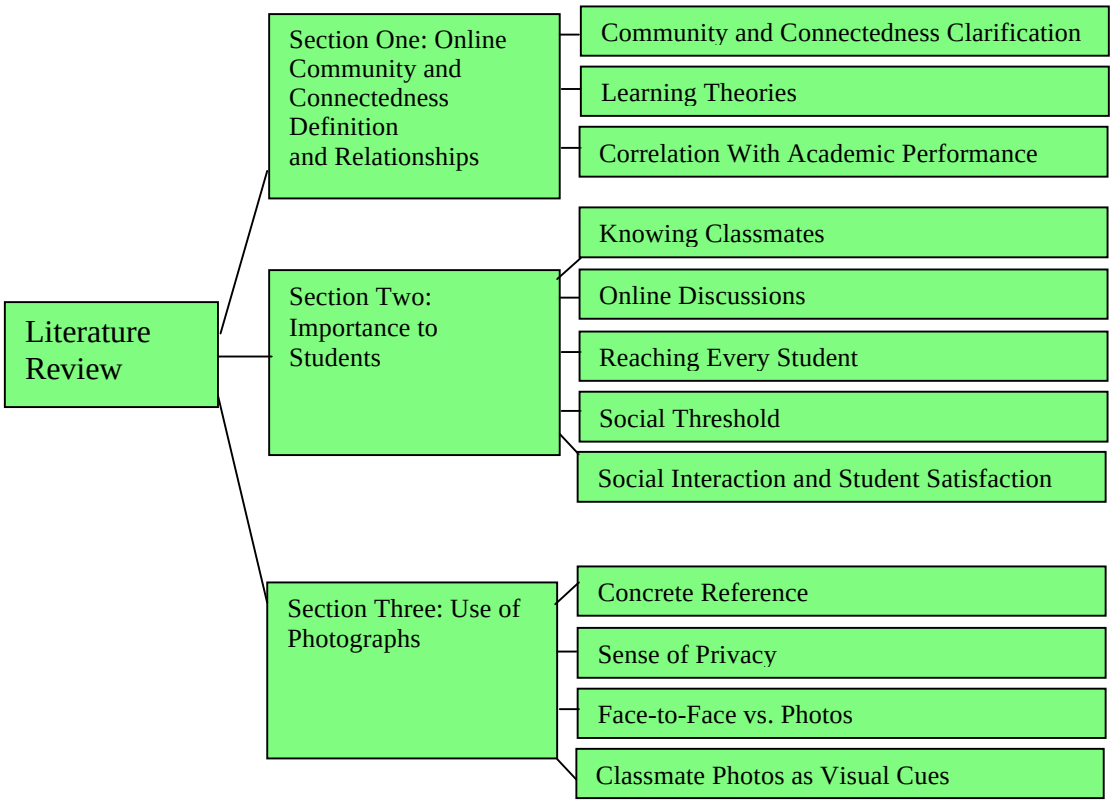


Figure 2.1. Review of literature overview.

The second section of the literature review chapter explores the importance of community and connectedness in online classes from a personal, social standpoint.

The third section focuses on existing research that addresses the use of classmate photographs in online classes.

Section One: Definition and Relationships

Community and Connectedness Clarification

Online community and connectedness has been defined as synonymous with social presence (Palloff & Pratt, 2004). Aragon (2003) and Rovai (2001) on the other hand, both view social presence as one component of online community. However, these definitions that view online community as an umbrella term that includes social presence refer to the same online community that is an umbrella over online community and connectedness. According to Tu (2000), social presence, or online community and connectedness, has been defined as "the degree of person-to-person awareness" (p. 1662). In a mixed-methods research study with 50 Arizona State University students, Tu (2000) concluded that online community and connectedness is one of the most influential components of effective online instruction and therefore is "one of the most significant factors in Distance Education" (p. 1663).

Since online community and connectedness is so critical to online instruction, and due to the lack of a clear definition, Tu and McIsaac (2002) conducted a mixed-methods research study to develop such a definition, along with addressing guidelines for improving social environments and instructional design in online classes. Tu and McIsaac asked 51 students in an online graduate course to each complete a 30-item questionnaire addressing online community and connectedness and privacy. The researchers received completed questionnaires from 43 of the 51 students. Their quantitative results showed

that the frequency of students' online discussion posts does not significantly vary with the level of social presence. In other words, whether or not students participated extensively or rarely in the online courses did not directly relate to the students' levels of social presence. Tu and McIsaac then conducted in-depth interviews with eight of the participants to better understand the student's responses on the questionnaires. In the interviews, students shared reactions such as the sense of feeling confused in the online discussions due to the difficulty of keeping straight "'who' was talking to 'whom' about 'what'" (p. 143). Tu and McIsaac concluded that many factors contribute to online community and connectedness, it is a very complex concept, and it is essential to online interactions. They summarized that online community and connectedness is "the degree of feeling, perception, and reaction of being connected by CMC (computer mediated communication) to another intellectual entity through a text-based encounter" (p. 10) and that the task of enhancing this important aspect of online environments is very complicated and requires much more study. They also suggested that online community and connectedness is both personal and elusive, noting, "When users notice it, there is social presence" (p. 135).

Russo (2000) defines social presence, or online community and connectedness, as the extent to which a person is perceived as real in a mediated environment, such as an online class, and Gunawardena and Zittle (1997) define it as a construct that comprises a number of dimensions relating to the degree of interpersonal contact, including intimacy and immediacy. They noted that courses that have no visual components are often rich in content but low in social connections and thus low in intimacy and immediacy. They

explained immediacy as the “psychological distance” between students who are in discussions and noted “immediacy enhances social presence” (p. 9).

For the purposes of this study, a composite of the above definitions of *online community and connectedness* will be used as follows: Online community and connectedness refers to the extent to which online students are perceived as real and have a sense of person-to-person awareness in an online class. In other words, online community and connectedness is each student’s sense of being part of the group and sensing the other people who are part of the group as opposed to feeling isolated and disconnected.

Learning Theories

As noted earlier in this paper, Carey (2001) points out that theories specifically relating to online education are currently being developed. One method being used to develop such theories is the application of some long-standing educational theories to online education. One such theory, Social Presence Theory, was developed in 1976 by Short, Williams, and Christy. Social Presence Theory states that social presence is the degree to which a person taking part in mediated communication is perceived as a real person and that, when the social presence level becomes uncomfortable, participants will take efforts to change their situations. Russo (2000) and Tu and McIsaac (2002) both cite the Social Presence Theory as background and agree that community and connectedness is a critical factor in successful online courses.

Wilson (2001) presents another theory that helps explain the importance of online community and connectedness. Although Wilson’s Sense of Community: A

Psychological Construct theory is relatively new and built around the concept of online education, it has roots in the sense of trust and belonging factors of the Constructivist Learning Theory. Wilson's new theory notes that students in an online course can develop a sense of community and connectedness that benefits their learning and includes belonging, trust, expected learning, and obligation. Wilson notes that online teachers are discovering that the success of an online class depends on the sense of community and connectedness between the class participants. This idea that a sense of community and connectedness is critical to online classes is supported by many researchers (e.g., Mackie & Gutierrez , 2004-2005; Allen, 2006).

Social constructivist views of learning have shown that learning is a social process (Kim, 2001, Rogoff 1990, Vygotski, 1978). In accordance with this view, social presence and connectedness is a necessary step to benefit from a social learning environment. Three basic assumptions underlie the social constructivist theory of learning: 1–Reality is constructed by human activity; 2–Knowledge is socially and culturally constructed; and 3– Learning is a social process that requires that students involve in social activities (Kim, 2001, Rogoff, 1990). Kim (2001) continues to note that cognitive perspectives are rooted within the relationships students have with other people and the environment and that learners who connect within a community are better able to construct new meaning and understand new information. The social constructivism theory strongly stresses the need for collaboration amongst learners, and suggests that, in order for students to connect with each other, they must have a sense of social presence and a sense of community. This need is a basic educational need, regardless of the

educational platform. Thus, this social need is present in all classrooms, including online classrooms.

In explaining their Self-Determination Theory, Ryan and Deci (2000) indicate that healthy human psychological development relies on three basic psychological needs: autonomy, competence, and relatedness. The theory explains that people are most likely to be happy and motivated when they have a sense of control over their lives and that they will most likely feel they have control over their lives when the three basic psychological needs are met. They describe the third need on this list, relatedness, as having warm and caring connections with others. They explain that this need for relatedness is a core psychological need of human beings and that, within any situation where it is lacking, humans will likely experience poor motivation. If many online students have little or no connection with each other, they certainly will not have warm and caring connections with each other, so they will likely be missing out on the psychological need of relatedness, which, according to Ryan and Deci (2000) would likely result in reduced motivation.

Online students and face-to-face students are motivated by the same basic things according to a study conducted by Stevens and Switzer (2006) with 54 undergraduates in two class sections of a special education teacher training course. In their study, Stevens and Switzer used Harter's Scale of Intrinsic Versus Extrinsic Orientation in the Classroom, which utilizes a dichotomous scale where, for each question, students chose the description that was most like them. The study included two sections of the same course, one taught face-to-face and the other online. Stevens and Switzer quoted Ryan

and Deci (2000) as having documented that students who are motivated are likely to remain interested in learning, and Stevens and Switzer's (2006) results supported that conclusion. Mayo (2005) supports this idea when he notes that students who feel connected to a group in an online class are more likely to complete the course. So, even though Ryan and Deci (2000) did not develop the Self-Determination Theory as a tool specifically explaining behavior of online students, it appears that the concepts relate well to online education since they are not qualities tied specifically to one mode of education or one life situation. Rather, like some other general theories about learning, the Self-Deterimination Theory concepts are general human qualities that apply to all areas of life, such as educational classrooms, interpersonal relations therapy, and personal health and exercise situations.

Correlation with Academic Performance

According to Bibeau (2001), there is a relationship between academic performance and online community and connectedness. She points out that learning is a social function and that social issues are a key component of effective online classes. She cites studies that connect the Internet to social isolation (Kraut et al., 1998; Nie & Erbing, 2000), indicate that lack of social and sensory cues in online discussions can increase a student's sense of isolation (Berge & Collins, 1995), and suggest that social connections in online classes increase student satisfaction and success rates (Rourke et al., 1999). Both Short et al. (1976) and Rourke et al. (1999) indicate that social presence is an important component of educational experiences. This agreement that spans almost 25 years and traditional and online education creates a solid base. Short et al. (1976) go

on to suggest that a combination of social presence, cognitive presence, and teaching presence make up a complete learning situation. Aragon (2003) supports the importance of the social aspect of online classes by noting that research is increasingly showing a connection between online community and connectedness and learning outcomes, and Jung et al. (2002) show in their research findings that ongoing communication with others can lead to greater satisfaction and better performance in an online class.

In his 2002 study, Picciano explored this relationship between online students' academic performance with their interactions and sense of presence. He collected data from 23 students in a New York college's online asynchronous class. Participation and grade data were collected during the class and a survey was conducted at the end of the class. Picciano found that students who felt they had interacted at a high level had a significant correlation ($r = .6732$ at the .05 level) between sense of presence and belonging in the class and the feeling that they had had a positive learning experience. The relationship between the sense of social presence and academic performance on assignments was also positively correlated, but at a lesser level ($r = .5467$ at the .05 level) than the perceived success. Picciano's work suggests that students who feel comfortable and included will likely enjoy online classes more and perform better in them. Students who have this sense of social presence within an online class are likely to feel connected to their online classes and thus experience a sense of community that is important to online class success. Russo (2000) also found that social presence has an impact on both satisfaction and learning and suggested that technologies should be used to increase social presence.

In a study comparing two versions of a class, one online and one in-person, and blind-reviewing of assignments, Johnson, Aragon, Najmuddin, and Palma-Rivas (2000) found that the face-to-face students (M = 3.47, SD = .60) performed slightly better than the online students (M = 3.40, SD = .61) but not significantly better. Interestingly, though, in 4 out of 29 skills learned in the class, the face-to-face students reported a higher confidence to independently use the skills they learned in the class than did the online students. Conversely, the online students only reported a higher confidence level than the face-to-face students on one skill that they learned in the class. Although these numbers show that the students reported equal confidence on 24 of the 29 skills, the differences that did show are worth further exploration. Is it possible that the lower confidences in the online classes related to community and connectedness?

Rovai (2002a) indicates that sense of community emerges in an online class when students feel a social presence and sense a connectedness with other students, thus not feeling isolated, a state that is significantly related to the high drop out rate in online classes. In a study about the importance of sense of community in online classes, Rovai (2002c) interpreted the responses on the *Classroom Community Scale* of 314 students who were enrolled in 26 online classes. He also incorporated the students' self-reports on their perceived levels of learning in the class into his results. He concluded that many online graduate students within his study did develop a sense of community and that those students who felt more of a sense of community were more likely to also feel that they had learned a lot in the course and were less likely to drop out without finishing. Although academic performance and dropout rates are two different issues, they are

related in that dropping out of a class precludes the possibility of ultimate successful academic performance in the class.

Online Class Drop-Outs

Researchers indicate that drop-out rates in online classes are much higher than in face-to-face classes, sometimes as high as 30% or more (Hill, Raven, & Han, 2002). In an effort to find ways to build community in online classes in hopes of addressing problems such as the high drop-out rate, the three researchers conducted an embedded case study that spanned several months and required them to sift through more than 400 pages of online communications. One of Hill et al's. (2002) main findings was that it was important to assure that students interact with each other and have a visual sense of each other. Hill et al. (2002) and Allen (2006) also suggest that a lack of a sense of community due to a lack of sense of others in a course is one contributor to this high drop-out rate. As Allen (2006) points out, student retention and degree completion are important to educational institutions. And, of course, students are also happier when they are able to reach their goals. So, it appears that a sense of community is an asset to both institutions offering online classes and to online students.

In a White Paper addressing the application of Self-Determination Theory to online learning, Mayo (2005) suggested that part of the reason that online learners have such a high drop-out rate might relate to social factors having to do with human interaction. He noted that individuals typically have a desire to be connected to a group and that students who feel connected are encouraged to continue their participation. Mayo's ideas are fully supported by Ryan and Deci (2000) when they explain that their

self-determination theory shows that healthy human psychological development relies on three basic psychological needs: autonomy, competence, and relatedness. Mayo (2005) indicates that it is the relatedness need that is so closely related to online learning. People need to feel connected to other people in order to feel that they belong. And, when people do not feel connected and do not feel that they belong, they tend to lose motivation to continue in that situation.

Zirkin and Sumler (1995) also found that, besides being factors in retention and student satisfaction, a sense of community is also a component of student academic success. They indicated that interaction is an essential factor in student achievement because it leads to increased test scores, better course grades, and student satisfaction. Moore and Kearsley (2005) concur and add that the importance of interaction, which is one way for students to connect, is greater for online courses than for face-to-face courses.

Although many studies show that online community and connectedness has a bearing on online student success, the relationship, as Rovai (2002c) notes, is not completely understood. Stelzer and Vogelzangs (1995) addressed this relationship in a textbook chapter and concluded that isolation is detrimental to motivation and often leads to dropping out. They noted that, students in online classes often feel this isolation as they sit alone with their computers and that, for success in online classes, it is important that students feel connected to the group and to the content of the class. In online courses, it could be that students feel unattached and therefore unmotivated, that they are isolated and therefore more likely to drop out, that the sense of isolation overrides the desire to do

well, or any number of other possibilities. But, whatever the actual connection, there is general consensus that online community and connectedness is an important issue for online student success.

Given the newness of online learning environments, it is not surprising that educators do not have a completely clear picture of issues leading to academic success in online classes. This situation will likely become clearer since both theory and research findings support online community and connectedness as a potential factor in academic success.

Section One Summary

Online community and connectedness refers to the awareness and "sense of being real" that online students have regarding each other as well as their sense of being part of a group that consists of the members of the class. This sense of community and connectedness is critical to the success of online classes.

Several different learning theories support the importance of online community and connectedness. Short, Williams, and Christy's Social Presence Theory (Short et al., 1976) provides the concept that students need to perceive their online classmates as real people in order to be comfortable with the class. From Wilson's Sense of Community: A Psychological Construct (Wilson, 2001) comes the idea that belonging and trust are important to developing online community and connectedness and that the success of online classes depends upon the sense of community and connectedness between the class participants. Social constructivist theories (Kim, 2001; Rogoff 1990; Vygotski, 1978) contribute the notion that learning is a social process and that learners who connect

within a community perform better and learn more. Ryan and Deci's (2000) Self-Determination Theory adds the thought that having connections with fellow students helps to satisfy a basic human need and results in higher motivation. Together, these learning theories present a clear picture of the importance of online community and connectedness.

