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**AN EXPERIMENTAL STUDY OF INSTRUCTOR IMMEDIACY
IN THE WIMBA VIRTUAL CLASSROOM**

by

Lorah Wood Bodie

A Dissertation Submitted to the Faculty of
San Diego State University and the University of San Diego
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

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May 2009

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Lorah Wood Bodie

DEDICATION

This work is dedicated to my mom and dad, Wourth and VeLynn Wood. Without you I would be nothing; because of you and your belief in me I have realized my dreams. I love you both more than you can ever know. Since you have left this life, I have missed you every day. I am so blessed to have you as my loving parents.

ABSTRACT OF THE DISSERTATION

**An Experimental Study of Instructor Immediacy
in the WIMBA Virtual Classroom**

by

Lorah Wood Bodie

Ed.D. in Educational Technology

San Diego State University and the University of San Diego, 2009

The social underpinnings of learning make it important to understand how people experience themselves and form relationships in web-based educational environments. Social presence is a critical factor of a communication medium that plays an important role in building community and improving the effectiveness of instruction. The components of social presence include words conveyed, verbal and nonverbal immediacy cues, and the context of the communication.

The immediacy component of social presence is most often defined as perceived psychological closeness which is created in part by nonverbal cues (e.g., smiling and using gestures) and verbal cues (e.g., utilizing humor and inclusive pronouns). A number of researchers have demonstrated that instructors/teachers who “use” verbal and nonverbal immediacy behaviors can facilitate interaction and reduce psychological distance. There is also evidence for improved learning outcomes including satisfaction and perceived learning when highly immediate instructor behaviors are employed.

However, few studies have investigated instructor immediacy, the ways it can be communicated, and its relationship to learning outcomes in online settings. It is important to assess the effectiveness of methods by which immediacy can be cultured into the design and delivery of instruction in virtual settings—the aim of this study was to contribute to this emerging research base.

The researcher employed a randomized one-factor experimental research design to explore the effects of immediacy (conceptualized as instructor behaviors and mode of communication media) on students’ perceptions of immediacy, cognitive learning, perceived learning, and satisfaction, in the Wimba Virtual Classroom. The study replicated design elements utilized by two previous studies, the main element being a 15-minute prerecorded teaching session where instructor immediacy was manipulated to create higher and lower conditions. In addition to manipulating instructor immediacy, the researcher explored two different technology-infused strategies for content delivery: one that combined full-motion video of the instructor with audio and text chat; and another that replaced full-motion video with a still photo of the instructor.

Participants were 576 students from an introductory psychology course at a large urban university in southern California. Thirty-five sessions were conducted in a computer lab equipped with 22 individual work stations. Cognitive learning was assessed at three points, before exposure to the teaching session, just after exposure, and 5-6 weeks after exposure.

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CHAPTER 1

INTRODUCTION

This chapter sets the present study in context and introduces the key constructs that underlie it—specifically, *learning*, *community*, *presence*, *social presence*, and *immediacy*. A summary of *media richness theory* is also included. The purpose, significance, and limitations of the study are then presented and key terms defined.

LEARNING

The goal of teaching is *learning*. Although no single definition of learning is universally accepted by educational theorists, researchers, and practitioners, most agree that one key element is a change in behavior or capacity (Schunk, 1996). Put another way, the outcome of teaching is a change in learners evidenced by their ability to do something different (and perhaps better) from what they were able to do before. Schunk notes that learning is generally inferential, that it is not observed directly but rather by its products (e.g., a term paper) or performances (e.g., a recital). Learning is traditionally assessed by written and oral tests; observation and role plays characterize assessment that is more authentic.

Basic to the study of learning is how the process occurs—and there are many theories that seek to explain it. The three most dominant positions are *behaviorism*, *cognitivism*, and *constructivism*:

- Behaviorists contend that learning can be explained in terms of observable phenomena, changes in the behavior of the learner that occur as a function of

factors in the environment (Kearsley, 2008). These factors in the environment act as stimuli that cause a response on the part of the learner.

- Cognitivists, on the other hand, emphasize the mental processing of information which includes the acquisition, organization, coding, storage, and retrieval of information (Schunk, 1996). Cognitivists also emphasize the role of learners' thoughts, beliefs, attitudes, and feelings and how they influence perception (Winne, 1985, as cited in Schunk).
- Constructivists view learning as an active process, where “students” construct their own knowledge and understanding of the world, through experiencing things and reflecting on their experiences (Kearsley, 2008). Key to success in formal learning settings is thoughtfully developed scaffolding to facilitate the learning process.

There is agreement among learning theorists that both the environment and personal characteristics affect the process of learning—although they dispute the role each plays and its criticality or influence (Schunk, 1996). Without a doubt, instructors and instructional designers need to be aware of how multiple factors in different combinations influence learners' perceptions, mental processing, and ultimately then, the learning process.

SOCIAL ASPECTS OF LEARNING AND COMMUNITY BUILDING

Learning, particularly as it occurs in formal educational settings, is an interactional process (Richmond, Gorham, & McCroskey, 1987). Interpersonal perceptions and communication between teachers and students are crucial to the teaching-learning process (Richmond et al., 1987). Clearly, the process of learning takes place in social environments, and relations with others affect cognitive understanding and personal knowledge construction (Richardson & Swan, 2003). “When students share questions, insights, and perplexities, they not only experience higher levels of mastery, but they open themselves to redefining and repositioning themselves in the world” (Osguthorpe & Graham, 2003, p. 231). Higher-level

collaborative interactions are more easily facilitated when a sense of *community* is formed through social and informational interactions (Garrison, Anderson, & Archer, 2000).

The concept of community in learning environments has been studied for several decades (Caverly & McDonald, 2002). Definitions of community in the education literature vary, but common elements include:

- A group with a shared purpose,
- Boundaries that define membership,
- Policies and rules that govern behavior,
- Interaction among the members of the group
- Support and respect among members (Vesley, Bloom, & Sherlock, 2007).

Yuen (2003) highlights the critical role of *community* in regards to academic success, postulating that a community of learners can assist individuals in achieving “what they cannot on their own” (p. 155). Researchers have found many positive outcomes related to a learner’s perception of community. For example, Bruffee (1993) and Dede (1996) agree that strong feelings of community can increase the availability of support and cooperation among members, commitment to group goals, satisfaction with group efforts, and a desire to persist.