Given that online students' personal connections relate to success of online classes, it is not surprising that these personal connections correlate positively with academic performance in online classes. Studies show that students' positive senses of social presence in online classes increase student success rates (Rourke et al., 1999), are a vital part of a complete learning situation (Short et al., 1976), result in better performance in online classes (Jung et al., 2002), cause students to enjoy online classes more and perform better in them (Picciano, 2002), and have an impact on both satisfaction and learning (Russo, 2000). Researchers also found that students who experienced online community and connectedness were less likely to drop out of online classes (Hill et al., 2002; Mayo, 2005; Rovai, 2002c; Ryan & Deci, 2000; Stelzer & Vogelzangs, 1995).

Section Two: Importance to Students

Knowing Classmates

In their 2002 study exploring the development of sense of community in online classes, Brook and Oliver asked 121 students in online classes to complete a questionnaire on online social issues. Their results showed that over 70% of the students did not feel that they "knew" people in their class or that their fellow students "knew" them. These students noted that, within the discussions, they did not recognize the people

who were participating, suggesting that, even though they were discussing with these other students, they did not maintain a sense of who was who. But, these same students showed that, despite not feeling that they knew each other, they did feel some sense of camaraderie, because 99% of them indicated that other people in the class would help them if so requested. Even though it is encouraging that they felt enough of a connection to sense that the members of the group would help each other when help was needed, not having a sense of each classmate as a unique individual definitely shows that these online students would be unlikely to forge personal or professional relationships during or after their classes.

Online Discussions

Thomas (2002) did not find online students responding to each other and actually communicating. Rather, in his study of 69 students' online discussions in a one-semester undergraduate course, he found that the communications were mostly separate opinions, not discussions, and that over half of students' posts received no responses and that a majority of the posts were "isolated, and mostly unrelated" (p. 361). He also noted that, even when a thread did have a series of responses, very few students read to the bottoms of the threads, thus choosing not to complete a "conversation" and encounter the different perspectives. He summed up the problem by suggesting that students in online environments are not interacting with other students, but rather simply with other students' writings. In other words, they have perhaps developed a sense of community with other writings, not with other people. It is possible that inviting students to post pictures to present a presence might help to reverse this situation. Thomas notes that

introverted students stated that they preferred the depersonalization. The results of a study by Lobel, Neubauer, and Swedburg (2002), however, counter the idea that using photos in online classes invades students' sense of privacy, since the students in the study indicated that they felt anonymous despite having their photos show with each discussion thread.

A sense of disassociation from fellow participants and discussions that lacked depth and interaction were also discovered by Kanuka and Anderson (1998) in their study of 25 participants in a 3-week asynchronous online forum in Canada. They found the discussions lacked in social interaction and the creation of meaning. It is possible, but not likely, that the short span of the course contributed to the lack of connection. Given that, for example, strangers sit next to each other for a few hours on an airplane and often connect and have serious discussions, it stands to reason that spending three weeks together in daily discussions could easily create some feelings of connectedness. So, it appears that the online environment in this course was not conducive to community building.

On the other hand, in their study of 13 students in an online class with asynchronous discussion, Rogers and Laws (1997) found that, although students noted that the class took two or three times more time than their face-to-face classes, the class was a successful learning experience. However they noted that it would have been much more difficult to feel a sense of community and handle the discussions if the class had had more than 13 students. Since many online graduate classes have considerably more than 13 students, and since most online classes need to have more than 13 students to be

financially viable, small class size is unlikely to be a solution for developing online sense of community. In addition, the instructor noted that creating a sense of community in the class was his biggest challenge, indicating again the need for clarification regarding methods that enhance the development of online community.

Reaching Every Student

Using the term "interpersonal presence," Herod (1999) was concerned that online community and connectedness was important, but not available in online classes in ways with which people are familiar, and thus undertook a study to explore online student perceptions of social presence in their classes. Using a questionnaire followed with further elaboration through e-mail communication, Herod gathered data from eight Canadian graduate students enrolled in an online course that utilized asynchronous threaded discussion. His findings showed that participants recognized three ways that social presence is developed: 1—through personal information, such as bios and pictures; 2—through personal efforts to reach out to fellow students through private e-mails, sharing of personal information, and support of each other; 3—through writing style, including emotion, tone, substance, and amount of interaction. The students in this study clearly felt that it was beneficial to bring their personal lives into the classroom at least at the level that would happen in a traditional face-to-face class.

If one accepts that social presence is complex and interpreted by individual perceptions, it is logical to conclude that, given the same circumstances, some online students are likely to feel less social presence than others. Zhang and Storck (2001) explored this concept in a study where they focused on the participation and knowledge-

acquiring aspects of peripheral members (members who participated very little) of an online community in China. The researchers downloaded and analyzed about six weeks of discussions from an online travel forum. They concluded that 90% of the participants were peripheral, meaning that they participated very little, while 10% of the participants communicated extensively. However, they also noted that the composite of the peripheral participants' communications was significant, because it contributed about half of the total discussion bulk. For purposes of this paper, this study is significant in regards to the role social presence plays in leading 90% of a group to remain at the peripheral level, and in regards to the importance of not having online students performing at a peripheral level. Even though discussions in face-to-face classes are also typically dominated by a small percentage of the class participants, the non-participants in face-to-face classes are still clearly present and the instructor can ascertain if the non-participants are quietly attending to the goings on in class. Online instructors do not have this option available to them, so as Jung et al. (2002) suggested, the social presence of each and every student becomes a larger issue for online classes than it is for face-to-face classes.

Social Threshold

Some students can be quite successful working in a "faceless" classroom, but others feel the need for a more personal touch. Wegerif (1998) conducted a 3-month study with 21 students in an online course to look at the impact of social presence on learning. The students were in the United Kingdom, Italy, and Canada. He analyzed discussion boards and e-mails, conducted interviews, used a questionnaire, and discovered that some students felt the class was great while others felt it was cold and

isolating. Also, participation ranged from 122 messages from a student who thought the class was great to 4 messages from a student who felt very little sense of presence. One student shared that communicating by writing was too difficult for her, that the class required a lot of discipline, and that dropping out was too easy. Wegerif noted that some students failed to cross a social threshold that allowed them to feel like part of a community rather than outsiders looking in. Since personal photos have been shown to lessen the sense of isolation in online courses (Mackie & Gutierrez, 2004–2005), perhaps adding visuals in the form of student photos would help more students to find their way across this social threshold.

Social Interaction and Student Satisfaction

Using a mixed-methods research format, Rovai (2001) studied a five-week online Blackboard course by asking students to complete a survey about classroom community, studying messages the students posted on the discussion board, and comparing statistical data that Blackboard gathered and tallied. The main purpose of the study was to determine if online instructors could take steps to promote a sense of classroom community and to study online thread communication differences based on gender. The survey that Rovai used was the Sense of Community Index (SCCI) developed by Rovai and Lucking in 2000. This tool is the precursor to the *Classroom Community Scale* (CCS) that is a currently-used tool for measuring online community and connectedness and is used in this study. The results of Rovai's five-week online study showed a significant gender main effect: females scored higher on the SCCI than did males $F(1,9) = 6.56$, $p = .03$. This result indicated that the females in the study felt a

higher sense of community and connectedness than did the males. The qualitative part of this mixed-method research study involved the instructor posting a discussion thread at the end of the course and asking students to discuss the strong and weak aspects of the course. Reminiscent of a detail noted during the evaluation of the discussion board posts which showed that males were less personal and more negative in their postings, a gender difference was seen in the responses to the end-of-course thread as males posted 64% of the negative comments, but only 11% of the positive comments. Rovai discussed several findings:

- Increased structure within a class decreased sense of community.
- Higher student participation in discussions increased sense of community.
- The relationships among the people in the course (student-student and student-teacher) were more important in creating sense of community than was the relationship between student and course content.
- Online instructors who want to increase community should use interactive teaching methods.
- In online discussions, the male voice tends to be negative, impersonal, assertive, independent, and authoritative. The female voice tends to be positive, supportive, connected, and helpful.
- Students with the highest tone of independence had the lowest community scores, and students with the highest tone of connectedness had the highest community scores.

- Instructors should design courses with the specific intent of avoiding a sense of isolation.
- Sharing by online students promotes sharing by other online students.
- Students are more likely to experience satisfaction in a class when they have a personal sense of each other.

Rovai's (2001) results emphasize the importance of developing a sense of community and connectedness within online classes and that personal connections between students are an important part of developing online community and connectedness. His recommendation that online instructors work to avoid student isolation, promote sharing and participation, and increase relationships among students all lend credence to the idea that that researchers should explore the effect of classmate photos in online classes.

Jung et al. (2002) also showed in their research findings that ongoing communication with others can lead to greater satisfaction and better performance in an online class. They suggested that creators of online courses must incorporate a variety of techniques to promote social interaction in order to enhance student satisfaction and participation levels. They noted that interaction between students appears to be more important in online classes than in traditional classes, as well as more important to some students than others. Although Jung et al. do not address the use of personal photos, the idea aligns with their call for the use of a variety of techniques as well as their assertion that different students have different needs and that student interaction is critical in online classes. Bibeau (2001) supported the idea that personal photos would be beneficial when she noted that thumbnail photos of classmates allowed students to connect comments to

faces, diminishing a sense of distance in online classes. Gunawardena and Zittle (1997) did not address personal photos in their study, but did recommend emoticons, which are small happy-face-type icons with expressions, as a means of increasing community and connectedness in online courses. Their suggestion of the use of emoticons alludes to the idea that adding visuals to online classes would help students connect with each other. Tu and McIsaac's (2002) study suggested other ways of developing community and connectedness, including greetings, praise, casual conversations, small group projects, and allowing students to choose some discussion topics. Both the conclusions by Gunawardena and Zittle (1997) and by Tu and McIsaac (2002) suggested that increased research is needed to further understand online community and connectedness. This repeated suggestion by different researchers that more research is needed to understand how to increase online community and connectedness supports the idea that, since almost no research has been conducted regarding the use of classmates photos in online classes, no one is in a position to assertively state that the practice would not be beneficial. The truth is that the most beneficial aspects for the development of online community and connectedness have yet to be determined.

Hara and Kling (2000) conducted a study of six students in an online class with asynchronous discussion by analyzing their discussion threads, conducting interviews, and observing them in person. Hara and Kling concluded that many of the students exhibited distress during the course and that many of their problems were not atypical for online classes, leading the researchers to conclude that too many studies emphasize the positive aspects of online classes and that online education could be better served if more

researchers would focus on the distressing aspects of online education by encouraging students to focus on their related confusions and anxieties, such as lack of connectedness.

Hughes and Hagie (2005) explored both student appreciations and frustrations in a mixed-methods research study that spanned three semesters and involved 60 participants. The two researchers compared student opinions about online and face-to-face classes. The subjects involved were all taking an online course and had all previously taken face-to-face courses at the same university. Hughes and Hagie noted that students reported positive aspects of face-to-face classes included personal connections and negative aspects of online classes included lack of personal connections, showing that students do sense different social levels in online classes than in face-to-face classes.

Section Two Summary

Students often do not feel they know their online classmates. Even though they enter into discussions with their classmates, students often do not sense that they know to whom they are talking (Brook & Oliver, 2002). Due to lack of personal connections, online discussions are also often disconnected, resulting in incomplete conversations and sharing of separate opinions rather than real discussions (Kanuka & Anderson, 1998; Thomas, 2002).

Some students report the desire to have personal connections in online classes at about the same levels as they have in face-to-face classes (Herod, 1999). As in face-to-face classes, online discussions are dominated by a small percentage of the class (Zhang & Storck, 2001), but instructors have no way of knowing that students who participate

very little in online classes are gaining from the discussion of others, so involving all students in online classes is an important goal (Jung et al., 2002). Reaching these low participators may require efforts beyond those needed for the high performers since some students do not easily cross the social threshold to become part of an online community (Wegerif, 1998). For example, some students can function well in a class with no visuals, whereas the inclusion of classmate photos and/or other visuals may help pull some students out of the background.

Gender tends to be a determiner of sense of community and connectedness, with females reporting more connectivity, and interactions between students increase sense of community and connectedness (Jung et al., 2002; Rovai, 2001). Interaction between students appears to be even more important in online classes than in face-to-face classes, so developers of online courses need to take steps to attempt to increase levels of community and connectedness in online classes, such as increasing interaction opportunities, posting of personal photos, using emoticons, sending greetings, giving praise, promoting casual conversations, planning small group projects, and requesting student involvement in class decisions. All of these ideas should be used at this point since educators currently do not know how to best develop online community and connectedness.

Section Three: Use of Photographs

Concrete Reference

Morrison, Ross, and Kemp (2004, pp. 187–188) point out that pictures in learning situations can be *representational* and used to represent people, providing a concrete

reference “which makes the information easier and more meaningful to the learner.” In the case of personal pictures in online courses, the associations can help to make classmates seem real, and therefore more meaningful.

In her classes, Russo (2000) found that students reported a higher level of online community and connectedness towards her than towards each other. She noted that students saw her picture on the class Web site, and both saw her picture and heard her voice in audio lectures. This situation led her to conclude that putting student pictures on course Web sites would give students concrete references to each other and may help to raise online community and connectedness. In addition, she noted that, given today’s computer technology capabilities, adding pictures to Web sites constitutes a low cost, simple method of raising social presence. She added that including student voices would also, obviously, increase social presence. In addition, she noted that voice requires higher technology, so would be more difficult and will become more of a possibility as bandwidth increases become more routine.

Sense of Privacy

When one notes that many students might choose to function at a peripheral level, one might also wonder if an increased social presence would be positive, negative, or neutral to the success of these students in online courses. Lobel et al. (2002) somewhat addressed this issue in their research with synchronous discussions in an undergraduate course. The researchers studied the interpersonal aspect of the discussions and concluded that online students function in a “privacy zone” that is not available to face-to-face students and that this state creates a freer sense of communication. These students

indicated that they felt anonymous, and thus less reserved and self-conscious about posting comments. Interestingly, these students said that they felt this sense of freedom even though their names and personal pictures were posted with each thread. For the purposes of the study, this finding is significant since it suggests that using pictures with discussion threads as a means of increasing social presence does not necessarily conflict with the idea that many online students may choose to protect their privacy.

Face-to-Face vs. Photos

In their 2002 study, Hill et al. examined instructional design strategies and learner choices that can enhance online community. They used surveys, interviews, observations, and discussion content analysis to study 47 graduate students in two online classes over a three to four month period. The classes met face-to-face at the start of the class and at the midterm and communicated via chat rooms and bulletin boards the rest of the time. They found that the face-to-face meetings were very helpful in developing a sense of community because students did not feel like they were talking to "faceless classmates." Since many online classes have students from very diverse areas, face-to-face meetings are not always possible. But, posting pictures might work as a way to give all classmates a face so students are not in that isolated position of feeling that they are attempting to communicate with "faceless classmates."

Allen (2006) reported that social integration was shown to be a key factor of student success in face-to-face classes, so it is only logical to assume it would be a factor in online classes as well. Allen (2006) and Simonson, Smaldino, Albright, and Zvacek (2006) both noted that interaction and in-person face-to-face time with peers was

essential for successful interactive online classes. Such a scenario, however, is not realistic when students in a single online class may be hundreds of miles or more apart. It is possible that alternative virtual interactions might help address this social need.

Classmate Photos as Visual Cues

One main way to improve online community and connectedness is to use the standard human technique: visual cues. Mackie and Gutierrez (2004–2005) studied the effect of participants' pictures in a synchronous online environment using both quantitative (a 7-point Likert scale survey) and qualitative methods (open-ended questions). According to Mackie and Gutierrez, the CAMS online instructional system includes the option to have photos appear with each instruction thread, and that within a study, over 80% of the students reacted positively to the feature. These students indicated that the pictures (a) gave them a sense of who they were talking to in a class, (b) gave them a sense of belonging to a class, (c) made the learning environment easier and more comfortable, (d) lessened the ambiguity, and (e) helped develop connections between students and teachers. One student who did not have a photo to post noted she felt at a disadvantage since she would recognize others on campus, but they would not know her. A student also noted that the pictures allowed students to recognize each other from other classes, even though they did not remember names and that this recognition was helpful when it came time to form groups. Incorporating the personalization into each communication created a "humanized community where all participants have the opportunity to get to know the other participants" (p. 195). In other words, the photos helped to create online community and connectedness. They also noted that the procedure

resulted in more engaging interactions and made participation easier. The researchers reported that faculty have the opportunity to use online instructional systems other than CAMS, such as Blackboard and WebCT, but many have turned away from the other systems and exclusively use CAMS since CAMS offers some unique community-enhancing features, such as the ongoing viewing of classmate photos.

In a grounded-theory research study in Scotland, Nicol, Minty, and Sinclair (2003) also reported value in having visuals of classmates, although these "visuals" were in-person. They used analyses of online discussions, interviews, and an open-ended questionnaire on the social dimensions of electronic learning in a course using the FirstClass course-delivery forum with asynchronous discussion. The course began with a face-to-face meeting. Participants noted that this meeting was essential so that they were not communicating with faceless individuals. Acknowledging that not all courses have the option of meeting face-to-face, Nicol et al. discuss other options, such as the Open University of Catalonia's method of having students post personal photos at the start of class so that a digitized thumbprint of each student can accompany every thread the student posts, thus providing an ongoing social reference. The researchers also noted that the use of the pictures is an example of people infusing standard social cues from face-to-face classes into online classes and that using such personal tags might help students keep track of their online communications. This approach is logical since people are familiar with such social cues and using these cues can enhance the social comfort and presence and ward off the isolation so often experienced in online classes. Based on her experiences as an online student, Bibeau (2001) supports the use of common social cues

when she notes that online learners need both physical and social contexts within their discussions and that ways to address the social need include personal sharing, anecdotes, praise, encouragement, and thumbnail photos of classmates.