Skillful instructors and instructional designers can build and sustain community by enabling, encouraging, and facilitating interactions in which learners feel included and valued, and can thereby benefit from sharing ideas, experiences, and resources (Rovai, 2001). Given the importance of the social aspects of learning, it is important to investigate strategies to culture opportunities for social interaction into web-based educational settings and measure the resulting effects on learning outcomes.

TECHNOLOGY AND SOCIAL CONNECTIONS

As technology advances, the affordances that support community building change as well. Put another way, innovations in the use of technology are altering the ways in which people experience themselves and view the relationship between the physical and virtual worlds (Hammer, 1998). The proliferation of technology and increased global access to the Internet have opened doors to new teaching and learning options, including a variety of delivery methods in educational and business settings. In higher education the move to web-based and other “alternative” forms of delivery derive from a desire to serve increasing numbers of students with diverse needs. Web-based classrooms can be an effective alternative to traditional face-to-face classrooms, facilitating access to participants without regard to geographic location and free of the constraints of time.

Connecting individuals through technology for the purpose of learning can pose significant challenges as well as unique opportunities. With the use of technology, instructors can facilitate learning by means that extend beyond the limits of the traditional classroom. Social interaction in web-based environments is facilitated somewhat differently than in face-to-face settings and enables people to relate to one another in new ways. Due to the social nature of learning, it is important to understand how people experience themselves as being *present* in these new environments, and the ways in which they communicate, form relationships, and build community.

PRESENCE AND SOCIAL PRESENCE

The concept of *presence* has been studied to aid in understanding, predicting, and controlling the qualities and components of mediated (web-based) as well as face-to-face

environments. Presence research spans several disciplines including communication, computer science, education, psychology, and sociology. Feeling present indicates an awareness of being in a certain location. *Social presence* is the awareness of others in the same location. In face-to-face learning environments, the instructor and learners are physically present. When instructors and learners enter into mediated environments they can become present in a virtual sense (also referred to as telepresence) and when they perceive others in that environment they experience the mediated social presence of others.

According to communications researchers Biocca, Kim, and Levy (1995) media can collapse space and time to provide the limited illusion of “being there” in other places and together with other people. That sense of “being there” is a critical factor that lies at the center of web-based experiences. The presence construct is particularly important to understand in environments where the instructor and the students are not co-located. Researchers have found that a learning environment in which presence is well established is highly interactive; in addition, participants feel connected—part of a group or community with common goals and interests.

Social presence theory plays a significant role in creating a sense of community and improving instructional effectiveness in web-based educational settings (Richardson & Swan, 2003). The components of social presence include the amount of information transmitted, words conveyed, verbal and nonverbal immediacy cues, and the context of the communication.

IMMEDIACY

The immediacy component of social presence has been defined as perceived psychological or physical closeness (Christophel, 1990), created in part by physical (nonverbal) cues such as smiling, a relaxed body posture, and speaking directly to students. Verbal cues such as utilizing humor and personal examples or experiences also contribute to increased immediacy (Hostetter & Busch, 2006). Instructor or teacher immediacy has received considerable attention in the communication and education literatures. Results of several studies suggest that instructors who adopt immediacy behaviors can facilitate interaction, enhance closeness, and reduce psychological distance (Andersen, 1979; Christophel, 1990). There is also encouraging evidence for improved student motivation, satisfaction with learning, and other learning outcomes when highly immediate instructor behaviors are employed (Gorham, 1988; Gorham & Christophel, 1990; and Kelley & Gorham, 1988).

MEDIA RICHNESS THEORY

New technologies have made it possible to extend the range and scope of communications opportunities beyond the traditional classroom (Newberry, 2001). Different technologies, or communication media, have varying capabilities for conveying messages and verbal or visual cues. Media richness theory is most often associated with organizational/business and communications literature. This theory is used to analyze communication and media choices with the goal of reducing ambiguity of communication through selection of appropriate media type (Newberry, 2001). Daft and Lengel (1984) were among the first researchers to rigorously study this area. Their main assumption was that

communications media have varying capacities for resolving ambiguity, negotiating interpretation, and facilitating understanding. Further, that for ambiguous tasks, performance (understanding) improves when communicators use “richer” media. The degree of “richness” is based on the capacity of the medium to facilitate instant feedback, transmit multiple verbal and nonverbal (immediacy) cues, allow for the use of natural language, and convey a personal focus (Daft & Lengel). Rich media, then, are characterized as those with the capacity to carry or convey the most information, while lean media are characterized as those with a lesser capacity for doing so. Newberry (2001) provides a hierarchy of media types, richest to leanest, as follows:

1. Face-to-face
2. Synchronous video
3. Synchronous audio
4. Text-based chat
5. Email/asynchronous audio
6. Threaded discussion

Knowledge about the impacts of different communication media on learning outcomes and knowledge construction can help guide instructors and instructional designers as they develop methods for delivery of educational content in web-based settings.

STATEMENT OF THE PROBLEM

Technology is advancing faster than the research base that seeks to determine its effectiveness in supporting the achievement of educational goals. Repeated searches in the

literature have revealed at least four major gaps specifically related to the social presence and immediacy constructs. Few studies have:

1. Been conducted in web-based educational settings that assess audio and video capabilities,
2. Assessed cognitive learning gains within these settings,
3. Measured retention of learning gains over time, or
4. Utilized experimental or quasi-experimental research designs to guide the research process.

Most of the research associated with social presence has focused on asynchronous text-based environments that have been devoid of advanced technologies (with audio/video capabilities) that deliver learning content or support interaction between/among the participants. Additionally, many of these studies have measured satisfaction with learning and perceived learning, but few have measured “actual” cognitive learning. Not surprisingly, for those few that have assessed cognitive outcomes, results have been mixed.

The instructor immediacy element of social presence has been widely studied in face-to-face educational environments with many positive effects, but few studies have been conducted in web-based settings. As with social presence studies, instructor immediacy research has shown positive results related to highly immediate instruction when measuring participants’ satisfaction with learning and perceived learning, but few have measured cognitive learning. Results have been mixed for those that have—most likely reflecting the varied web contexts in which the instruction has unfolded. Only a handful of studies have measured retention of learning over time, and those that have used only a 1-week delay. And lastly, only a few studies of immediacy and social presence have utilized experimental or quasi-experimental research designs. Ten of the 81 studies were included in a meta-analytic

review conducted by Witt, Wheelless, and Allen, (2004), where variables have been manipulated and studied in controlled settings.