The popular college student social utility, Facebook, offers a good example of how people feel about photos when they talk to others online. Facebook, founded in 2004, was originally created as a way for college students to connect with each other. Today, Facebook has over 23 million visitors per month (CrunchBase, 2007). Although posting photos is not required on Facebook, it is an extremely rare Facebook page that has no photos at all. The photos add a visual to the asynchronous Facebook discussions, thus making the interaction more personal. The Facebook model has become so popular that it is now also used outside of the college realm, such as within companies and as a means of contact for professional groups (www.facebook.com, 2007). The young people who have gone through college with Facebook available to them will likely expect visuals in other online communication situations. This consideration of the possible expectations of a "new wave" of graduate students also supports the idea that researchers need to determine the effect of classmates' photos on online community and connectedness to help educators take a stand in regards to whether or how they will incorporate photos into their classes.

Section Three Summary

Experiences of different researchers and educators support the idea that adding classmate photos to online classes might increase community and connectedness and the current-day technological advances make it possible to test this possibility. Although

some people are concerned that the use of photos in online classes might create a privacy problem, a study on this issue showed that online students felt a sense of privacy even though their photos were posted in the class (Lobel et al., 2002). Some studies (Allen 2006; Simonson et al., 2006) showed that face-to-face time was essential for successful online classes, but given the impossibility of this situation, classmate photos might be the next best thing to face-to-face encounters. According to a study by Mackie and Gutierrez (2004-2005), students find that classmate photos make online classes more personal and comfortable. Mackie and Gutierrez also reported that instructors were choosing an online instructional system that allowed student photos with each discussion thread in an effort to help develop sense of community in online classes. Given the option to post photos in online situations, many college students freely choose to do so as evidenced by the popular online social utility, Facebook. Students who have been part of the "Facebook generation" are likely to both expect photos in online classes and be very open to posting photos in the classes. This new generation of students supports the need to explore the effect of photos in online classes.

Need for Further Research

The literature shows a clear indication that the social aspect of education is important to overall student success, that social connections are more difficult in online courses than in traditional courses, and that visual cues, such as photos, can help students to make connections.

Researchers also have general agreement that online community and connectedness is a key component to online learners' success, that online courses need to

be structured to encourage community and connectedness, and that many current online classes are lacking in community and connectedness.

This discrepancy between the clear need for community and connectedness and the lack of it, clarifies the need for further research to illuminate techniques that help to promote community and connectedness in discussion-based online courses.

Much has been studied regarding online community and connectedness, and there is common agreement that this social side of online classes is important. Although personal photographs offer an easy social addition to online classes, very little research has been done that studies the effects of repeatedly seeing classmate photos while taking online classes. As shown in Figure 2.2, there may be a connection between photos and online community and connectedness as well as success in online classes.

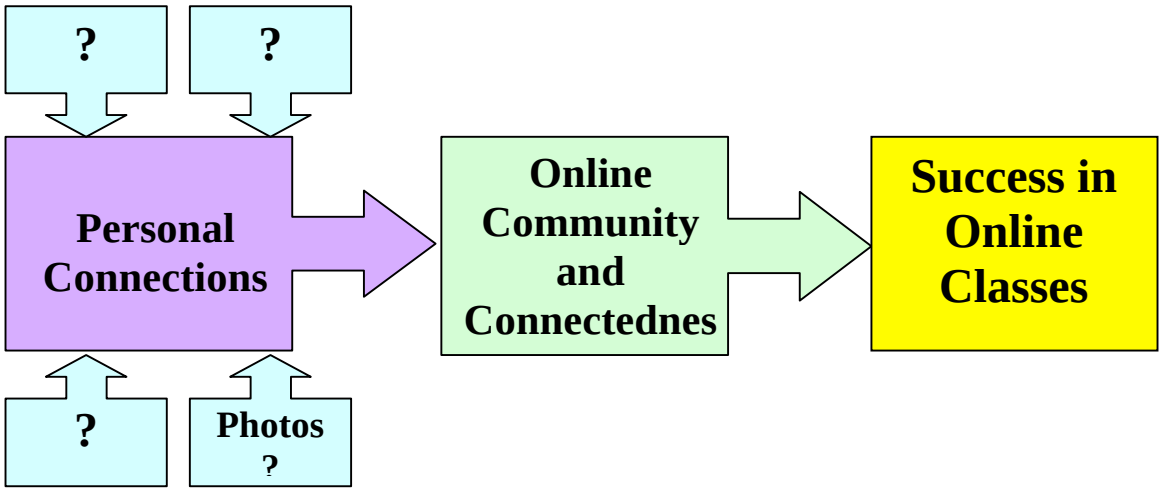


Figure 2.2. Possible relationship between photos and online community and connectedness

Since photos require more advanced technology and higher levels of computer memory than text does, including photos has not been practical until only recently.

Currently, as technology is improving to make online video a standard, using online photos has become a less complicated issue that no longer causes a problem for most computers and Internet connections. Consequently, from a technology standpoint, the timing is perfect to address the effect of photographs on online community and connectedness. From an educational standpoint, the timing is in the "better late than never" category.

This researcher chose to conduct a study entitled *The Effect of Classmate Photographs on Online Community and Connectedness*. The study used quantitative research based on responses to two surveys that were combined into one online survey. The two surveys are *The Online Community and Connectedness Survey*, which was created by this researcher for this study, and Rovai's (2002b) *Classroom Community Scale*.

Chapter 3

Research Design and Methodology

Chapter Preview

The following paragraphs offer an overview of the research design and methodology used in this study. The overall framework and research questions are presented to provide a general overview of the study. Then the methodology, study population, instrumentation, administration, procedures, and data analysis plan are explained to provide more specific detail.

Study Framework

The purposes of this study were to explore the effect that seeing photos of online classmates has on students' levels of community and connectedness, and to compare the effect of seeing classmate photos on the levels of community and connectedness experienced by "online-only students" and "on-campus-presence students" in online classes.

Respected educational theories, such as Social Presence Theory (Short et al., 1976) and the Self-Determination Theory (Ryan & Deci, 2000), and a variety of research studies, such as those conducted by Jung et al. (2002), Mackie and Gutierrez (2004–2005) and Brook and Oliver (2002), support the idea that online community and connectedness is important in online classes and is a critical part of a positive online-student experience.

The evidence to support the use of classmate photos, however, is not as prevalent as is evidence of the importance of community and connectedness. Searching through

various online educational journal search sites, university library search tools, and Google Scholar, and using search terms such as “online classes & photos,” “distance education & photos,” “online community & photos,” “online social presence & photos,” “online sense of presence & photos,” and “online classmate photos,” this researcher found only three studies (Berge & Collins, 1995; Lobel et al., 2002; Mackie & Gutierrez, 2004–2005) and two anecdotal reports (Bibeau, 2001; Russo, 2000) that directly involved the effects of classmate photos in online classes. Other studies, such as Nicol et al. (2003) and Herod (1999) suggest the use of photos in their study discussions, but do not involve photos in their studies. The three studies that involved photos in online classes (Berge & Collins, 1995; Lobel et al., 2002; Mackie & Gutierrez, 2004–2005) all indicated that photos of online classmates appear to have a positive effect on online community and connectedness, but the lack of research relating to photographs suggests a need for further research in that area. This study helps to clarify three issues:

1. Whether repeatedly viewing classmate photos makes a difference in students’ levels of community and connectedness in online classes.
2. Whether photos make a different impact on the sense of community and connectedness between on-campus-presence students and online-only students.
3. How students feel about (a) personal connections in online courses vs. face-to-face courses, (b) group dynamics in online courses, (c) experiences with online discussions, and (d) interest in having classmate photos in online classes, as well as whether or not the subjects in the treatment group will have

significantly more positive opinions and/or less negative opinions than those of the subjects in the control group.

Together, the educational theories, related online research results, and lack of photo-based research, provide literature-supported purposes for this study as described in this chapter and as seen below in the research questions and hypotheses. The first two research questions and hypotheses address the participants' measured levels of community and connectedness. The third research question gathers participants' opinions regarding community and connectedness in both online and face-to-face classes and about viewing classmate photos in online classes.

Research Questions

1. Does repeated viewing of classmate photos make a difference in the measured sense of community in online graduate courses as measured with the *Classroom Community Scale* (Rovai, 2002b)?
2. Does the impact of photos on the sense of community and connectedness differ in on-campus-presence graduate students and online-only graduate students?
3. How do online graduate students feel about (a) personal connections in online courses vs. face-to-face courses, (b) group dynamics in online courses, (c) experiences with online discussions, and (d) classmate photos in online classes?

Research Hypotheses

1. Students in classes where classmate photos are viewed repeatedly will score higher on the Rovai (2002b) *Classroom Community Scale* than will students who are not in classes where photos are viewed repeatedly.
2. Online-only students in classes where they repeatedly view classmate photos will experience higher levels of community and connectedness than will on-campus-presence students who repeatedly view classmate photos.
3. When completing the *Online Community and Connectedness Survey* (OCCS) (Glisan, 2006) that was created by this researcher for this study to gather opinions about (a) personal connections in online courses vs. face-to-face courses, (b) group dynamics in online courses, (c) experiences with online discussions, and (d) interest in having classmate photos in online classes,

   the opinions of the subjects in the treatment group will be significantly more positive and/or less negative than those of the subjects in the control group.

Dependent Variable and Independent Variables

To explore the first two research questions, one independent variable was utilized: a community and connectedness score as determined from subjects' responses to the *Classroom Community Scale* (Rovai, 2002b). Two independent variables were explored: the presence or absence of classmate photographs and whether or not the students had an on-campus presence or an online-only presence. The subject groupings used to explore these variables were the control and treatment groups based on the

selected classes and on-campus-presence and online-only groups generated by responses to one question in the survey. The mean community and connectedness scores of the different groups were compared. To explore the third research question, the 20 individual OCCS survey questions were used as dependent variables in order to explore subjects' opinions. The opinions of students in the treatment group were compared to those in the control group.

Methodology

According to Creswell (2005), true experiments require random assignment of subjects to control and experimental groups, and when convenience sampling is used because the researcher cannot use random methods to create groups, as in this study, the experimental situation is actually a quasi-experiment consisting of a control and treatment group. This quasi-experiment utilized a between-group design with one treatment (photos) and the CCS survey, which was used to measure online community and connectedness. The results from the control and treatment groups were studied as a whole and in the subsets of on-campus-presence students and online-only students to address the first two research questions, whether photos make a difference in online community and connectedness and whether having an on-campus presence makes a difference.

To answer the third research question, the OCCS survey was used to collect participant opinions about the use of photos in online classes.

Study Population, Sampling Frame, Sampling Plan

The population for this study was graduate students taking online courses at one central U.S. university. Instructors who were teaching at least two completely online courses during the duration of the study were invited to participate. These instructors were located by conducting thorough searches of the university's online course listings. An invitation-to-participate e-mail was sent to a total of 79 instructors. Of these 79, 69 either did not respond to the e-mail, or chose not to participate due to one of the following reasons:

- Although his or her name was listed for a given class online, he or she was not actually teaching it, and he or she actually did not teach two online classes during the course of the study. (Did not meet criteria)
- One or both classes actually met in person on some occasions. (Did not meet criteria)
- One or both classes were ongoing classes where students had already posted photos. (Did not meet criteria)
- One or both classes included a number of undergraduate students. (Did not meet criteria)
- One or both classes regularly met using online video conferencing and therefore classmates would have ongoing visuals of each other aside from photos that would be posted in the classes. (Did not meet criteria)
- He or she had no time to participate in study.
- He or she would rather not participate in study.

Prior to the Spring 2007 semester, 10 instructors agreed to participate, resulting in the identification of a total of 20 class sections. During the last semester of the study, one participating professor ended up not having the planned class, so the collected data of four subjects from the class's matching control class were also dropped from the study, resulting in nine treatment classes and nine control classes. At initial activation, the study consisted of nine graduate classes serving as treatment classes and nine graduate classes serving as control classes.

Of the 18 graduate courses involved in the study, nine were assigned to the control group and nine were assigned to the treatment group. The makeup of the on-campus vs. online-only presence groups was by chance based on the students in the 18 classes.

The sampling frame consisted of all 346 students in the 18 classes that were selected to participate in the research project. The classes were all located at one central U.S. university. The students in the sampling frame were not required to participate in the survey, and 151 students elected not to participate. There was some coverage and sampling error since convenience sampling was used so that specific classes could be involved in the research, thus allowing for the manipulation of the use of classmate photographs. According to Gravetter and Wallnau (2004), the ideal means of selecting study participants is through random sampling in order to assure that there is no bias in the process used to select study participants and to assure that the study can be extrapolated to an entire population. For this study, since the procedure involved asking students to post photos in the treatment classes, random sampling could not be used. As

Creswell (2005) explains, convenience sampling is often used instead of random sampling in order to find subjects that match a specific research need. Creswell also explains that, when convenience sampling is used, the study results cannot be extrapolated beyond the subjects involved in the study, but that the results can provide useful information.

To help minimize sampling error, the study included two online classes taught by each of nine instructors in the Spring, Summer, and Fall ’07 semesters. One of each instructor’s classes was a control class and the other was a treatment class that included classmate photos. Including a control class and a treatment class taught by each instructor helped to minimize the sampling error since this choice eliminated some of the instructor variance that could have existed between the different online classes that made up the control and treatment classes.

Another step taken to help reduce the sampling error was to include a large number of potential participants. Creswell (2005) points out that a sampling will better reflect a whole population if a large sample is included in a study.

A total of 350 students were contacted by e-mail and invited to participate in the survey. Of the 350 contacted students, 171 were in the treatment classes and 175 were in the control classes. The remaining four students were in the control class that was dropped from the study. Table 3.1 shows the photo-posting breakdown of students in the treatment classes.

Treatment Fidelity

In the treatment classes, tracking was activated within Blackboard to record how often students chose to view the photos in the class photo albums. The treatment students accessed the class photo albums an average of once or twice per week. Individual students ranged from zero visits to the photo album to one student who visited 52 times. In one class, all the students accessed the photo album. In a second class, three students did not access the photo album. In three classes, two students did not access the photo album, and in the remaining three classes, only one student did not access the photo album. Overall, about 80% of the students in the treatment classes visited the photo albums a minimum of once every two weeks.

Table 3.1

Percent of Students Who Participated

Type of Class	Number invited to participate in study	Percent who chose to participate	Percent who chose to post photos	Percent of those who posted photos who also choose to participate	Percent of those who chose to participate that chose not to post photos
Treatment	171	75% (129÷171)	49% (84 ÷ 171)	95% (80÷84)	38% (49 ÷ 129)
Control	175	40% (70 ÷ 175)	N/A	N/A	N/A

Instrumentation

The dependent variable in this study was the level of online community and connectedness as measured by the odd-numbered questions on the *Classroom Community*

Scale (CCS), which was developed by Dr. Fred Rovai in 2002 (2002b). A second survey tool, the *Online Community and Connectedness Survey* (OCCS), which was developed by this researcher for this study, was used concurrently to gather additional subject opinions (see Appendix C for full text of both scales). Each of the two survey tools consists of 20 5-point Likert scale questions, but from the CCS, only the 10 odd-numbered questions were used for analyses. In addition, eight demographic questions and two control vs. treatment group questions were included.

Since the CCS was used to measure subject community and connectedness, its proper development procedures, validity, and reliability were verified. According to Rovai (2002b), during the development of the CCS, a panel of four experts evaluated the 40 initial questions for content validity. Questions that were not rated as totally relevant by all four experts were deleted. Additionally, Rovai points out that a preliminary factor analysis was conducted with the initial questions, which resulted in elimination of more of the weaker questions. Then, the 20 remaining questions (10 that relate to feelings of connectedness and 10 that relate to learning and community) were reordered in an effort to avoid responses that related to placement of related items. Finally, Rovai conducted an initial study that included 375 students enrolled in 28 online courses using the Blackboard course management system. In analyzing the data, whole-scale item reliability was measured with Cronbach's alpha (.93) and test-retest reliability was conducted using equal-length halves, resulting in a split-half coefficient of .91, indicating excellent reliability. Internal consistency measures were also figured, resulting in a Cronbach's coefficient of .92 and a split-half coefficient for the connectedness questions

also of .92, indicating excellent reliability. For the learning and community questions, the Cronbach's coefficient was .87 and the split-half coefficient was .80, showing good reliability. The CCS was found to be a valid measure of classroom community. In addition to use in studies conducted by Rovai, the CCS has been used in studies by other researchers, such as Graff (2003), Ertmer, and Stepich (2005), Liu, Magjuka, and Seung-hee (2006), Glisan and Trainin (2006), and Lear (2007).