PURPOSE OF THE STUDY

This study focused on the immediacy construct in a web-based setting, investigating the influence of instructor immediacy (operationalized as having two dimensions: instructor behaviors and communication media). Although immediacy was operationalized as having two dimensions (behaviors and media type), the researcher did not accord them equal “value.” In other words, she hypothesized that the primary dimension, verbal and nonverbal instructor behaviors, would carry greater weight (related to perceptions of immediacy, cognitive learning, perceived learning, and learner satisfaction) than the secondary dimension, the medium by which the instructor interjected herself (rich media/full-motion video v. lean media/still photo of the instructor with audio). Specifically, the purpose of the study was to explore how higher- and lower-immediacy and the use of rich and more lean media would affect participants’ perceptions of immediacy cognitive learning, perceived learning, and satisfaction with learning. The study replicated some of the experimental research design elements utilized by Witt (2000) and Schutt (2007), the key element of both being the use of prerecorded teaching sessions where instructor immediacy was manipulated to create higher and lower conditions. Additionally, like Schutt’s study, the learning environment was organized into two different types, each featuring a different combination of auditory and visual communication tools. Ultimately then, this resulted in four experimental conditions for investigation. Further details of Witt’s and Schutt’s studies are outlined in Chapter 2 and the elements that were replicated for this study are detailed in Chapter 3.

RESEARCH QUESTIONS

The overall hypothesis that underlies the study was that higher-immediacy instructor behaviors and the use of rich media (full-motion video of the instructor) would result in greater levels of perceived immediacy, cognitive learning, perceived learning, and satisfaction with teaching. Again, immediacy was operationalized as having two dimensions: instructor behaviors and communication media, with the primary dimension (verbal and nonverbal instructor behaviors) carrying greater weight than the secondary dimension (the medium by which the instructor interjected herself). The specific research questions and hypotheses around which the study was structured are detailed here.

Research Question 1

RQ1: *How do participants perceive immediacy?*

H₁: The researcher hypothesized that participants exposed to higher-immediacy instructor behaviors (Groups 1 and 2) would perceive higher immediacy than those exposed to lower-immediacy behaviors (Groups 3 and 4), and that Group 1 (exposed to higher-immediacy behaviors with rich media/full video) would perceive the highest immediacy among groups. The null hypothesis would be no difference.

Research Question 2

RQ2: *How does immediacy influence cognitive learning?*

H₂: The researcher hypothesized that participants exposed to higher-immediacy instructor behaviors (Groups 1 and 2) would outperform those exposed to lower-immediacy behaviors (Groups 3 and 4), and that Group 1 (exposed to higher-immediacy behaviors with

rich media/full video) would out perform all other groups. The null hypothesis was no significant difference in cognitive learning between groups.

Research Question 3

RQ3: *How does immediacy influence perceived learning?*

H₃: The researcher hypothesized that participants exposed to higher-immediacy instructor behaviors (Groups 1 and 2) would indicate higher levels of perceived learning than those exposed to lower-immediacy behaviors (Groups 3 and 4), and that Group 1 (exposed to higher-immediacy behaviors with rich media/full video) would perceive higher levels of learning than all other groups.

Research Question 4

RQ4: *How does immediacy influence satisfaction with teaching?*

H₄: The researcher hypothesized that participants exposed to higher-immediacy instructor behaviors (Groups 1 and 2) would show higher satisfaction ratings than those exposed to lower-immediacy behaviors (Groups 3 and 4), and that those in Group 1 (exposed to higher immediacy behaviors delivered with rich media/full video) would indicate higher levels of satisfaction with the teaching session than all other groups.

SIGNIFICANCE

Research findings point to the importance of the social aspects of learning and their influence on learning outcomes. Studies across several decades have shown that learners who perceive higher levels of instructor immediacy have stronger outcomes than those who perceive lower levels of immediacy (Andersen, 1979; Christophel, 1990; Freitas, Myers, &

Avtgis, 1998); Witt & Wheelless, 2001). These and other important investigations have helped to lay the groundwork for evaluating the social aspects of teaching and learning in web-based settings, but many questions remain. Although many immediacy studies have been conducted in traditional classroom settings, few have investigated immediacy and its influence on learning outcomes in web-based settings. Fewer still have utilized empirical research designs to guide the research process, particularly in evaluating the effects of immediacy on cognitive learning and retention of learning gains over time.

This study contributed to the research base in several ways. First, it provided confirmatory evidence of the importance of immediacy and its effects on learning outcomes, most especially in the cognitive learning domain. Secondly, it measured learning gains at two intervals. The first measurement was done immediately after exposure to the teaching session. And as of this writing it is the only known immediacy study to have measured retention of learning gains more long-term, some 5 to 6 weeks after exposure to the teaching session. Lastly, the strength of the research design, replicating key elements from the studies of Witt (2000) and Schutt (2007), provides a structure that can be used by future researchers to explore outcomes for other populations, topic areas, and combinations of communication media.

It is important to consider how different levels of instructor immediacy behaviors and combinations of communication media influence key learning outcomes, particularly learning in the cognitive domain. It is also important to investigate the effectiveness of different methods by which immediacy can be cultured into the design and delivery of instruction in web-based settings. The research findings from this study will help to inform not only

researchers, but practitioners involved in designing and facilitating learning in web-based settings.

LIMITATIONS

As with all investigative research, this study is bound by limitations. Seven are detailed here.

1. The prerecorded instructional segments for this study were relatively short in length, 15 minutes. Results for studies utilizing the same research design with longer sessions may yield different results.
2. The study utilized a “one shot” single occasion exposure. Multiple exposures over time may not produce the same results.
3. Study participants were exposed to prerecorded instructional segments and were therefore not able to interact during the session; they viewed the interactions of the instructor and other students. Perceptions and learning outcomes may vary in settings where participants are able to directly engage with the instructor and other students.
4. The study was limited to two combinations of technologies to deliver the learning content (full video of the instructor with audio and text chat, and still photo of the instructor with audio and text-chat.) Other delivery methods and combinations of technologies may produce different results.
5. Study participants were recruited from two sections of one undergraduate psychology course. Studies whose participants are drawn from courses in other disciplines or whose demographic make-up is different may have different results.
6. The study utilized only one instructor. The use of different instructors that vary by gender, age, or other variables could produce different results.
7. And lastly, even though the content for the teaching sessions (cognitive dissonance theory) was not covered in class by the regular course instructor, there was a 5-paragraph section in the social psychology chapter of the course text (*Psychology*, 8th Edition, by David G. Myers) that the students were to have read prior to taking the regular course exam, into which the delayed posttest measures were embedded. It is unknown whether the participants for this study read that section of the text or how exposure to that material may have affected their understanding of the topic, either positively or negatively.