In preparation for this study, this researcher conducted a pilot study that spanned seven months. Two main purposes of this pilot study were to assure that the OCCS survey questions were meaningful and to learn to use the Flashlight online survey tool effectively. The participants in the pilot consisted of a total of 55 online graduate students from two online graduate courses at one central U.S. university. Of the 50 participants, 18 provided anecdotal feedback after completing the survey. Based on these comments and the pilot results, many adjustments were made both to the research plan and the survey, including the following key adjustments. (These adjustments apply only to the 20-question OCCS, not to Dr. Rovai's 20-question CCS. Dr. Rovai's scale was left unchanged so as to preserve its validity and reliability.) The main changes to the OCCS resulting form the pilot are listed here.

1. Questions were revised to eliminate double negatives, and open-ended demographic questions were revised to fixed-response questions.
2. The plan to contact possible participants twice in hopes of getting them to participate was expanded to five contacts.

3. In Flashlight, the survey questions were restructured from two blocks of 20 questions to four blocks of 10 questions so that the Likert choice headers are always visible within a small computer window.
4. In order to spread out the choices and to eliminate the neutral option, the *Online Community and Connectedness Survey* was initially set up as an 8-point scale. But, since Dr. Rovai's scale was on a 5-point scale, feedback was received that the two scales should be the same both for comparison purposes and to avoid confusion. For these reasons, the 8-point scale was changed to a 5-point scale. Ideally, it would be best to have both scales be even-point scales to eliminate a middle choice, but such a change would negate the reliability and validity of the Rovai instrument.

The OCCS was structured to solicit opinions about online classes in relation to personal connections, group dynamics, discussions, and the use of photos in online classes. The first 11 questions included one question (#3) that internally compared the two types of classes and five sets of paired questions, with each pair including a question about face-to-face classes and the same question about online classes (see Appendix C for full survey). The ten paired questions compared subjects' opinions about face-to-face classes (1, 4, 6, 8, and 10) to their opinions about online classes (2, 5, 7, 9, and 11). Different researchers, including Hughes and Hagie (2005), have conducted similar comparisons, and report that students feel they have more social connections in face-to-face classes, and Herod (1999) found that students prefer to have personal connections in online classes at a similar level as in face-to-face classes.

Cronbach's coefficient alpha was computed in SPSS (SPSS Inc., 2005) to correlate the sum of answers for each individual question with the total sum of all answers in an effort to determine reliability for the OCCS. For the CCS, Rovai (2002b) reported excellent coefficient alphas of .93 for the full scale and .92 for the connectedness subscale. This researcher also found a coefficient alpha of .93 for the full scale, but .91 for the connectedness subscale, which is also a good reliability score. The coefficient alpha for the OCCS was .78, which Creswell (2005) notes also indicates good reliability. The importance of these results to this study is that both tools can be used with confidence.

Survey Administration

An online self-administered survey was used for this research study using the Flashlight online survey tool (Washington State University, 1992). Data was collected anonymously since participants could access the survey from their own computers and the survey did not collect and report participant identification in any way. Flashlight is set up so that once a researcher deletes the data he or she collects, the information is gone forever. Even though Flashlight backs up data regularly, deleted information is not saved. Also, the Flashlight server is protected by a secure firewall to prevent unwanted tampering.

Study Procedures

Reflecting what Dillman (2000) refers to as "societal trends toward self-administration" (p. 7), a common current procedure for conducting an online survey is to invite possible subjects to participate in an online survey by sending them a link through

an e-mail. Recipients of such an e-mail have a choice whether or not to follow the link and check out the survey. Then, they further have a choice to complete the survey and submit it. This self-administrative mode was chosen for this study. Subjects were sent an e-mail link, had to go to the link, complete the survey, and press a button to submit the survey over the Internet. Subjects had no interface with the researcher and all subjects remained completely anonymous.

Dillman (2000) points out that surveys that are sponsored by a government body, such as an educational institution, receive higher responses. This study benefited by being offered within the confines of specific online graduate courses and being supported by the instructors of those courses. However, students were fully informed that participation was not only not mandatory, but also completely anonymous. (See IRB sample letter in Appendix A.)

The following step-by-step plan was created by the researcher to assure that each class involved in the study received the same treatment. Steps 4–13 were methodically followed for each class.

Step 1: Contact Dr. Fred Rovai and secure permission to use his survey questions in an online survey in conjunction with this researcher's survey questions.

Step 2: Secure IRB approval.

Step 3: Find faculty members who agree to participate.

Step 4: Create Class Photo Albums as menu items in all the treatment classes.

Step 5: Turn on tracking in all the treatment classes to create records of the number of times the Class Photo Albums are visited.

Step 6: In the treatment classes, ask instructors to invite students to send pictures for the Class Photo Albums. Post the photos that are sent.

Step 7: Enter both the *Online Community and Connectedness Survey* and Dr. Rovai's *Classroom Community Scale* into Flashlight's online survey program.

Step 8: Near the midway point in each semester, send e-mail prenotices to all students in the 18 classes.

Step9: After three days, send e-mail cover letters to all students in the participating classes explaining participants' rights and indicating that they can agree to participate by actually submitting their completed surveys.

Step 10: About a week later, send a second e-mail to all the students thanking those who responded, explaining that the identities of those who have responded are not known, and asking those who haven't responded to please do so.

Step 11: After about another week, repeat Step 7.

Step 12: After about the third week, repeat Step 7 again. (Each e-mail for Steps 7-10 has different content as shown in the Appendix B. Due to the anonymous situation, all initially selected students receive all e-mails.)

Step 13: Secure number of visits to the Class Photo Albums from the Blackboard statistics feature to clarify treatment fidelity.

Step 14: Download participant responses from Flashlight to Excel.

Step 15: Adjust the data for negative questions according to the coding plan (see next section).

Step 16: Use SPSS (SPSS Inc., 2005) software to compute different analyses.

Coding

When using the Flashlight online survey tool (Washington State University, 1992), a 5-point Likert scale, such as the one used in this study, is set up so that it ranges from "Strongly Agree" on the left to "Strongly Disagree" on the right. When the results are downloaded, a one is assigned to "Strongly Agree" and a five is assigned to "Strongly Disagree." Coding was used to reverse these point-values so that the higher point value was attributed to "Strongly Agree" as prescribed in Dr. Rovai's instructions for scoring the CCS (Rovai, 2002b). In addition, as prescribed in Dr. Rovai's instructions, coding was used to convert the Likert scale range from 1–5 to 0–4.

In preparing the data for SPSS (SPSS Inc., 2005), all responses were recorded as a number from 0 to 4 as shown below. Also, since some of the questions were worded in a negative format, they were awarded scores in reverse of the positively-worded questions so as to make the responses comparable and to comply with Dr. Rovai's instructions for the CCS (see survey in its entirety in Appendix C).

A. Main Survey Questions

The *Online Community and Connectedness Survey* was coded as follows:
For positive items 1–16 and 18–20:

Weights: Strongly Agree = 4, Agree = 3, Neutral = 3, Disagree = 1, Strongly Disagree = 0

For negative item 17:
Weights: Strongly Agree = 0, Agree = 1, Neutral = 2, Disagree = 3, Strongly Disagree = 4

The *Classroom Community Scale* answers were coded as follows:
For positive items: 21, 22, 23, 26, 27, 31, 33, 35, 36, 39
Weights: Strongly Agree = 4, Agree = 3, Neutral = 2, Disagree = 1, Strongly Disagree = 0

For negative items: 24, 25, 28, 29, 30, 32, 34, 37, 38, 40
Weights: Strongly Agree = 0, Agree = 1, Neutral = 2, Disagree = 3, Strongly Disagree = 4

B. Demographic Questions

Question 41 was coded as a positive item above. The remaining demographic questions were coded by assigning numbers beginning with one for the first response and continuing through two, three, four, or five as needed.

Question 47 was then subcoded as follows: Responses 1, 2, and 4 were all on-campus presence and coded as one. Response 3 indicated an online-only presence and was coded as two.

Questions 49–52 collected information regarding the class students were in so they could be assigned to either the control or treatment group.

Data Analysis Plan

An online self-administered survey was used for this research study using the Flashlight online survey tool (Washington State University, 1992). The survey consisted of two parts which are actually two separate surveys: the *Classroom Community Scale* (CCS) by Dr. Fred Rovai (2002b) and the *Online Community and Connectedness Survey* (OCCS) created by this researcher for this study.

The data was downloaded from Flashlight to Excel. This resulted in a table with one row per participant with all of a given participant's responses presented in one row. To address negative questions, answers in Dr. Rovai's scale were recoded according to his directions (as described in the *Coding* above). Similarly, Question #17 in the *Online Community and Connectedness Survey* was recoded by reversing the values. These changes were necessary in order to match the coding system that Dr. Rovai developed.

SPSS (SPSS Inc., 2005) was used for the statistical analysis of the data. An alpha of .05 was used in all comparisons. To test the hypotheses in Question 1 (Students in classes where classmate photos are viewed repeatedly will score higher on the Rovai *Classroom Community Scale* than will students who are not in classes where photos are viewed repeatedly.) and Question 2 (Online-only students in classes where they repeatedly view classmate photos will experience more of an increase in levels of community and connectedness than will on-campus-presence students who repeatedly view classmate photos) a two-way ANOVA was calculated to look for significant main effects and interactions and follow-up one-way ANOVAs were calculated to explore the interaction that was found.

Since the OCCS was used to gather opinions rather than to measure community and connectedness as was done with the CCS, the results from the OCCS were viewed as categorical data. This choice also allowed for studying the frequencies and percentages of the responses. As Gravetter and Wallnau (2004) explain, categorical data are analyzed with nonparametric tests, such as the chi-square test. According to Ray (2006-2007), the chi-square test is useful in determining whether two groups of subjects have significantly different opinions. With Hypothesis #3 (When completing the *Online Community and Connectedness Survey* (OCCS) (Glisan, 2006) that was created by this researcher for this study to gather opinions about (a) personal connections in online courses vs. face-to-face courses, (b) group dynamics in online courses, (c) experiences with online discussions, and (d) interest in having classmate photos in online classes, the opinions of the subjects in the treatment group will be significantly more positive and/or less negative than those of the subjects in the control group.) the researcher was interested in determining whether the control and treatment groups had different opinions, so chi-square tests were used to analyze Hypothesis #3. In addition, response frequency and percentages were calculated.

For the study, an alpha of .05 was used. This choice was made because this researcher thought that it was more critical to avoid a Type II error than a Type I error since the purpose of this study was to encourage further related study. There was no risk of financial loss or other serious problems if there actually was not a significant difference in the effect of the use of photos in online courses and the results said there was one. But, if the results erroneously said there was no significant difference and there

was one, the results could negatively impact the existence of future research on the topic, and this researcher wanted to guard against that possible result.

Chapter 4

Results of Study

The study consisted of nine graduate classes serving as treatment classes and nine graduate classes serving as control classes. This researcher investigated the difference that repeated viewing of classmate photos makes in online community and connectedness as well as whether or not there was an interaction between level of community and connectedness of students who have an on-campus presence and those who live so far from campus that they have an online-only presence.

The results are shown in this chapter, beginning with sample characteristics that show the responses by control and treatment groups broken down into participating classes, as well as by age, gender, location, and level of online experience. This data is followed by a presentation of the results that pertain to Questions #1 and #2 and the results that pertain to Question #3.

Sample Characteristics

Since this study was conducted using a convenience sample, the community and connectedness data was explored in relation to the demographic data to look for potential bias and to present a description of the sample. The section includes: (a) an overview of the classes involved in the study, (b) a break down of the treatment and control groups, (c) numbers of on-campus-presence and online-only participants, (d) frequency of subjects broken into gender and age, and (e) one-way ANOVA results for community and connectedness levels by age, gender, and level of online experience. The information in

this section helps to clarify the study and offers a means for readers to compare their situations to the situation on which these results are based.

Overview of Courses and Student Location

Table 4.1 lists the courses, treatment (with photos) or control (without photos) designation, total number of students per class, and total number of participants in the study. Table 4.2 displays the study participants by on-campus presence and online-only presence. No specific distance from the university was set to determine which respondents lived too far away to have an on-campus presence. Rather, since determining how far is too far to travel is a subjective choice, students were allowed to decide for themselves if they lived too far away by choosing one of these responses:

__ I take both online and face-to-face classes at this university.

__ I take only online classes at this university, because online classes fit my schedule better. However, I live in the area and can easily go to campus to talk with the professor or meet with a classmate if needed.

__ I take only online classes at this university. I live too far away to take face-to-face classes.

__ I take only online classes at this university. I am concurrently taking face-to-face classes at another university.

Students who chose “I take only online classes at this university. I live too far away to take face-to-face classes.” were categorized as having an *online-only presence*. The remaining students were given the designation *on-campus presence*.

Table 4.1

Overview of Courses in Study

Instructor	Treatment Course #	# Students	# Participants	# Students Posted Photos	Control Course #	# Students	# Participants
A*	1	26	17	10	10	20	12
B	2	23	16	9	11	11	4
C	3	16	10	11	12	10	4
D	4	15	15	9	13	26	10
E	5	14	11	8	14	24	11
F	6	16	9	7	15	30	7
G	7	13	13	12	16	4	1
H	8	36	23	9	17	20	9
J	9	16	15	9	18	26	12
Totals		175	129	84		171	70

*Example: Instructor A taught courses 1 and 10.
(List of Courses by number, presence or absence of photos, number of students, and number of participants. The letters correspond to the nine instructors.)

Table 4.2

Frequencies and Percentages by On-campus Presence and Online-only Presence

Demographic Characteristics	Frequency	Percent
On-campus Presence	136	68
Online-only Presence	63	32

Subject Response Rates

Invitation-to-participate e-mails were sent to a total of 346 graduate students within the 18 participating classes. Of those students, 203 completed the survey for a 58% participation rate. A total of 171 students were invited to post photos in their classes, and 84 of them posted photos, resulting in a 49% photo participation rate. Within individual classes, the photo participation rate ranged from a low of 39% in class #2 to a high of 92% in class #7. Tables 4.3 and 4.4 show the gender and age breakdown of the participants. A much higher percentage of female students (72%) participated than did male students (28%). Due to the anonymous nature of the survey and the researcher's distance from the participating classes, it is not known if these lopsided percentages were also present in the classes or if a higher percentage of female students simply chose to participate. However, class lists show that about twice as many of the gender-specific student names in the different classes were female than were male. The age breakdown showing a higher incidence of middle-aged students was fairly typical for graduate courses.

Table 4.3

Frequencies and Percentages by Gender

	Overall Freq	Percent	Control	Treatment	On-Campus	Online-Only
Male	55	28	24 (34%)	31 (24%)	37 (27%)	18 (29%)
Female	144	72	46 (66%)	98 (76%)	99 (73%)	45 (71%)

Table 4.4

Frequencies and Percentages by Age

	Overall Freq	Percent	Control	Treatment	On-Campus	Online-Only	Male	Female
Under 25	26	13	10	16	25	1	4	22
25-30	38	19	10	28	27	11	10	28
31-40	58	29	22	36	46	12	18	40
41-50	52	26	21	31	27	25	20	32
Over 50	25	13	7	18	11	14	3	22

ANOVAs for Age, Gender, and Online Experience

Four one-way ANOVAs were completed to use the demographic questions for further exploration of the levels of community and connectedness experienced by the control vs. treatment classes. The results of three ANOVAs comparing control vs. treatment classes to demographics are presented in Table 4.5 and show that age had a significant effect. On the 0–4 score used in the survey, the mean scores for age ranged from a low for the under 25 group (M = 1.69, SD = .679) to a high for the over 50 group (M = 2.84, SD = 1.179). However, the age ANOVA did not pass the Homogeneity of Variance test, so the ANOVAs were not reliable. Both gender and online experience passed the homogeneity test, but did not show a significant effect. Six more ANOVAs were conducted to compare the community and connectedness scores to the different demographics (age, gender, online experience, 18 different classes, photo choice, and class scenarios), but none of these ANOVAs showed significant results. The results did

Table 4.5

Summary of One-Way ANOVAs for Survey Demographic Questions by Control or Treatment Classes

ANOVAs Summary				
Comparison Demographic	df	F	*p*	Meets Homogeneity of Variance?
Age	4	6.500*	<.001	No (.002)
Gender	1	.291	.590	Yes (.981)
Online Experience -Started online this semester -Started online last semester -Started online between 2 sem. and 3 years ago -Started online more than 3 years ago	3	.380	.768	Yes (.169)

*Significant at .05 level

not support the findings of Rovai (2001) that females score significantly higher on the CCS than do males nor the findings of Wegerif (1998) that females report higher levels of community and connectedness than do males.