DEFINITION OF KEY TERMS

Affective Learning Domain: Emotional responses to the instructor, content or learning environment that may have an influence on the quality and quantity of information learned (Martin, 2001).

Cognitive Learning Domain: The recall, comprehension, application, and synthesis of new information (Martin, 2001).

Immediacy: Behaviors that serve to enhance interaction and closeness with another (Mehrabian, 1969). Immediacy has also been defined as perceived psychological or physical closeness (Christophel, 1990). For this study, immediacy was operationalized as having two dimensions: instructor behaviors and communication media.

Learning Community: A group of individuals who share an interest in a topic, task, or problem, and have the opportunity and tools to construct knowledge as a shared outcome (Riel, 2000).

Mediated Immediacy: The delivery of communication cues through mediated channels, which influence perceptions of psychological closeness (O'Sullivan, Hunt, & Lippert, 2004).

Social Presence: The ability of participants to project their personal characteristics into a community of inquiry, so as to be perceived as real people to other participants (Garrison et al., 2000).

Wimba: A company that develops collaborative learning software applications and services for use in educational settings; see <http://www.wimba.com/>

CHAPTER 2

REVIEW OF LITERATURE

Chapter 1 described the study's underpinnings and its potential influence on the field.

It oriented the reader to learning theories that seek to explain the process of learning.

Theoretical underpinnings related to media richness were also discussed. The purpose, significance, and limitations of the study were presented and key terms defined.

This chapter is a comprehensive review of literature related to the key constructs about which data will be gathered and the ways in which they are related. It is organized as follows:

- Social presence—definitions, social presence and community, social presence and immediacy
- Immediacy—definitions, historical overview, and empirical studies and cognitive learning outcomes

The chapter then goes into greater depth on the immediacy construct and its effects on cognitive learning. Areas for further research are also identified.

SOCIAL PRESENCE

As mentioned previously, presence is the sense of “being there” in technology-enabled experiences and social presence is the awareness of being there with others. Social presence is a key element of effective instruction, given that most teaching and learning unfolds in social contexts. Social presence has long interested the research community; communications researchers were among the first to explore it rigorously.

In 1976, Short, Williams and Christie defined social presence as the “degree of salience of the other person in a mediated communication and the consequent salience of their interpersonal interactions” (p. 65). Being salient refers to the projection of a person and their interactions into a technology-mediated environment, such that they feel that they are actually present in that environment. Short et al. describe social presence as a subjective quality of the communication medium related to the social psychology concepts of intimacy and immediacy, as determined by eye contact, smiling, physical distance, personal topics of conversation, and timeliness of response. Short et al. suggest that the higher the intimacy and immediacy within the medium, the richer the medium and the higher the social presence.

Placing more emphasis on perception by others, Gunawardena and Zittle (1997) later defined social presence as “the degree to which a person is perceived as a ‘real person’ in mediated communication” (p. 9). Attending more to learner responsibility, Garrison et al. (2000) argue that social presence is the ability of participants to project their personal characteristics into a community of inquiry, so as to be perceived as real people to other participants. The concept of social presence is most simply described by Whiteman (2002, p. 6) as “the feeling that others are involved in the communication process” indicating a sense of community.

Social Presence and Community

Social presence has been shown to foster feelings of community by enriching interaction between instructors and students and among students, while contributing to group cohesion. Social presence in learning environments is associated with feelings of inclusion, affection, and control (Whiteman, 2002).

Web-based learning environments may lack the critical verbal (tone of voice, intonation, and expression) and visual cues (direction of gaze, posture, eye contact, facial expression, etc.) that contribute to building interpersonal ties. With fewer social context cues, communication through the use of technology is generally regarded as less personal than face-to-face communication. Rovai (2002) asserts that with fewer social cues, social presence is diminished, and as social presence declines so does the sense of community. However, he also states that it is the teaching methods used for course delivery rather than the environment that most strongly influence feelings of community. Put another way, it is not the use of technology but the way that it is used that will ultimately affect the quality of learning experienced in web-based environments.

Some researchers agree that social presence is cultured through interpersonal communications that develop in web-based settings in much the same way as in traditional face-to-face settings, even though the social cues are expressed and perceived somewhat differently. As in face-to-face settings, students in web-based settings who are passive in the learning process may benefit less from their involvement in a learning community than those who are actively involved (Vesley et al., 2007). Vesley et al. note that instructors play a key role in terms of orchestrating opportunities for student involvement as members of the learning community.

Strategies suggested in the literature for culturing social presence in web-based settings are in many cases simple, and easy to implement. A comprehensive list developed by Aragon (2003) organizes strategies for three groups of individuals: course designers, instructors, and participants (see Appendix A). Aragon maintains that social presence should

be intimidated in the design of web-based courses and that the main responsibility for cultivating social presence lies with the instructor.

Social Presence and Immediacy

Many variables can contribute to cultivating an inclusive culture that fosters social interactions. One of the main variables is instructor and peer immediacy (expression of emotion, use of humor, self-disclosure) which contributes to increased social presence and feelings of community. Gunawardena (1995) provides a detailed discussion of literature on social presence in traditional face-to-face classrooms indicating that instructor immediacy is a good predictor of affective learning, while the link to cognitive learning is not empirically supported.

Many researchers have used immediacy items to assess social presence. A seminal study conducted by Gunawardena and Zittle (1997) measured social presence by blending the differential immediacy scales developed by Short et al. (1976) and structuring them to address the social presence construct. At that time, few studies had been conducted to assess the influence of social presence in distance education contexts and scales to measure social presence in these contexts had not yet been developed. They felt it important to measure social presence from a group perspective—participants' reactions to one another rather than to the teacher. The restructured bipolar scale (14 items) assessed student perceptions of the medium with the goal of providing construct validity for the social presence scale. Results of a bi-variate correlational analysis between the social presence measures and six bipolar social indicators indicated strong positive correlations between the two, suggesting that the social presence scale accurately measured the intended social presence parameters. To predict

overall satisfaction, a stepwise regression procedure was utilized. Results indicated that social presence was a strong predictor of satisfaction (contributing to about 60% of the variance) in a text-based conferencing environment.