Analysis of Research Questions #1 and #2

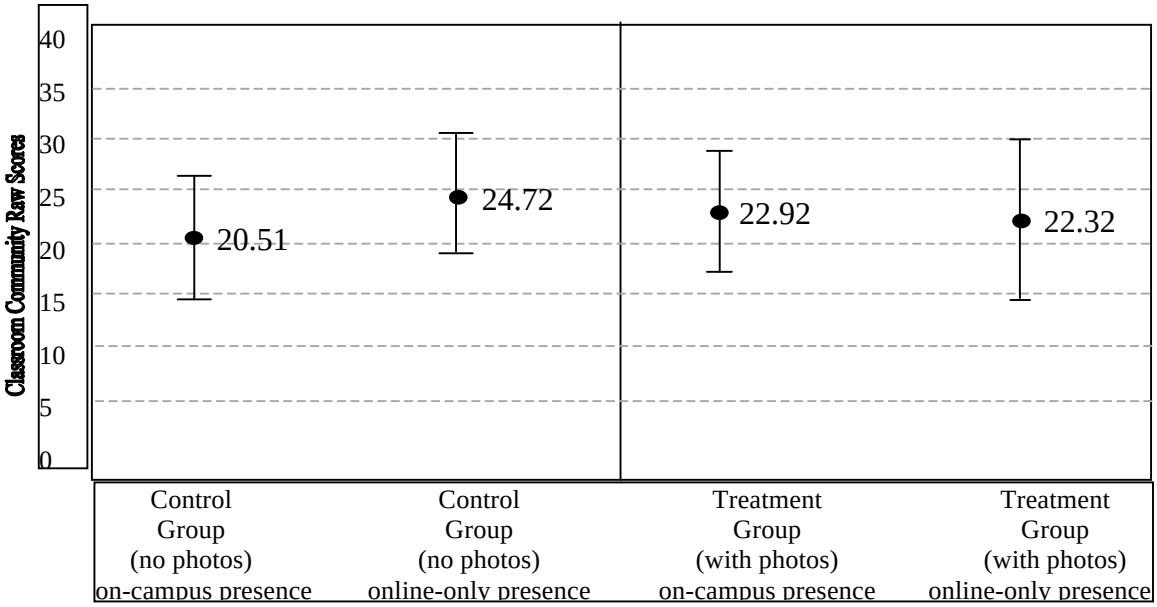
To examine the first two research questions (shown in Chart 4.1), a 2 x 2 Factorial ANOVA was determined using SPSS (SPSS Inc., 2005). Tables 4.7 and 4.8 and Graphs 4.1 and 4.2 show these results.

Table 4.6

Research Questions #1 and #2 and Associated Hypotheses

Research Questions	Hypotheses
Research Question 1: Does repeated viewing of classmate photos make a difference in the measured sense of community in online graduate courses as measured with the Classroom Community Scale (Rovai, 2002)?	Hypothesis #1: Students in classes where classmate photos are viewed repeatedly will score higher on the Rovai *Classroom Community Scale* than will students who are not in classes where photos are viewed repeatedly.
Research Question #2: Does the impact of photos on the sense of community and connectedness differ in on-campus-presence graduate students and online-only graduate students?	Hypothesis #2: Online-only students in classes where they repeatedly view classmate photos will experience higher levels of community and connectedness than will on-campus-presence students who repeatedly view classmate photos.

The community and connectedness score means varied, but did not present a consistent pattern (see Graph 4.1). Possible total raw scores on the community and connectedness part of the *Classroom Community Scale* (the odd numbered questions) range from 0 to 40, with higher scores showing more community and connectedness. For the on-campus-presence subjects, the control group had a lower mean score (M = 20.51, SD = 5.554) and the treatment group had a higher mean score (M = 22.92, SD = 7.023). The results of the online-only subjects were just the opposite, with the control group having a higher mean score (M = 24.72, SD = 5.792) and the treatment group having a lower mean score (M = 22.32, SD = 7.690). So, compared to the control group, the on-campus-presence treatment subjects experienced more community and connectedness and the online-only treatment subjects experienced less community and connectedness. To determine whether or not the differences in the means were significant, an ANOVA was completed.



Graph 4.1. Control vs. treatment means by control and treatment groups.

As Gravetter and Wallnau (2004) indicate, a minimum of 30 subjects is necessary for a distribution of sample means to approach a normal distribution and an ANOVA requires a normal distribution. A large number of possible subjects was chosen for this study to assure that there would be at least 30 subjects in each group. Gravetter and Wallnau (2004) also indicate that another condition necessary for conducting an ANOVA is that the variance must be equal for all groups being compared, which requires a test for homogeneity of variance. The Levene Test for Homogeneity of Variance was computed in SPSS ($p = .164$). According to the SPSS software help information, (SPSS Inc, 2005), a significance level greater than .05 indicates equal variance across groups. Both the number of subjects and the homogeneity of variance indicated that the assumptions for the use of an ANOVA were met.

Using the odd-numbered questions on Rovai's scale to compute the dependent variable values, an ANOVA was computed. Tables 4.7 and 4.8 show that the ANOVA revealed no significant main effects for the independent variables, photos vs. no photos and for on-campus vs. online-only presence, but a significant presence x photos interaction: F (1, 195) = 5.171, p=.024. Graph 4.2 shows this interaction. In this graph, the dots represent the means and the bars represent ± one standard deviations. Gravetter and Wallnau (2004) cite criteria develop by Cohen when they suggest evaluating effect sizes as follows: $0.01<r^2<0.09$ = small effect; $0.09<r^2<0.25$ = medium effect; $r^2>0.25$ = large effect. The effect size in this situation was .026, which shows a small effect.

Table 4.7

2 x 2 Factorial Chart (Presence and Photos)

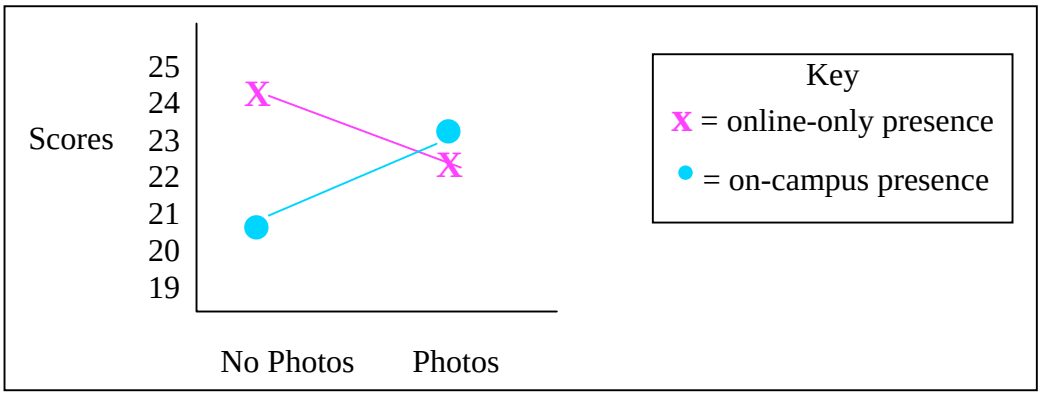
	Control (No Photos)	Treatment (Photos)	Marginal Means
On-campus presence	20.51 n=45	22.92 n=91	21.717 n = 136
Online-Only	24.72 n=25	22.32 n=38	23.518 n = 63
Marginal Means	22.616 n=70	22.619 n=129	

Table 4.8

Two-Way Analysis of Variance for Presence and Photos

Source	df	F	*p*	r^2
Between Subjects				
Presence	1	2.892	.091	.015
Photos	1	.000	.997	.000
Presence x Photos	1	5.171*	.024	.026
Within (error)	195			

* significant at .05 level



Graph 4.2. Presence x photos interaction.

Since the presence x photos interaction was significant, two one-way ANOVAs were computed in SPSS to look at the simple main effects for photos and no photos for on-campus presence and for photos and no photos for online-only. The results showed a significant difference between photos and no-photos for on-campus-presence subjects, $F(1, 134) = 4.050$, $p = .046$. The analyses indicated that the difference between photos

and no-photos for online-only subjects was not significant, $F(1, 61) = 1.776$, p. = .188. These results are not consistent with the first two hypotheses, since they neither show that viewing classmate photos in online classes consistently makes a difference in levels of community and connectedness of the online students nor that online-only students who repeatedly view online classmate photos have a significantly higher level of community and connectedness than do on-campus-presence students who repeatedly view online classmate photos. So, even though there is a significant interaction, it is not enough to support the first hypothesis. Although the significant finding shows the on-campus-presence students who viewed photos had a higher community and connectedness score, which might appear to support the first hypothesis, this result was not relevant since the online students did not show a similar result. In fact, the online-only students in the control (no photo) classes had higher levels of community and connectedness than the online-only students in the treatment (photo) classes, and this result is exactly the opposite as projected with the second hypothesis. So, Hypotheses 1 and 2 were rejected.

Even though the overall results did not support previous research that women score higher community and connectedness scores (Rovai, 2001; Wegerif, 1998), separate analyses of male and female subjects revealed that the female on-campus-only subjects in the treatment classes (with photos) showed significantly higher levels of community and connectedness than did female on-campus-only subjects in the control classes (no photos), $F(1,97) = 4.853$, p. =.030. The male subjects did not show any significant results. These findings show that the female subjects account for the significant results reported above.

Analysis of Research Question #3

To analyze Question #3 as shown in Table 4.9, frequencies, percentages, and chi-square tests were calculated for the 20 OCCS questions (see Table 4.12). Three questions showed significant differences (at the .05 level) between the responses of the control and treatment groups. Since 20 tests were performed for this hypothesis, it is possible that one of the three significant results was due to chance. So, a Bonferroni adjustment was calculated by dividing the alpha level of .05 by 20 to get an adjusted alpha level of .0025. The double asterisk at the bottom of the table reflects this adjusted level. With the adjusted alpha level, only Question 3 and Question 13 were significant. Question #3—In the control group (no photos), 37% of the subjects strongly agreed or agreed and 59% of the subjects disagreed or strongly disagreed that it was equally easy to make friends in online and face-to-face classes. In contrast, 35% of the treatment group (photos) strongly

Table 4.9

Research Question #3 and Hypothesis #3

Research Question #3	Hypothesis #3
How do online graduate students feel about (a) personal connections in online courses vs. face-to-face courses, (b) group dynamics in online courses, (c) experiences with online discussions, and (d) classmate photos in online classes?	When completing the *Online Community and Connectedness Survey* (OCCS) (Glisan, 2006) that was created by this researcher for this study to gather opinions about (a) personal connections in online courses vs. face-to-face courses, (b) group dynamics in online courses, (c) experiences with online discussions, and (d) interest in having classmate photos in online classes, the opinions of the subjects in the treatment group will be significantly more positive and/or less negative than those of the subjects in the control group.

agreed or disagreed and only 41% disagreed or strongly disagreed. The difference in the number disagreeing or strongly disagreeing suggests that the students viewing classmate

photos were less negative about making friends in online classes than were the students without photos. The chi-square test result: $x^2(4, N = 199) = 18.389$, $p = .001$. Question #13—When asked if online class discussions are as meaningful as face-to-face discussions, 54% of the control group strongly agreed or agreed and 43 disagreed or strongly disagreed. In the treatment group, about the same percent strongly agreed or agreed (57%), but again, many fewer disagreed or strongly disagreed (29%) showing that the students viewing classmate photos were less negative about online discussions than were the students without the photos. The chi-square test result: $x^2(4, N = 199) = 11.414$, $p = .022$. Question #20—In response to the statement that "Seeing faces (photos) of online classmates would help me think of them as individuals," the results were not significant at the .025 level, but showed similar positive responses (72% and 71%) but differing negative responses (Control: 19%, Treatment: 9%), suggesting that the treatment group (with photos) was less likely to disagree with the statement. However, this result was not significant at the .025 level. The chi-square test result: $x^2(4, N = 199) = 10,139$, $p = .038$.

The responses to the photo-related survey questions, Questions 18, 19, and 20, were further reported in Table 4.10. Since 63% of the students said they were happy to post online pictures, 69% said they would like to see pictures when they talk to their online classmates, and 71% said that seeing photos of online classmates would help them think of their classmates as individuals, this researcher concluded that the majority of the online students in this study were interested in using photos in online classes.

Students appeared to be somewhat ambiguous about their feelings regarding posting photos. Table 4.11 shows that students' opinions about posting photos do not always match their actions.

Table 4.10

Opinions About Community & Connectedness and Photos in Online Classes

	Percents		
Interest in having photos in online classes	Strongly agrees or agrees with the idea of posting a self-photo in online classes (Question 18)	Strongly agrees or agrees that would like to see classmate photos in online classes (Question 19)	Strongly agrees or agrees that photos help see classmates as individuals (Question 20)
	63%	69%	71%

Table 4.11

Ambiguous Nature of Photo Choices

Experimental class subjects who strongly agreed or agreed that they would be happy to post photos, but did not post them	Total subjects (control and treatment) who strongly agreed or agreed that it would be nice to see classmate photos, but were neutral or disagreed with posting photos of themselves	Experimental class subjects who strongly agreed or agreed that it would be nice to see classmate photos, but did not post photos of themselves	Experimental class subjects who were neutral or disagreed with the idea of posting photos, but still posted photos of themselves
12%	15%	19%	13%

None of the five questions in the face-to-face-opinion group (1, 4, 6, 8, and 10) had significant differences between the control and treatment groups. However, as reported in the Table 4.12, the combined frequencies and percentages yield some interesting numbers. These results are further discussed in Chapter 5.

Table 4.12

Descriptive Statistics for the OCCS Survey Questions

Item	M C/T	SD C/T	Chi Sq	Strongly Agree C/T		Agree C/T		Neutral C/T		Disagree C/T		Strongly Disagree C/T	
				Frq	%	Frq	%	Frq	%	Frq	%	Frq	%
PERSONAL CONNECTIONS													
1. I feel like my face-to-face classmates are people I know.	2.84	.845	.331	12	17	42	60	10	14	5	7	1	1
	2.74	.732		13	10	78	61	31	24	6	5	1	1
2. I feel like my online classmates are people I know.	1.77	.981	.672	0	0	21	30	18	26	25	36	6	9
	1.96	1.003		2	2	47	36	33	26	38	30	9	7
3. I find it equally easy to make friends in face-to-face and online classes.	1.70	1.068	.001*	0	0	26	37	3	4	35	50	6	9
	1.91	1.061		6	5	39	30	32	25	42	33	10	8
4. In face-to-face classes, I often have personal discussions with fellow students	3.09	.676	.38	16	23	47	67	4	6	4	4	0	0
	2.93	.877		30	23	73	57	15	12	9	7	2	2
5. In online classes, I often have personal discussions with fellow students.	1.81	1.120	.163	1	1	28	40	5	7	29	41	7	10
	1.55	1.097		3	2	32	25	18	14	56	43	20	16
6. I remember people from my different face-to-face classes.	3.23	.663	.134	21	30	47	67	0	0	1	1	1	1
	3.20	.591		37	29	82	64	9	7	1	1	0	0
7. I remember people from my different online classes.	2.16	1.030	.209	2	3	32	46	16	23	15	21	5	7
	2.24	1.044		8	6	61	47	18	14	38	30	4	3

Table 4.12 continues

Item	M C/T	SD C/T	Chi Sq	Strongly Agree C/T		Agree C/T		Neutral C/T		Disagree C/T		Strongly Disagree C/T	
				Frq	%	Frq	%	Frq	%	Frq	%	Frq	%
12. Making friends in classes is important to me.	2.43	1.001	.718	7	10	33	47	15	21	13	19	2	3
	2.38	.937		11	9	54	42	40	31	21	16	3	2
16. I know my online instructors as well as I know my face-to-face instructors.	1.61	1.231	.313	8	11	9	13	12	17	30	43	11	16
	1.78	1.194		10	8	33	26	21	16	48	37	17	13
GROUP DYNAMICS													
8. I like to do group projects in face-to-face classes.	2.19	1.158	.550	6	9	31	44	8	11	20	29	5	7
	2.25	1.046		14	11	52	40	25	19	28	22	10	8
9. I like to do group projects in online classes.	1.40	1.134	.956	1	1	15	21	13	19	23	33	18	26
	1.43	1.109		3	2	25	20	25	20	47	36	29	23
10. I think most of my face-to-face classes are friendly, connected groups.	2.66	.866	.467	8	11	39	56	15	21	7	10	1	1
	2.81	.716		15	12	83	64	23	18	8	6	0	0
11. I think most of my online classes are friendly, connected groups.	2.33	.896	.343	4	6	31	44	19	27	16	23	0	0
	2.29	1.026		9	7	58	45	31	24	24	19	7	5
17. I feel isolated when I take online classes.	1.67	1.113	.894	4	6	13	19	19	27	24	34	10	14
	1.69	1.144		8	6	28	22	27	21	48	37	18	14

Table 4.12 continues

Item	M C/T	SD C/T	Chi Sq	Strongly Agree C/T		Agree C/T		Neutral C/T		Disagree C/T		Strongly Disagree C/T	
				Frq	%	Frq	%	Frq	%	Frq	%	Frq	%
DISCUSSION ISSUES													
13. Discussions in online classes are as meaningful as in face-to-face classes.	2.23	1.374	.022*	15	21	23	33	2	3	23	33	7	10
	2.35	1.170		18	14	55	43	19	15	28	22	9	7
14. In online classes, it is easy to remember what I have discussed with whom.	1.80	1.235	.264	4	6	24	34	7	10	24	34	11	16
	1.88	1.143		10	8	38	30	17	13	55	43	9	7
15. In online classes, I feel like I am discussing with real people, not just text.	2.73	.962	.633	11	16	42	60	5	7	11	16	1	1
	2.69	.991		17	13	81	63	11	9	14	11	6	5
PHOTO-RELATED OPINIONS													
18. I am happy to post a picture of myself in an online class.	2.56	.958	.423	7	10	39	56	12	17	10	43	2	3
	2.61	.955		19	15	61	47	33	26	12	9	4	3
19. I would like to see faces (photos) when I talk to online classmates.	2.71	.980	.062	12	17	39	56	7	10	11	16	1	1
	2.78	.886		26	20	60	47	32	25	10	8	1	1
20. Seeing faces (photos) of online classmates would help me think of them as individuals.	2.71	.980	.038	13	19	37	53	7	10	13	19	0	0
	2.82	.905		28	22	63	49	27	21	9	7	2	2

*Significant at the .0025 level (Top numbers : Control data; Bottom numbers: Treatment data)

The significant differences that were found between the opinions of the control and treatment groups all indicated less negative responses by the treatment group. This result combined with the percentage results for Questions 18, 19, and 20, caused this researcher to fail to reject Hypothesis #3. Overall, the treatment group did report less negative opinions about personal connections, discussions, and photos in online classes than did the control group.

Chapter 5

Discussion, Conclusions and Recommendations

Discussion

This research study focused on the following three research questions that were presented in Chapter 1:

1. Does repeated viewing of classmate photos make a difference in the measured sense of community in online graduate courses as measured with the *Classroom Community Scale* (Rovai, 2002b)?
2. Does the impact of photos on the sense of community and connectedness differ in on-campus-presence graduate students and online-only graduate students?
3. How do online graduate students feel about (a) personal connections in online courses vs. face-to-face courses, (b) group dynamics in online courses, (c) experiences with online discussions, and (d) classmate photos in online classes?

The research questions were addressed through the results of an online survey completed by treatment-class graduate students who were invited to post self-photos and view classmate photos and control-class graduate students who were not asked to post photos. Furthermore, results were divided into subjects who had an on-campus presence and those who had an online-only presence.

In regards to research Questions #1 and #2, the results showed significantly higher community and connectedness scores for on-campus-presence students who

viewed classmate photos in their classes, but suggested little or no effect due to the viewing of classmate photos by the online-only students. These results do not consistently support the results of the study by Mackie and Gutierrez (2004-2005) that having classmate photos in online classes made the classes more personal and resulted in students feeling more connected to the class and each other. One difference between the two studies, however, was that the study by Mackie and Gutierrez included thumbnail photos with every discussion thread, whereas this study presented photos in a class photo album that students accessed as a separate feature as opposed to as part of each discussion thread. It is possible that this difference is responsible for some of the difference in the results of the two studies.

Likewise, in regards to whether or not an on-campus presence made a difference in students' community and connectedness, the results did not show a clear difference between the reactions of on-campus-presence students and online-only students in regards to the effects of classmate photos on online community and connectedness.

The ANOVA results for research questions #1 and #2 did show an interaction, but it was not an interaction that consistently supported the hypotheses in this study. Rather, the results showed that on-campus-presence students in classes with photos had higher levels of community and connectedness than their control-class counterparts but that online-only students in control classes had a higher level of community and connectedness than online-only students in classes with photos. In fact, the online-only students who did not view photos had a higher level of community and connectedness than did online-only students in treatment (photo) classes and all the students in the

control classes. This finding runs counter to the idea that the use of classmate photos in online classes will increase the levels of community and connectedness in online classes. A follow-up one-way ANOVA showed that only the on-campus-presence student scores were significantly different.

Likewise, the student opinions that were gathered by survey questions 18, 19 and 20 did not support the idea that students feel more connected to other students in classes without photos nor that only students with an on-campus presence react positively to photos. In fact, their opinions indicated just the opposite, creating some ambiguous results. One possible factor affecting the results might be that, as Wegerif (1998) found, some students do not easily assimilate into an online community and thus might not feel a high level of community and connectedness, and the classes with the lower scores on the CCS might have a higher percentage of students who reacted in this way. One factor that supports this suggestion is that there were seven subjects who scored between 0 and 8 (out of 40) on the CCS, showing a total disenchantment with the classes, and six of these subjects were in the treatment (photo) classes, suggesting that, by coincidence, the percentage of students connecting in the photo classes could have been less than in the control classes. Also, the nature of the questions in the CCS survey is such that, if a student did not like a class, and was open about that issue in the survey, his or her community and connectedness score would be quite low.

Another result that goes counter to the idea that absence of photos is an actual indicator of higher levels of community and connectedness is that students in the control classes (non-photo) participated at a lesser rate (40%) than did the students in the

treatment (photo) classes (75%). This high participation rate in the photo class suggests that the presence of photos might have encouraged an interest in participation in the survey. Interaction with the photos might have instilled a sense of connectedness which would support Picciano's (2002) and Russo's (2000) findings that online community and connectedness causes students to enjoy online classes more and participate more in them.

One possible explanation for the increased community and connectedness for the on-campus-presence students who viewed photos might be that the higher count of younger students in the on-campus group resulted in a "Facebook factor." In other words, these students, more so than older students, might rely on photos to make personal connections, because they are accustomed to doing so when they use Facebook. If the study had included a higher number of younger students in the online-only category, perhaps the "Facebook factor" would have changed the results to support Hypothesis #1.

Another possible explanation for the on-campus-presence-with-photos result is that these students already knew each other, and thus naturally had a connection.

Interestingly, in the treatment (photo) classes, 29% of the possible participants chose not to post photos, but still chose to participate in the survey. This response rate could suggest an interest in the photo situation, but, for example, a lack of a photo to post, a reluctance to post a photo, or a lack of knowledge regarding posting photos. Although inability to post photos would not support Russo's (2000) point that today's technology allows for easy photo posting, any of these three reasons could logically inhibit a student from posting a photo and possibly even create a lack of comfort with the whole concept, and thus result in a lower community and connectedness score.

On the other hand, students in the treatment classes accessed the class photo albums an average of once or twice per week, with individual accessing ranging from zero times in six weeks up to 52 times in six weeks, with about 80% looking at the photo album a minimum of once every two weeks. This quantity of photo album viewing suggests an interest in classmate photos. Coupled with the results of a study by Mackie and Gutierrez (2004–2005) that showed that students felt that viewing classmate photos in online classes gave them a sense of feeling connected to other students in the class, this high level of photo-album viewing supports the findings of Herod (1999) that students in online classes report a desire to have personal connections with their fellow classmates.

Determining the effects that photos have on community and connectedness in online classes is not an easy task since it is not easy to isolate a benefit and attribute it to photos. Any given online class has an interactive combination of components that could possibly affect community and connectedness, such as communication with the instructor, friendliness of the class site, familiarity with other students, responsiveness of other students, smoothness of technology involved, pleasantness of group projects, responsibility levels of group members, and interest in discussion topics. In this study, the results could be skewed due to different professors, different course difficulty levels, different student mixes, and different levels of student comfort with online classes.

Concerning Question #3, the significant results might have been due to the effects of the photos. For example, students in the treatment (photo) classes might have been significantly more positive about the idea that seeing photos of online classmates would help them think of the classmates as individuals since the photos caused them to

have a higher sense of their online classmates as individuals. Likewise, the photos might have assisted the subjects in the treatment classes in experiencing more meaningful discussions and sensing a higher level of ease in making friends in online classes.

An indication that the paired question were meaningful is that, when looking at the composite responses (not divided into control and treatment groups) as seen in Table 5.1, some dramatic opinions become obvious. For example, 73% of the subjects responded that they felt like they knew their face-to-face classmates, but only 35% of the subjects felt they knew their online classmates. In regards to having personal discussion with classmates, 83% of the subjects had such discussions in face-to-face classes, but only 32% in online classes. Only 52% of subjects said they remembered people from their online classes, whereas 94% remembered people from their face-to-face classes. Similarly, liking to do group projects differs from 52% (face-to-face) to 22% (online) and viewing classes as friendly, connected groups differs from 73% (face-to-face) to 52% (online). Although comparisons related to Table 5.1 are outside the realm of this study, they are meaningful to this study from the standpoint that they show that students generally feel less connected in online classes. If it is possible that adding photos to the classes will help increase these feelings of connectedness, it is important for educators to be aware of this tool.

Question 18 directly asks subjects if they would be happy to post a self-photo in an online class and 63% said they would be happy to do so. Also, Question19 asks if subjects would like to see classmate photos in online classes, and 69% said they would like to see classmate photos. Table 4.11 shows that 12% of the subjects agreed that they

would be happy to post photos, and then did not do so and 13% of the subjects indicated they were neutral or disagreed with posting self-photos and still did so. Also, the results

Table 5.1

OCCS Frequencies and Percentages with Control and Treatment Results Combined

Item	Strongly Agree or Agree		Disagree or Strongly Disagree	
	Frq	%	Frq	%
1. I feel like my face-to-face classmates are people I know.	145	73	13	7
2. I feel like my online classmates are people I know.	70	35	78	40
3. I find it equally easy to make friends in face-to-face and online classes.	71	36	93	47
4. In face-to-face classes, I often have personal discussions with fellow students	166	83	14	7
5. In online classes, I often have personal discussions with fellow students.	64	32	112	57
6. I remember people from my different face-to-face classes.	187	94	3	2
7. I remember people from my different online classes.	103	52	62	32
8. I like to do group projects in face-to-face classes.	103	52	63	32
9. I like to do group projects in online classes.	44	22	117	59
10. I think most of my face-to-face classes are friendly, connected groups.	145	73	16	9

Table 5.1 continues

Item	Strongly Agree or Agree		Disagree or Strongly Disagree	
	Frq	%	Frq	%
11. I think most of my online classes are friendly, connected groups.	102	52	47	24
12. Making friends in classes is important to me.	105	53	39	20
13. Discussions in online classes are as meaningful as in face-to-face classes.	111	56	67	34
14. In online classes, it is easy to remember what I have discussed with whom.	76	38	99	50
15. In online classes, I feel like I am discussing with real people, not just text.	151	76	32	17
16. I know my online instructors as well as I know my face-to-face instructors.	60	30	106	53
17. I feel isolated when I take online classes.	53	27	100	50
18. I am happy to post a picture of myself in an online class.	126	63	28	14
19. I would like to see faces (photos) when I talk to online classmates.	137	69	23	12
20. Seeing faces (photos) of online classmates would help me think of them as individuals.	141	71	24	12

show that the students were more eager to see classmate photos than to post their own photos. These ambiguous responses suggest that some students are not prepared to post photos or are perhaps not quite sure about posting photos in online classes. It is possible that this uncertainty stems from the fact that, since technology is just now reaching the point where posting pictures is universally feasible, some students are simply not accustomed to the idea. Also, some students might have a concern about the safety

aspects of posting personal photos online. Ambiguity regarding posting photos likely affected the relationship between photos in online classes and students' sense of community and connectedness in online classes.

The responses to the paired face-to-face opinion questions (Questions 1, 4, 6, 8, & 10) and online opinion questions (Questions 2, 5, 7, 9, & 11) indicated that students felt they have much more community and connectedness in their face-to-face classes than in their online classes. The very fact that students perceive that community and connectedness is lower in online classes is problematic. Given the common tendency to meet expectations, believing that online classes have lower community and connectedness can be a self-fulfilling prophecy. Also, if, as Jung et al. (2002) indicate, community and connectedness is more important in online classes than in face-to-face classes, the problem of low levels of community and connectedness in online classes becomes an even bigger problem. One main way to increase students' expectations in online classes is to provide them with experiences that negate their standing beliefs. If students begin to sense higher levels of connectedness in online classes, slowly, over time, reality can overcome perceptions. Although the community and connectedness scores in this study did not support the findings of Mackie and Gutierrez (2004–2005) that viewing classmate photos in online classes creates higher levels of community and connectedness, the subjects' opinions did support Mackie and Gutierrez.

Rovai (2001) and Jung et al. (2002) found in their research that gender is a determiner of sense of community and connectedness since females exhibit more community and connectedness than males do. The study this paper is reporting on,

however, did not find a significant difference based on gender ($F(1, 197) = 1.43$, $p = .706$). Although the treatment group was 66% female compared to the control group which was 76% female, there does not appear to be a bias in this study based on gender since there is no significant differences between male and female responses.

Conclusions and Implications

Due to the limitations of this study, the results cannot be applied to all online students, but the results can be used to encourage further research in the area of the use of photos in online classes.

The results of this study did not support the idea that classmate viewing of photos increases online community and connectedness. The results also did not support the concept that the presence of photos will have a more positive effect on the measure of community and connectedness of online-only students than on on-campus-presence students. One consideration is that, in this situation, the online community and connectedness tool did not accurately measure the presence of online community and connectedness. This possibility is supported by the ambiguous relationship of the online community and connectedness scores derived from the CCS and the student opinions derived from the OCCS. Another possibility is simply that the 84 students who chose to post photos were comfortable with the concept and the 87 students who chose not to post photos were not comfortable with the idea and that completely different results might be generated from a different group of subjects. Also, the differences in the classes involved might have affected the results, or the on-campus designation might have been too broad, resulting in some students who really do not feel connected causing the on-campus

subjects and the online-only subjects to be more synonymous than intended. Maybe the results turned out as they did simply because some treatment-class students were so disconnected from their online classes to experience higher levels of community and connectedness and the photos actually increased their connection levels, but the increase is not apparent since no pre-photo levels of community and connectedness were measured for these students. And, finally, perhaps the treatment classes included high percentages of introverted people and, as Thomas (2002) found, introverted people prefer depersonalization in online classes. This possibility, however, would run counter to Lobel et al. (2002) findings that students felt they maintained anonymity even when their photos were posted in online classes.

The scores from the CCS did not match the student opinions since the subset of students who scored significantly higher than others was the on-campus-presence students in the control (no photo) classes, and the opinions of all the students suggested they thought photos would help to increase community and connectedness. In agreement with the findings of Brook and Oliver (2002) and Herod (1999), the results of this study show that students view their community and connectedness to be lower in online classes than in face-to-face classes. As long as students perceive themselves as having lower community and connectedness in online classes, more effort needs to be put into increasing online community and connectedness. Research clearly shows that community and connectedness is an important part of education (Jung et al., 2002; Rourke et al., 1999; Russo, 2000; Short et al., 1976). If online classes continually have less community and connectedness than face-to-face classes, or even if students just think there is less

community and connectedness, the online classes are in need of improvement. And, if as this study showed, the majority of students think classmate photos will help increase online community and connectedness, then photos should become a part of most online classes. This idea is supported by Tu and McIsaac's (2002) idea that when students think they have social presence, they then have social presence. Finally, given Tu's (2000) finding that online community and connectedness is one of the most significant components in online class success, it becomes very clear that students' opinions on the issue are very powerful.

Recommendations for Future Research

Since this study was conducted within online graduate classes on Blackboard, at one central U.S. university, and within the classes of a total of nine instructors, the results cannot be extrapolated past the subjects in this study. However, the ambiguous results in this study suggest that wider, more representational studies regarding the use of classmate photos in online classes are warranted. Given that online education is a global concern, this researcher suggests studies be conducted spanning the whole U.S. as well as in other countries. This researcher also recommends including classes using a variety of online course programs rather than just Blackboard.

Research should explore the effects of the use of photos in course management systems that are set up to have thumbnail photos attached to each discussion thread compared to course management systems, such as Blackboard, that do not have a classmate photo setup that allows easy ongoing viewing of classmate photos. Having the photos attached to each discussion thread would more closely simulate face-to-face

discussions where classmates see a person's face each time he or she speaks, and therefore become familiar enough with the person to recognize him or her in subsequent discussions and/or classes. This scenario would provide a more natural situation than the Class Photo Albums used in this study.

Another research area of interest to explore would be the different reactions to photos by students who are casually taking an online class or two vs. students who are enrolled in a degree program and thus will expect to take a series of classes at the same university and might have a higher interest in forming relationships with classmates.

Several different researchers (Hill et al., 2002; Mayo, 2005; Rovai, 2002c; Ryan & Deci, 2000; Stelzer & Vogelzangs, 1995) have indicated a possible connection between online community and connectedness and dropout rates in online classes. This researcher sees value in research that explores the connections between dropout rates and classes with and without classmate photos. If viewing classmate photos does indeed increase students' sense of each other, and as Thomas (2002) and Kanuka and Anderson (1998) note, these personal connections result in more students investing in their online classes, then educators need to know this information.

This study included only graduate students. However, further research with both undergraduate and graduate students would be a logical extension.