More recently, Richardson and Swan (2003) modified the survey developed by Gunawardena and Zittle (1997) to study the role of social presence in web-based learning environments and its relationship to students' perceptions of learning and satisfaction with the instructor. The scale was modified to allow for examination of individual course activities, whereas, the original scale examined only an overall perspective. Participants ($n = 97$) were enrolled in online learning courses at Empire State College. These learners were non-traditional in that they were older than typical college-age students (36-45 years old). Results from analyses indicated correlations of .68 between students' perceived social presence and perceived learning, and .60 between perceived social presence and satisfaction with the instructor, indicating that those who perceived higher social presence perceived that they learned more and were more satisfied with the instructor. Interestingly, the researchers found that gender accounted for some variability in students' overall perception of social presence, with women perceiving higher degrees of social presence than men.

Hostetter and Busch (2006) compared social presence with learner satisfaction and cognitive learning in several sections of the same course delivered both as web-based and face-to-face college classes with identical syllabi and assignments. Participants were recruited over two semesters from four online sections and two face-to-face sections, offered at urban and rural campuses ($n = 112$). One of the researchers taught the courses based at the urban campus and the other taught those based at the rural campus. The survey instrument used for the study was originally developed by Gunawardena and Zittle (1997), and later modified by

Richardson and Swan (2003), both detailed earlier. Hostetter and Busch (2006) altered the wording of the questions slightly to reflect the delivery method for the course from which their participants were recruited (online or face-to-face). An independent samples t-test was conducted indicating no significant difference between online and face-to-face classes related to their perceptions of social presence. An ordinary least squares regression test was run to determine the effect of social presence on learner satisfaction. Results indicated that social presence was a significant predictor of learner satisfaction ($p < .001$), explaining 40% of the variance in learner satisfaction scores. Interestingly, participants from the urban campus indicated significantly higher social presence than students from the rural campus. With regard to cognitive learning, an ordinary least squares regression test was performed to determine the effect of social presence on individual paper scores. No significant effect was found for cognitive learning.

Persistence rates have also been studied relative to the social aspects of learning. Numerous studies have shown that students in web-based courses do not persist (continue to completion of the course) at the same rates as students in traditional face-to-face courses (Rovai, 2002). Understanding what contributes to a desire to persist will aid in the design and delivery of instruction in web-based settings. A range of studies targeting learners in both business and academia indicate that strong social connections to others in the learning environment contribute in positive ways to course completion. Wehlage, Ruttner, and Smith (as cited in Rovai, 2002) reported that schools with exemplary dropout prevention programs provided students with a supportive community environment, devoting considerable attention to removing barriers that might prevent students from becoming or staying connected with the school. Additionally, these exemplary schools facilitated opportunities for developing

feelings of membership and engagement, and provided activities designed to foster a sense of belonging. In a study of adult learners in a worksite GED program, results indicated that 84% of those who completed the course belonged to class cliques (felt social connections to their peers), whereas 70% of dropouts were socially isolated (Vann & Hinton, 1994, as cited in Rovai, 2002). In their study of a higher education business program, Ashar and Skenes (1993, as cited in Rovai, 2002) found that with higher levels of social integration fewer participants dropped out of courses before completing, resulting in a significant positive effect on participant retention. More interestingly, they found that although learning needs alone were motivation enough to attract adult learners to a web-based program, this was not enough to retain them.

In summary, then, Figure 1 illustrates the relationship between the concepts of community, social presence, and instructor immediacy and some of the ways they have been shown to influence educational outcomes.

IMMEDIACY

As mentioned earlier, a core aspect of social presence is psychological or physical closeness—what researchers refer to as immediacy (Christophel, 1990). Immediacy is created in part by physical cues such as smiling and a relaxed body posture, as well as speaking directly to students, utilizing humor, and modulating the voice (Hostetter & Busch, 2006). Albert Mehrabian, an original thinker in this area, postulated that the immediacy principle allowed for feelings to be inferred by movement (toward or away) from people, things, and even ideas (Mehrabian, 1981). He grounded the immediacy concept in approach-avoidance theory, which contends that “people approach what they like and avoid what they don’t like”

(Mehrabian, 1981, p. 22). Mehrabian identified nonverbal immediacy behaviors which imply a reaching out toward the other person who is at a distance. These behaviors included standing close, leaning forward, directly facing, and making eye contact, which can serve to reduce psychological distance between communicators. He maintained that these behaviors convey greater liking than standing farther away, leaning backward, and not directly facing or making eye contact.