A study on photos in online classes that includes a qualitative component would be interesting in order to find out why students do or do not choose to post photos and for what purposes students viewed classmate photos. Adding a a space after each question in

the OCCS where participants are encouraged to add comments to clarify their responses would be one way to incorporate a qualitative component.

This study categorized each separate class as either a treatment class or a control class. Another possibility that might generate interesting results with less uncontrolled variance would be to have the first half of each class run without photos and to measure the community and connectedness in each class at the half-way point. Then, after the half-way point, ask students to submit photos and then measure the community and connectedness at the end of the semester. An advantage of this format would be to gather information from the same students for both control and treatment situations. A disadvantage would be that there would not be time to offer participants repeated opportunities to participate in the survey. In other words, the survey at the midpoint would have to be conducted within one week and anyone who didn't respond immediately would have no second chance since the photos would have to be introduced to start the second half of the class. This disadvantage would likely seriously lessen the number of participants.

Since some students might be apprehensive about posting a self-photo, another study that would be of interest to this researcher is the community and connectedness benefit of posting interest icons. An interest icon would be an alternative to posting a photo and could be anything that represents a personal interest for the given individual and would create a visual representation. For example, a person who has a passion for downhill skiing could post a silhouetted graphic of a downhill skier and fellow classmates might think of this person as "the skier." It would be interesting to compare

classes with photos only, interest icons only, and combinations of photos and interest icons.

The most important recommendation that this researcher has regarding future research and photos in online classes is simply that, unlike in the past, a great deal of photo-related research takes place. Other researchers, such as Gunawardena and Zittle (1999) and Tu and McIsaac (2002) have also concluded that more community and connectedness research is needed, and classmate photos are one possibility for increasing community and connectedness. Hara and Kling (2000) concluded that more online-related research needs to address problem areas rather than positive aspects of online classes, which also suggests that more community and connectedness research is needed. Online education is finally technologically ready and is past the point where anyone seriously questions the importance of building community and connectedness. In the quest to improve online community and connectedness, it would be wrong in today's world not to explore all tools, and classmate photos is one possible tool.

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Appendix A

IRB Form

University of Nebraska Lincoln	University of Nebraska-Lincoln Institutional Review Board (IRB) 312 N. 14th St., 209 Alex West Lincoln, NE 68588-0408 (402) 472-6965 Fax (402) 472-6048 irb@unl.edu	**FOR OFFICE USE ONLY** **IRB#** **Date Approved:** **Date Received:** **Code #:**

IRB NEW PROTOCOL SUBMISSION

Project Title:	Online Community and Connectedness

Investigator Information:

Principal Investigator:	Ellen McPeek Glisan	Secondary Investigator or Project Supervisor*:	Dr. Al Steckelberg
Department:	TLTE	Department:	TLTE
Department Phone:	402-472-2231	Department Phone:	402-472-2231
Contact Phone:	210-496-6110	Contact Phone:	402-472-5491
Contact Address:	13014 Mahogany Run	Contact Address:	59 Henzlik Hall, UNL
City/State/Zip:	San Antonio, TX 78232	City/State/Zip:	Lincoln, Nebraska 68588-0385
E-Mail Address:	eglisan@maniesmarketplace.com	E-Mail Address:	als@unl.edu

* Student theses or dissertations must be submitted with a faculty member listed as Secondary Investigator or Project Supervisor.

Principal Investigator is:

	Faculty		Staff		Post Doctoral Student
X	Graduate Student		Undergraduate Student		Other

Type of Project:

X	Research		Demonstration		Class Project
	Independent Study		Other		

Does the research involve an outside institution/agency other than UNL*?	Yes [ ] No [X]

* Note: Research can only begin at each institution after the IRB receives the institutional approval letter

If yes, please list the institutions/agencies.	
Where will participation take place (e.g., UNL, at home, in a community building, etc)	University of Nebraska online

Project Information:

Present/Proposed Source of Funding:	None		
Project Start Date:	August 2006	Project End Date:	May 2007

*Please attach a copy of the funding application.

Type of Review Requested: Please check either exempt, expedited, or full board. Please refer to the investigator manual, accessible on our website: http://www.unl.edu/research/ReComp1/compliance.shtml, to determine which type of review is appropriate. **Final review determination will be made by the IRB.**

[X] **Exempt:** Please check your response to each question.

	Yes	X	No	1. Does the research involve prisoners?
	Yes	X	No	2. Does the research involve using survey or interview procedures with children (under 19 years of age) that is not conducted in an educational setting utilizing normal educational practices?
	Yes	X	No	3. Does the research involve the observation of children in settings where the investigator will participate in the activities being observed?
	Yes	X	No	4. Will videotaping or audio tape recording be used?
	Yes	X	No	5. Will the participants be asked to perform physical tasks?
	Yes	X	No	6. Does the research attempt to influence or change participants' behavior, perception, or cognition?
	Yes	X	No	7. Will data collection include collecting sensitive data (illegal activities, sensitive topics such as sexual orientation or behavior, undesirable work behavior, or other data that may be painful or embarrassing to reveal)?
	Yes	X	No	8. For research using existing or archived data, documents, records or specimens, will any data, documents, records, or specimens be collected from subjects after the submission of this application?
	Yes	X	No	8a. Can subjects be identified, either directly or indirectly, from the data, documents, records, or specimens?

[X] **Expedited** [ ] **Full Board**

Description of Subjects:

Total number of participants (include 'controls'):	180

Will participants of both sexes/genders be recruited? Yes [X] No [ ]
If "No" was selected, please include justification/rationale.

Will participation be limited to certain racial or ethic groups? Yes [ ] No [X]
If "Yes" was selected, please include justification/rationale.

What are the participants' characteristics?

Graduate students who are enrolled in the specific classes that are included in the experiment.

Type of Participant: (Check all appropriate blanks for participant population)

	Adults, Non Students		Pregnant Women		Persons with Psychological Impairment
X	UNL Students		Fetuses		Persons with Neurological Impairment
	Minors (under age 19)		Persons with Limited Civil Freedom		Persons with Mental Retardation
	Victims		Adults with Legal Representatives		Persons with HIV/AIDS
	Other (Explain):				

Special Considerations: Yes [X] No [ ]

If yes, please check all appropriate blanks below.

	Audio taping		Videotaping		Archival/Secondary Data Analysis		Genetic Data/Samples
	Photography	X	Web-based research		Biological Samples		Protected Health Information

Project Personnel List:

Please list the names of all personnel working on this project, starting with the principal investigator and the secondary investigator/project advisor. Research assistants, students, data entry staff and other research project staff should also be included. For a complete explanation of training and project staff please go to http://www.unl.edu/research/ReComp1/compliance.shtml

Name of Individual:	Project Role:	UNL Status*	Involved in Project Design/Supervision? Yes/No	Collect Data? Yes/No
Ellen McPeek Glisan	**Principal Investigator**	**Graduate Student**	**Yes**	**Yes**
Al Steckelberg	**Faculty Advisor**	**Faculty**	**No**	**No**

*Faculty, Staff, Graduate Student, Undergraduate Student, Unaffiliated, Other

Required Signatures:

Principal Investigator:		Date:	
Secondary Investigator/Project Advisor:		Date:	
Unit Review Committee:		Date:	

FOR OFFICE USE ONLY
PROTOCOL:
DATE APPROVED:

PROJECT DESCRIPTION

1. Describe the significance of the project.

What is the significance/purpose of the study? (Please provide a brief 1-2 paragraph explanation in lay terms.)
Online students take classes in a very different environment than do face-to-face students. Comparatively, online classes consist of students individually working with their computers. Thus, it is logical to conclude that this state might result in a sense of isolation with no sense of a learning community. Some instructors attempt to change this situation by using techniques such as discussions and group projects that require students to interact with each other. But, even with these types of techniques, many online students feel a sense of isolation that is typically not an issue in face-to-face classes (Wegerif, 1998). Most online students remain "faceless individuals" to their classmates. As Rovai (2001) concluded, Distance Education must address feelings of isolation amongst online students, and students are more likely to experience satisfaction in a class when they have a personal sense of each other. This study will search out the levels of community and connectedness experienced by online students who take only online courses and online students who also have an on-campus presence to determine if this "facelessness" blocks their ability to connect to their fellow online students and if seeing photos of their fellow classmates increases their satisfaction with online courses.

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2. Describe the methods and procedures.

Describe the data collection procedures and what participants will have to do.
Between 16 and 20 UNL graduate courses will be involved. In the eight experimental courses, students will repeatedly see photos of their online classmates. The other eight classes will be the control groups with no photos. All participants will complete the survey online at their own computers. They will be given a URL address (the address will be to a page on the Flashlight Survey site) where they can anonymously complete the web-based survey which will include questions in multiple choice and Likert scale formats. The results will be compiled by Flashlight without identifying the participants. Survey attached.

How long will this take participants to complete?
Participants will be able to complete the survey in about 15-20 minutes

Will follow-ups or reminders be sent? If so, explain.
Since the survey will be anonymous, there will be no way to know who has participated. Therefore, Ellen McPeek Glisan will send four reminder e-mails to the whole group of possible participants. The first reminder will be sent one week after the initial invitation to participate. Subsequent reminders will each be sent one week apart. The reminders will thank those who have participated and ask those who have not to please participate. (copies attached)

3. Describe recruiting procedures.

How will the names and contact information for participants be obtained?
The e-mail addresses will be secured through the instructors teaching the courses.

How will participants be approached about participating in the study?

Participants will be sent an e-mail from Ellen McPeek Glisan explaining the study and asking them to please fill out the survey. *(copy attached)*

****Please submit copies of recruitment flyers, ads, phone scripts, emails, etc.**

4. Describe Benefits and Risks.

Explain the benefits to participants or to others.
The benefit of this study is to gather information that will encourage further studies and help determine ways to make online classes more universally appealing and surmountable in an effort to both lower drop out rates and increase success rates.

Explain the risks to participants. What will be done to minimize the risks? If there are no known risks, this should be stated.
There are no known risks associated with this research.

5. Describe Compensation. Will compensation be provided to participants? Yes ☐ No ☒

If 'Yes', please describe amount and type of compensation, including money, gift certificates, extra credit, etc.

6. Informed Consent

How will informed consent/assent be obtained?
The act of completing and submitting the survey will represent consent. In the initial contact e-mail (copy attached), participants will be informed that participation is completely voluntary and anonymous. They will also be instructed that completing and sending the survey will serve as consent to have their anonymous data included in the study results.

****Please attach copies of informed consent forms, emails, and/or letters. Please refer to the last page for a checklist of the information that needs to be included in the informed consent document.**

7. Describe how confidentiality will be maintained.

How will confidentiality of records be maintained?
The survey information will be collected anonymously by the Flashlight survey software.

Will individuals be identified?
The survey participants will not be identified.

How long will records be kept?
Names and e-mail addresses of participants will never be collected.

Where will records be stored?
In the primary investigator's private home office

Who has access to the records/data?
Investigator only

How will data be reported?
The goal is to report the data in a scientific journal and/or at a professional meeting. A summary of findings will be sent to all students in the six classes.

For web based studies, how will the data be handled? Will the data be sent to a secure server? Will the data be encrypted while in transit? Will you be collecting IP addresses?
Flashlight does not use any of the data collected for their own research. All of the information collected is confidential.

Once the researcher deletes the data he or she collected, it will be gone forever. Data on the server where Flashlight resides is regularly backed up in order to prevent data loss, but once a user deletes the results of a survey, there is no longer a need to save this backed-up information.

The overseers of Flashlight take every measure to protect the security of the data on the server. The server is behind a secure firewall and all security updates are applied to the server in a timely fashion. The Flashlight server is also physically secured in the server room, which includes video surveillance.

While no IP numbers are stored with the survey responses, Flashlight does collect IP numbers in the server log. The server log is replaced on a rotation schedule and there is no link that can definitely be made between any respondent and the IP number they took the survey from. If a survey has respondent IDs, this is also the case. Those IDs are in no way tied to the server log of IP numbers. [BUT. MY SURVEY DOES NOT HAVE RESPONDENT IDs--Ellen]

If transcriptions are required, how will transcriptions be handled? Who is doing the transcriptions? Please attach a copy of the confidentiality agreement that transcriptionists will sign.
There will be no transcriptions.

** For studies utilizing Protected Health Information (PHI; e.g., information obtained from a hospital, clinic, or treatment facility), how will this PHI data be obtained and safeguarded? Please provide a copy of the release of authorization that will be used to obtain permission from the participant for the agency/institution to release protected health information for project purposes or a letter from the agency/institution documenting agreement to provide protected health information for project purposes.*
No Protected Health Information used.

**For studies involving genetic data/sampling/analysis, illegal drug use, or criminal activity that places the participant at risk for legal action, how will confidentiality be maintained? Will a Certificate of Confidentiality be obtained to protect the compelled disclosure of this information?*
No genetic data/sampling/analysis, illegal drug use, or criminal activity involved.

8. Copies of questionnaires, survey, or testing instruments.

Please list all questionnaires, surveys, and/or assessment instruments/measures used in the project.
Two 20-question surveys will be combined and used: Classroom Community Scale by Dr. Fred Rovai (2000) and Online Community and Connectedness Survey by Ellen McPeek Glisan.

Rovai, Alfred. (2002). Development of an instrument to measure classroom community. *Internet and Higher Education, 5,* 197–211.

Please submit copies of all instruments/measures.—A copy of the combined survey is attached.

Appendix B

Survey Prenotice, Introductory E-mail, and Follow-Up E-mails

Prenotice

Date??, 2007

Dear UNL Graduate Student:

I am conducting research regarding the level of community and connectedness that graduate students experience in online classes. The survey takes only a few minutes and is rather interesting for students in online classes. So, I think you will enjoy it, and it will be a great help to online education if you participate.

I will be sending you the URL address in a few days, and I hope you will go to the Web site and click on your answers.

Thank you,

Ellen McPeek Glisan, University of Nebraska Doctoral Student

Ellen McPeek Glisan
Teaching, Learning, & Teacher Education Department
University of Nebraska/Lincoln
eglisan@maniesmarketplace.com
210-496-6110

Introductory e-mail

Ellen McPeek Glisan
Teaching, Learning, & Teacher Education Department
University of Nebraska/Lincoln
eglisan@maniesmarketplace.com
210-496-6110

Date??, 2007

Dear UNL Graduate Student:

I am contacting you because you are a graduate student at UNL and have taken one or more online classes. I would like a few of your opinions since a main way to improve online classes is to gather opinions from online students. My name is Ellen McPeek Glisan, I am a doctoral student at UNL, and I am conducting a study regarding online community and connectedness. I invite you to participate in a research study examining online community and connectedness and hope you will take a few minutes of your time to influence the future of online classes.

The benefit of this study is to gather information that will help determine ways to make online classes more universally appealing and surmountable in an effort to increase success rates in online classes and to enhance networking opportunities in online classes.

I have created a survey entitled *Online Community and Connectedness Survey* to learn more about how students in online courses relate to each other compared to relationships in traditional face-to-face classes. To verify the validity of the survey, I am also asking you to answer the questions from a survey created by Dr. Fred Rovai. The questions from the two surveys will be presented as one online survey. Answering all the questions will take about 15 minutes. All you have to do is click strongly agree, agree, neutral, disagree, or strongly disagree.

If you would like to participate, please go to this URL address: XX, fill out the survey, and click submit. You will **not** have to answer any questions that you do not wish to answer. The survey does **not** ask for your name, e-mail address, or other personal identification.

You are not required to participate in this study. Your decision whether or not to participate in this study has no bearing on your grades or any other aspect of your UNL courses. In fact, no one will have any idea who participated and who did not. Since participation is anonymous, your responses will be strictly confidential and none of your professors will know if you responded or how you responded. You can choose to participate by completing and submitting the survey. If you choose not to participate, simply do not complete the survey. You must be 19 or older to participate.

There are no anticipated risks, compensation, or benefits to you as a survey participant. You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with the investigators or the University of Nebraska–Lincoln. Your decision will not result in any loss of benefits to which you are otherwise entitled. If you decide to participate, you are free to, with no consequences, withdraw your consent to participate simply by not sending the survey even after you complete it. If you have any questions about this research, please contact me at 210-496-6110 or at eglisan@maniesmarketplace.com.

If you have unanswered questions about your rights as a research participant or want to report concerns about the study, you may contact the University of Nebraska—Lincoln Institutional Review Board, telephone (402) 472-6965.

By answering this survey you give me permission to report the results of your anonymous survey as part of my final research report. If you would like a copy of the final survey results, please contact me at the above phone number or e-mail address.

Thank you for your interest,

Ellen McPeek Glisan, University of Nebraska Doctoral Student

Please print this letter and keep it for your records.

Contact #3

Date??, 2007

Dear UNL Graduate Student:

I contacted you a week ago regarding an online survey about community and connectedness in online courses. If you went to the survey site and completed the survey, I would like to thank you. If you did not complete the survey, I ask you to please do so. Your input will be very helpful in helping to make online classes more student-friendly.