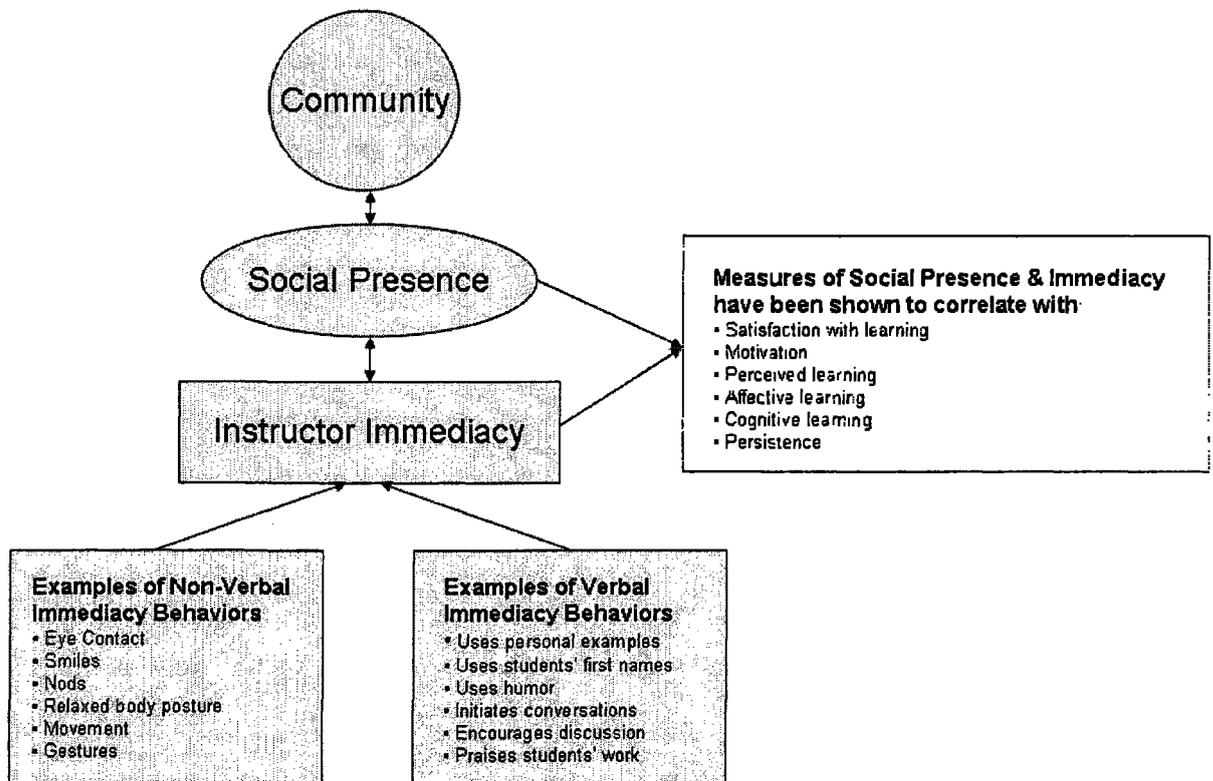


Figure 1. The relationship between social presence and immediacy and their effects on educational outcomes.

Immediacy and Learning Outcomes

Since its inception, the immediacy construct has received much attention and sparked considerable controversy among instructional communications researchers (Witt et al., 2004). As reported by Witt et al., the first decade of immediacy research related primarily to nonverbal immediacy behaviors and affective learning (student attitudes and predisposition to certain behaviors). Links to perceived cognitive learning and actual cognitive learning were more often reported after Richmond et al. (1987) introduced what they termed “learning loss”—the difference between students’ perceived learning and what they predict they would have learned if they’d had the “ideal” instructor. Richmond et al. and other researchers (Gorham, 1988; Gorham & Christophel, 1990) found a significant relationship between nonverbal immediacy and learning loss, which has been widely studied in immediacy research since its introduction in 1987, most often in conjunction with affective learning.

Andersen (1979) published one of the initial articles on immediacy and learning research. Her study was the first to find a significant relationship between learning outcomes and instructor nonverbal immediacy behaviors. Andersen’s study garnered 238 participants from introductory communications courses. The student participants and trained observers rated nonverbal immediacy behaviors for 13 different instructors who taught the same course on the same day at the same time of day. In addition to nonverbal immediacy she collected data for three learning outcomes, affective learning, behavioral commitment to the content, and cognitive learning. She utilized the General Immediacy (GI) Scale, which features two items about instructor communication style (immediate or non-immediate) using a Likert-type scale (e.g., cold/warm, friendly/unfriendly, close/distant). In addition she used the Behavioral Indicators of Immediacy scale (BII), a lower inference instrument (15 items) which

specifies specific teacher nonverbal behaviors, featuring a Likert-type scale (e.g., standing/sitting, tense/relaxed, formal/informal). Four 7-step evaluative semantic differential scales were used to assess affect toward the course, the course content, communication practices, and the course instructor. Results of correlational analyses indicated that nonverbal immediacy behaviors predicted 13% of the variance in intent to recommend the class to others, 19% of the variance in affect toward the course content, 22% of variance in affect toward communication practices, and 46% of the variance in affect toward the teacher. Interestingly, outcomes related to cognitive learning (operationalized by grades on a single test) did not show a significant correlation with nonverbal immediacy. Both The GI and BII instruments used by Anderson have been validated, shown to be reliable, and are still in use today. Notably, Anderson's BII scale formed the basis of Richmond et al.'s (1987) Nonverbal Immediacy Behaviors (NIB) scale (detailed later in this chapter) which has been more widely used.

An array of instruments to assess nonverbal and verbal immediacy behaviors were developed in the late 1980s, validated, and used extensively in face-to-face settings to investigate immediacy and its effects on learning outcomes. Two of the most commonly used instruments are those developed by Richmond et al. (1987) to measure nonverbal immediacy (14 items), and those developed by Gorham (1988) to measure verbal immediacy (20 items; see Appendix B).

In their 1987 study of immediacy behaviors, Richmond et al. (1987) sought to determine whether nonverbal instructor behaviors were associated with perceived cognitive learning in undergraduate college-level courses. They conducted two immediacy studies, one to investigate individual nonverbal behaviors (361 participants), and one to investigate them

collectively (358 participants). Their Nonverbal Immediacy Behaviors (NIB) scale was based on Anderson's (1979) BII instrument. Students in the courses studied were asked to indicate their level of learning for the course on a 0-9 scale, with 0 meaning they learned nothing and 9 meaning that they learned more than in any other course they had taken. Using the same scale, they were asked to indicate how much they thought they would have learned if the ideal instructor had taught the course. They then created a variable termed *learning-loss* by subtracting the score on the first scale from the score on the second. Participants were then presented with the 14 statements from the nonverbal immediacy scale (reference Appendix B) mixed in with 39 other items that were irrelevant to the study and asked to indicate whether or not their instructor had used each behavior. The researchers calculated a total immediacy score by summing the frequency scores of the 14 immediacy items, indicating an alpha reliability score of .87 for the first study and .80 for the second. They then ran multiple correlations between perceived learning and the scores for immediacy items (individual and combined), then between learning-loss and the scores for immediacy items (individual and combined). For both studies, the correlation of total immediacy predicted 50% of the variance in perceived learning. Correlations between individual immediacy items and learning-loss were somewhat higher than those for perceived learning, indicating an even stronger relationship. Interestingly, the analyses for individual nonverbal items revealed that not all were of equal importance. Three items, smiling at the class, having a relaxed body posture, and vocal expressiveness stood out as most important. Richmond et al. (1987) concluded that ideal instructors can be described as highly immediate and that immediacy behaviors are substantially associated with perceived cognitive learning.