The survey will take about 15 minutes. If you would like to participate, please go to this URL address: XX, fill out the survey, and click submit. You will **not** have to answer any questions that you do not wish to answer. The survey does **not** ask for your name, e-mail address, or other personal identification.

For further information about the study, please look back at the initial contact letter or contact me at the e-mail address or phone number below.

Thank you for your interest,

Ellen McPeek Glisan, University of Nebraska Doctoral Student

Ellen McPeek Glisan
Teaching, Learning, & Teacher Education Department
University of Nebraska/Lincoln
eglisan@maniesmarketplace.com
210-496-6110

Contact #4

Date??, 2007

Dear UNL Graduate Student:

You have received a couple of e-mails from me about an online survey about community and connectedness in online courses. I would like to say thanks if you have responded to the survey. If you have not yet participated, please know that your opinions are very much desired and can be helpful in improving future online classes. I'd like to ask you to please take about 15 minutes and go to XX, fill out the survey, and click submit. You will **not** have to answer any questions that you do not wish to answer. The survey does **not** ask for your name, e-mail address, or other personal identification.

The study is very easy to take. All you have to do for each question is click on "strongly agree," "agree," "neutral," "disagree," or "strongly disagree." So, you can complete the survey very quickly.

For further information about the study, please look back at the initial contact letter or contact me at the e-mail address or phone number below.

Thank you for your interest,

Ellen McPeek Glisan, University of Nebraska Doctoral Student

Ellen McPeek Glisan
Teaching, Learning, & Teacher Education Department
University of Nebraska/Lincoln
eglisan@maniesmarketplace.com
210-496-6110

Contact #5

Date??, 2007

Dear UNL Graduate Student:

In one week, I will be closing my online survey about community and connectedness in online classes. I would like to thank those of you who have already completed the survey. For those of you who have not completed it, as you know from my previous contacts, I would very much like your opinions to be part of the shaping of future online classes. If you have not yet completed the survey and would like to take advantage of this last opportunity, please go to XX.

The study is very easy to take. All you have to do for each question is click on "strongly agree," "agree," "neutral," "disagree," or "strongly disagree." So, you can complete the survey very quickly.

For further information about the study, please look back at the initial contact letter or contact me at the e-mail address or phone number below.

Thank you for your interest,

Ellen McPeek Glisan, University of Nebraska Doctoral Student

Ellen McPeek Glisan
Teaching, Learning, & Teacher Education Department
University of Nebraska/Lincoln
eglisan@maniesmarketplace.com
210-496-6110

Appendix C

Online Community and Connectedness Survey

Online Community and Connectedness Survey
by Ellen McPeek Glisan, 2006

Overall Directions: This survey includes a total of 40 questions plus 8 demographic questions. The first 20 questions make up the *Online Community and Connectedness Survey* by Ellen McPeek Glisan. The second 20 questions are the *Classroom Community Scale* by Dr. Fred Rovai.

Section I: Read each statement below in regard to specific online and face-to-face classes or programs you are currently taking or have completed. If you have not recently taken either of the two types of classes, think back to a time when you took such classes. Choose the response that ***best*** represents your level of agreement with each statement. Use the Neutral answer for questions that you neither agree nor disagree with, are uncertain about, or that are not applicable to you. There are no right or wrong answers.

Please respond to all items	Strongly Agree (SA)	Agree (A)	Neutral (N)	Disagree (D)	Strongly Disagree (SD)
1. I feel like my face-to-face classmates are people I know. (current or last face-to-face class)	(SA)	(A)	(N)	(D)	(SD)
2. I feel like my online classmates are people I know. (current or last online class)	(SA)	(A)	(N)	(D)	(SD)
3. I find it equally easy to make friends in face-to-face and online classes.	(SA)	(A)	(N)	(D)	(SD)
4. In face-to-face classes, I often have personal discussions with fellow students.	(SA)	(A)	(N)	(D)	(SD)
5. In online classes, I often have personal discussions with fellow students.	(SA)	(A)	(N)	(D)	(SD)
6. I remember people from my different face-to-face classes.	(SA)	(A)	(N)	(D)	(SD)
7. I remember people from my different online classes.	(SA)	(A)	(N)	(D)	(SD)
8. I like to do group projects in face-to-face classes.	(SA)	(A)	(N)	(D)	(SD)
9. I like to do group projects in online classes.	(SA)	(A)	(N)	(D)	(SD)
10. I think most of my face-to-face classes are friendly, connected groups.	(SA)	(A)	(N)	(D)	(SD)
11. I think most of my online classes are friendly, connected groups.					

[These 9 questions will be in a separate screen from the first 11 questions in Section I so that students with smaller computer screens do not have to scroll to see the headers.]	Strongly Agree (SA)	Agree (A)	Neutral (N)	Disagree (D)	Strongly Disagree (SD)
12. Making friends in classes is important to me.	(SA)	(A)	(N)	(D)	(SD)
13. Discussions in online classes are as meaningful as in face-to-face classes.	(SA)	(A)	(N)	(D)	(SD)
14. In online classes, it is easy to remember what I have discussed with whom.	(SA)	(A)	(N)	(D)	(SD)
15. In online classes, I feel like I am discussing with real people, not just text.	(SA)	(A)	(N)	(D)	(SD)
16. I know my online instructors as well as I know my face-to-face instructors.	(SA)	(A)	(N)	(D)	(SD)
17. I feel isolated when I take online classes.	(SA)	(A)	(N)	(D)	(SD)
18. I am happy to post a picture of myself in an online class.	(SA)	(A)	(N)	(D)	(SD)
19. I would like to see faces (photos) when I talk to online classmates.	(SA)	(A)	(N)	(D)	(SD)
20. Seeing faces (photos) of online classmates would help me think of them as individuals.	(SA)	(A)	(N)	(D)	(SD)

Section II: Questions 21–40 deal with aspects of a current online class. If you are not currently enrolled in an online class, answer them in regard to your most recent online class.

Section Directions: Below you will see a series of statements concerning a specific course or program you are presently taking or recently completed. Read each statement carefully and place an X in the parentheses to the right of the statement that comes closest to indicate how you feel about the course or program. There are no correct or incorrect responses. If you neither agree nor disagree with a statement or are uncertain, place an X in the neutral (N) area. Do not spend too much time on any one statement, but give the response that seems to describe how you feel. ***Please respond to all items***

[Section II has different directions than Section I, because I kept the directions from Dr. Rovai's scale with his questions.]	Strongly Agree (SA)	Agree (A)	Neutral (N)	Disagree (D)	Strongly Disagree (SD)
21. I feel that students in this course care about each other.	(SA)	(A)	(N)	(D)	(SD)
22. I feel that I am encouraged to ask questions.	(SA)	(A)	(N)	(D)	(SD)
23. I feel connected to others in this course.	(SA)	(A)	(N)	(D)	(SD)
24. I feel that it is hard to get help when I have a question.	(SA)	(A)	(N)	(D)	(SD)
25. I do not feel a spirit of community.	(SA)	(A)	(N)	(D)	(SD)
26. I feel that I receive timely feedback.	(SA)	(A)	(N)	(D)	(SD)
27. I feel that this course is like a family.	(SA)	(A)	(N)	(D)	(SD)
28. I feel uneasy exposing gaps in my understanding.	(SA)	(A)	(N)	(D)	(SD)
29. I feel isolated in this course.	(SA)	(A)	(N)	(D)	(SD)
30. I feel reluctant to speak openly.	(SA)	(A)	(N)	(D)	(SD)

[These 10 questions will be in a separate screen from the first 20 questions in Section I so that students with smaller computer screens do not have to scroll to see the headers.]	Strongly Agree (SA)	Agree (A)	Neutral (N)	Disagree (D)	Strongly Disagree (SD)
31. I trust others in this course.	(SA)	(A)	(N)	(D)	(SD)
32. I feel that this course results in only modest learning.	(SA)	(A)	(N)	(D)	(SD)
33. I feel that I can rely on others in this course.					
34. I feel that other students do not help me learn.					
35. I feel that members of this course depend on me.					
36. I feel that I am given ample opportunities to learn.					
37. I feel uncertain about others in this course.					
38. I feel that my educational needs are not being met.					
39. I feel confident that others will support me.					
40. I feel that this course does not promote a desire to learn.					

Section III: Demographic and Other General Items:

41. I am more likely to drop out of an online class than a face-to-face class.
    ____ Strongly Agree
    ____ Agree
    ____ Neutral
    ____ Disagree
    ____ Strongly Disagree

42. Are you male or female?
    ____ Male
    ____ Female

43. When did you start participating in online college classes?
    ____ This semester
    ____ Last semester
    ____ Between two semesters and three years ago
    ____ More than three years ago

44. Do you prefer online graduate classes or face-to-face graduate classes?
    ____ I prefer face-to-face classes
    ____ I like the two types of classes about the same
    ____ I prefer online classes

45. How do your online grades compare to your face-to-face grades?
    ____ Online grades are quite a bit higher.
    ____ Online grades are a little higher.
    ____ Online and face-to-face grades are about the same.
    ____ Face-to-face grades are a little higher.
    ____ Face-to-face grades are quite a bit higher.

46. How old are you?
    ____ Under 25
    ____ 25-30
    ____ 31-40
    ____ 41-50
    ____ Over 50

47. Which of these scenarios ***most closely*** represents your situation?
    ____ I take both online and face-to-face classes at this university.
    ____ I take only online classes at this university, because online classes fit my schedule better. However, I live in the area and can easily go to campus to talk with the professor or meet with a classmate if needed.
    ____ I take only online classes at this university. I live too far away to take face-to-face classes.
    ____ I take only online classes at this university. I am concurrently taking face-to-face classes at another university.

48. When did you last take face-to-face college classes?
    ____ I am currently taking a face-to-face class
    ____ Within the last 3 years
    ____ Between 4 and 6 years ago
    ____ Between 7 and 10 years ago
    ____ More than 10 years ago

49. The classes listed in this question and the next two questions are all involved in this survey. Check the class through which you were invited to participate in this survey.
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name

50.
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name

51.
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name
    ____ Specific class and instructor name

52. Which of these options best describes your situation?
    ____ I was not invited to post a picture in this class.
    ____ I was invited to post a picture in this class, and I posted it.
    ____ I was invited to post a picture in this class, but I chose not to.

53. When you are finished, please click on “submit.”

Thank you for taking the time to complete this survey. Your opinions are appreciated!

**The survey was conducted online with the Flashlight survey software. Within Flashlight, a format slightly more stylish, but similar to what is shown here was used.

Appendix D

Item Abstract Table (Correlation of Research Questions and Survey Questions)

Item Abstract Table (Correlation of Research Questions and Survey Questions)

1. 1. Does repeated viewing of classmate photos make a difference in the measured sense of community in online graduate courses as measured with the *Classroom Community Scale* (Rovai , 2002)?

(Survey questions 21–40: The Rovai *Classroom Community Scale* questions)

21. I feel that students in this course care about each other.
22. I feel that I am encouraged to ask questions.
23. I feel connected to others in this course.
24. I feel that it is hard to get help when I have a question.
25. I do not feel a spirit of community.
26. I feel that I receive timely feedback.
27. I feel that this course is like a family.
28. I feel uneasy exposing gaps in my understanding.
29. I feel isolated in this course.
30. I feel reluctant to speak openly.
31. I trust others in this course.
32. I feel that this course results in only modest learning.
33. I feel that I can rely on others in this course.
34. I feel that other students do not help me learn.
35. I feel that members of this course depend on me.
36. I feel that I am given ample opportunities to learn.
37. I feel uncertain about others in this course.
38. I feel that my educational needs are not being met.
39. I feel confident that others will support me.
40. I feel that this course does not promote a desire to learn.

2. Does the impact of photos on the sense of community and connectedness differ in on-campus-presence graduate students and online-only graduate students?

(Survey questions 21–40: The Rovai *Classroom Community Scale* questions)

21. I feel that students in this course care about each other.
22. I feel that I am encouraged to ask questions.
23. I feel connected to others in this course.
24. I feel that it is hard to get help when I have a question.
25. I do not feel a spirit of community.
26. I feel that I receive timely feedback.
27. I feel that this course is like a family.
28. I feel uneasy exposing gaps in my understanding.
29. I feel isolated in this course.
30. I feel reluctant to speak openly.
31. I trust others in this course.
32. I feel that this course results in only modest learning.
33. I feel that I can rely on others in this course.
34. I feel that other students do not help me learn.
35. I feel that members of this course depend on me.
36. I feel that I am given ample opportunities to learn.
37. I feel uncertain about others in this course.
38. I feel that my educational needs are not being met.
39. I feel confident that others will support me.
40. I feel that this course does not promote a desire to learn.

(The following demographic questions)

47. Which of these scenarios ***most closely*** represents your situation?

__I take both online and face-to-face classes at this university.

__I take only online classes at this university, because online classes fit my schedule better. However, I live in the area and can easily go to campus to talk with the professor or meet with a classmate if needed.

__I take only online classes at this university. I live too far away to take face-to-face classes.

__I take only online classes at this university. I am concurrently taking face-to-face classes at another university.

48. When did you last take face-to-face college classes?

__I am currently taking a face-to-face class

__Within the last 3 years

__Between 4 and 6 years ago

__Between 7 and 10 years ago

__More than 10 years ago

49. The classes listed in this question and the next two questions are all involved in this survey. Check the class through which you were invited to participate in this survey.

__ Specific class and instructor name

__ Specific class and instructor name

__ Specific class and instructor name

__ Specific class and instructor name

__ Specific class and instructor name

__ Specific class and instructor name

__ Specific class and instructor name

50.

__ Specific class and instructor name

__ Specific class and instructor name

__ Specific class and instructor name

__ Specific class and instructor name

__ Specific class and instructor name

__ Specific class and instructor name

__ Specific class and instructor name

51.
__ Specific class and instructor name
__ Specific class and instructor name
__ Specific class and instructor name
__ Specific class and instructor name
__ Specific class and instructor name
__ Specific class and instructor name

52. Which of these options best describes your situation?
__ I was not invited to post a picture in this class.
__ I was invited to post a picture in this class, and I posted it.
__ I was invited to post a picture in this class, but I chose not to.

3. How do online graduate students feel about (a) personal connections in online courses vs. face-to-face courses, (b) group dynamics in online courses, (c) experiences with online discussions, and (d) classmate photos in online classes?

(All of the OCCS survey questions)
1. I feel like my face-to-face classmates are people I know.
2. I feel like my online classmates are people I know.
3. I find it equally easy to make friends in face-to-face and online classes.
4. In face-to-face classes, I often have personal discussions with fellow students.
5. In online classes, I often have personal discussions with fellow students.
6. I remember people from my different face-to-face classes.
7. I remember people from my different online classes.
8. I like to do group projects in face-to-face classes.
9. I like to do group projects in online classes.
10. I think most of my face-to-face classes are friendly, connected groups.
11. I think most of my online classes are friendly, connected groups.
12. Making friends in classes is important to me.
13. Discussions in online classes are as meaningful as in face-to-face classes.
14. In online classes, it is easy to remember what I have discussed with whom.
15. In online classes, I feel like I am discussing with real people, not just text.
16. I know my online instructors as well as I know my face-to-face instructors.
17. I feel isolated when I take online classes.
18. I am happy to post a picture of myself in an online class.
19. I would like to see faces (photos) when I talk to online classmates.
20. Seeing faces (photos) of online classmates would help me think of them as individuals.

(The following demographic questions)
47. Which of these scenarios ***most closely*** represents your situation?
__I take both online and face-to-face classes at this university.
__I take only online classes at this university, because online classes fit my schedule better. However, I live in the area and can easily go to campus to talk with the professor or meet with a classmate if needed.
__I take only online classes at this university. I live too far away to take face-to-face classes.
__I take only online classes at this university. I am concurrently taking face-to-face classes at another university.

48. When did you last take face-to-face college classes?
__I am currently taking a face-to-face class
__Within the last 3 years
__Between 4 and 6 years ago
__Between 7 and 10 years ago
__More than 10 years ago

49. The classes listed in this question and the next two questions are all involved in this survey. Check the class through which you were invited to participate in this survey.
__ Specific class and instructor name
__ Specific class and instructor name
__ Specific class and instructor name
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__ Specific class and instructor name
__ Specific class and instructor name

50.
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__ Specific class and instructor name
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51.
__ Specific class and instructor name
__ Specific class and instructor name
__ Specific class and instructor name
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__ Specific class and instructor name
__ Specific class and instructor name

52. Which of these options best describes your situation?
__ I was not invited to post a picture in this class.
__ I was invited to post a picture in this class, and I posted it.
__ I was invited to post a picture in this class, but I chose not to.

Appendix E

Budget

Budget

Since a free online survey tool (Flashlight) was used, the researcher completed all the data-entry and statistical work, and an electronic dissertation will be submitted, expenses are limited to the following:

Budget		
Item	**Budget Amount**	**Comments**
Proofreading	$100	
Binding/Electronic Fee	$25	
Abstract	$60	
Copyright	$50	
Total budget	**$235**	