Even though verbal cues were acknowledged as important contributors to the immediacy concept early on, prior to 1988 most of the attention in the literature was given to studies of nonverbal immediacy. According to Witt et al. (2004), it was after Gorham's pivotal 1988 study that researchers began studying both nonverbal and verbal immediacy measures and their effects on learning outcomes.

Gorham (1988) developed verbal immediacy measures based on data gathered from student focus groups to identify behaviors such as instructors' use of humor, self-disclosure, use of inclusive pronouns, and complimenting student contributions. The students who participated in the focus groups were undergraduates enrolled in upper-division communications courses ($n = 387$). They were part of a brainstorming exercise and were asked to identify specific behaviors for the best teachers they had been exposed to throughout their years of formal schooling. Those behaviors were consolidated into a list of 20 items (reference Appendix B). After the list was consolidated, participants indicated frequencies for the occurrence of these behaviors for the teacher in the class that preceded the one where the study was conducted, using a scale of 0 = Never to 4 = Very Often. Gorham also included the 14 nonverbal items from her earlier study with Richmond et al. (1987) for a total of 34 items. Total verbal and nonverbal scores were then calculated by summing the frequency scores for each set of items. Gorham assessed perceived cognitive learning using the "learning loss" method described above in the review of the Richmond et al. (1987) study, for which Gorham was a co-researcher. She also assessed affective learning/attitudes toward the course content using four 7-step bipolar scales (good/bad, valuable/worthless, fair/unfair, and positive/negative). Other outcomes were assessed but are not detailed here. Pearson correlations were computed for individual immediacy items with criterion variables (learning

loss, attitude) for the total sample and class subgroups. Scores for both verbal and nonverbal immediacy items were significantly correlated with both affective and perceived cognitive learning. Multiple regression analyses yielded meaningful results as well, indicating that verbal and nonverbal behaviors function in tandem to generate immediacy ($p < .001$). It is worth noting that analyses of individual verbal immediacy behaviors indicated that humor was particularly important. Two other verbal immediacy behaviors that students rated more highly were praising students work actions or comments, and the willingness of instructors to converse with students before or after class.

IMMEDIACY, HUMOR, AND LEARNING OUTCOMES

To further investigate the effects of humor (the highest rating verbal immediacy item from Gorham's 1988 study), Gorham and Christophel (1990) recruited students from several undergraduate communications courses to participate in a two-phase study yielding 206 participants. In phase one, participants completed an immediacy questionnaire to report behaviors for the instructor of one of their other courses, and questions related to their perceived cognitive learning and affect of learning for that course. The immediacy questionnaire used for phase one was based on Gorham's (1988) verbal immediacy scale (17 of the strongest 20 original items), and the short form (six items) of the nonverbal immediacy scale from Richmond et al. (1987). In phase two, participants kept a log of the number of times their teacher used humor over five class sessions, listing specific descriptions of each humorous incident. The logs were coded using a grounded theory constant comparison method during transcription to generate categories for analysis. Records for 117 male and 89 female participants were analyzed using Pearson's correlations. Researchers found that the

number of humorous incidents per instructor was positively correlated with each instructor's use of other verbal and nonverbal immediacy behaviors, and that immediacy was highly correlated with participants' perceived and affective learning. Interestingly, results indicated that male and female students perceive humor differently. For female students, learning outcomes were not as strongly influenced by humor as was indicated for male students. Regarding instructors, variations in use of humor by male teachers had a somewhat larger effect than variations in use of humor by female teachers.

IMMEDIACY, MOTIVATION, AND LEARNING OUTCOMES

Christophel (1990) investigated the relationship of verbal and nonverbal instructor immediacy to student motivation. Although student motivation had been investigated in educational settings, Christophel was among the first to link the approach-avoidance concept of immediacy with motivation. She used self-report measures to determine participants' motivational levels, and perceived and affective learning. Participants ($n = 562$) were primarily undergraduate students from a wide range of college-level courses. A 12-item trait and state motivation scale, featuring 12 bipolar items was used to determine how participants felt about taking a specific course (e.g., interested/uninterested, inspired/uninspired, excited/not excited). The trait motivation items related to taking classes in general, while state motivation related to a specific class in which they were enrolled. Correlations and regression analyses were used to investigate associations between immediacy, motivation, and perceived and affective aspects of learning. Results indicated that perceptions of instructor immediacy were positively correlated with state motivation, and that perceptions of trait and state motivation were positively associated with and a strong predictor of perceived

and affective learning. Results supported the notion that instructor immediacy behaviors first modify students' motivation which then impacts learning outcomes, with motivation serving as a mediating variable. Results also indicated that instructor immediacy behaviors were positively associated with learning outcomes and that nonverbal immediacy was a better predictor of learning than was verbal immediacy. This finding is interesting in light of the fact that Mehrabian (1971) indicated that movements and gestures (nonverbal immediacy behaviors) are so important that when words contradict them, others mistrust what is said and rely on what was seen rather than what was heard.

IMMEDIACY AND COGNITIVE LEARNING

As illustrated in the previous sections, the vast majority of immediacy research has relied on survey research (self-report) to measure students' perceptions of instructors and learning level. Even though self-reports are very useful for measuring affect and perceived learning, researchers question using these measures as accurate indicators of cognitive learning. Evaluating content knowledge (i.e., recall, recognition, test grades) is suggested as a more rigorous method for measuring cognitive learning and more of this type of research has been called for.

As noted earlier, Andersen (1979) was one the first to use an experimental design to investigate the relationship between nonverbal immediacy and teaching effectiveness. Her results indicated that although immediacy was a good predictor of student affect and behavioral commitment, no relationship was found between nonverbal immediacy and cognitive learning (as operationalized by grades on a single test).

Kelley and Gorham (1988) also utilized an experimental research design to test the effects of nonverbal immediacy behaviors on cognitive learning. They operationalized cognitive learning as the ability to store and recall word and number sequences. They created four conditions where levels of nonverbal “physical” immediacy (i.e., proximity, open posture, and head nods) and eye contact were manipulated to varying degrees. The four conditions included: high-immediacy /eye contact; high-immediacy/no eye contact; low-immediacy/eye contact; and low-immediacy/no eye contact. Results of a correlational analysis indicated that eye contact accounted for 6.9% of the variance on recall, while physical immediacy accounted for 11.4%.

Two other noteworthy immediacy studies that utilized experimental designs to study the influence of verbal and nonverbal instructor behaviors on cognitive learning are detailed here. These are Witt (2000) and Schutt (2007). At the heart of both studies was a 15- to 20-minute prerecorded teaching session where instructor immediacy was manipulated to create higher- and lower-immediacy conditions for investigation.

Witt (2000) explored how verbal and nonverbal instructor immediacy behaviors (operationalized as nonverbal and verbal sets) function to impact cognitive learning. He also investigated student motivation as it relates to immediacy and cognitive learning—not covered as part of this review.

Witt (2000) employed a 2x2 research design. Four teaching sessions were created and videotaped with identical content but varied combinations and degrees of verbal and nonverbal immediacy behaviors as follows:

1. Higher verbal-higher nonverbal
2. Higher verbal-lower nonverbal

3. Lower verbal-higher nonverbal
4. Lower verbal-lower nonverbal

Witt's sample ($N = 347$) was drawn from students enrolled in an introductory communications course in the fall of 1999. The course was a traditional face-to-face class that met in a large lecture hall once per week and another two times per week in small group settings. Witt conducted his sessions in the small group settings, although participants were randomly assigned to rooms and groups that differed from their usual class. Experimental conditions were strictly maintained; however, the researcher sought to preserve the authenticity of the classroom as well as minimize the impression that the sessions were part of an experiment.

Prior to viewing the prerecorded teaching sessions, participants were told that they would be viewing a lecture by a guest instructor related to their communications course, after which they would be asked some questions regarding their thoughts about the session. They were not told that they would be tested on the lesson content. Participants filled out a questionnaire that included demographic questions (age, gender, academic major, and class standing) and a 12-item student motivation scale. Next, they watched one of the four versions of the 15-minute prerecorded teaching session. Afterwards, they were asked to complete a cognitive learning assessment to test their recall of the content presented during the session. Recall measures were designed as an objective measure of cognitive learning and were comprised of segments of the script used for the teaching session, with key words blanked out. Word omissions varied in terms of difficulty and level of detail, and participants were scored on their ability to fill in the blanks. According to Wheelless (1971, as cited in Witt, 2000), typical reliability for this procedure, referred to as the *cloze procedure*, is in the range

of .80. The reliability coefficient for Witt's study was .88. Witt's results were analyzed with a two-way ANOVA (see Table 1).

Table 1. Witt's (Recall) Means from Two-Way ANOVA

| Variables | <i>N</i> | <i>M</i> |
|---------------------|------------|----------|
| Verbal Immediacy | | |
| Higher | 165 | 10.35 |
| Lower | 182 | 11.46 |
| Nonverbal Immediacy | | |
| Higher | 197 | 11.74* |
| Lower | 150 | 9.87* |
| Total | 694 | |

*Means were significantly different ($p < .05$).

The first hypothesis, which predicted greater cognitive learning (recall) for the groups that viewed sessions with higher verbal immediacy, was not supported. There was a significant main effect between higher and lower verbal immediacy groups, but in the opposite direction of what Witt predicted, with participants exposed to lower verbal immediacy scoring higher than those exposed to higher verbal immediacy. However, a post hoc comparison (Scheffe's *t* test) indicated no significant difference. Witt's second hypothesis predicted greater cognitive learning for groups who viewed the sessions with higher nonverbal immediacy, which the data analysis did support ($p = .0005$). Participants in the higher nonverbal immediacy group out performed those in the lower nonverbal immediacy group, with the difference in groups accounting for 3.09% of the variance in cognitive learning gains. A third hypothesis predicted the largest learning gains for the group that viewed the session with both high verbal and nonverbal instructor immediacy behaviors.

No significant difference was found for verbal and nonverbal immediacy combined, not surprising given the results of the independent analyses.

Schutt (2007) examined high and low instructor immediacy behaviors in a web-based field setting using two different combinations of technology tools. Her study examined the influence of instructor immediacy and learning environment on perceived instructor immediacy, perceived social presence, and cognitive learning outcomes. Only the results that pertain to the influence of immediacy and learning environment, on perceived immediacy and cognitive learning are detailed here.

As with Witt (2000), Schutt employed a 2x2 experimental research design with two factors. One factor was the level of instructor immediacy (high and low) and the second was the combination of communications media used in the learning environment. Two versions of a scripted and prerecorded 20-minute teaching session based on regular course content were produced, featuring full-motion video of the instructor, audio, and text-chat. Then two additional versions were created substituting a still photo of the instructor for the video, while retaining the audio portion of the file. This resulted in four treatment groups as shown below. It should be noted that all four treatments included the continuous display of PowerPoint slides related to session content.

1. High-immediacy/video, audio, and text-chat
2. High-immediacy/still photo, audio, and text-chat
3. Low-immediacy/video, audio, and text-chat
4. Low-immediacy/still photo, audio, and text-chat

The sample for Schutt's study was drawn from two 500-seat sections of an entry level psychology course offered in the fall of 2006; classes met twice weekly on Tuesdays and

Thursdays. One section of the course was delivered in a traditional face-to-face manner in a high-end technology infused classroom. The other was delivered as a blended course where one weekly class was delivered face-to-face in the same high-end classroom and the second was delivered synchronously in a Wimba Classroom, a virtual environment with affordances such as audio, video, content display, and application sharing. The 989 students registered for the two sections were randomly assigned to one of the four treatment groups and then sent an invitation to participate in the study by email. The invitation included a link to the URL where the recorded teaching session was located and other instructions. Those who chose to participate received extra credit (20 points out of a total of 700, 3% of the total course points). The email recruitment yielded 433 participants.

Schutt's study differed notably from Witt's (2000) in that participants were exposed to the stimulus materials and related post-measures in a field setting, rather than a controlled setting. Schutt's participants were told by their regular course instructor that they would complete an online assignment that included a prerecorded teaching session by a guest instructor in preparation for their upcoming midterm exam. Consistent with Witt's (2000) study, Schutt's participants were not aware at the onset of their participation that they were part of an experimental study. Schutt's participants were directed from the email invitation to one of four web pages based on the treatment group to which they had been assigned. The web pages were identical with the exception of the links to the prerecorded teaching sessions. The sessions were hosted on YouTube.com, a site that hosts user generated videos. Study questionnaires were posted on SurveyMonkey.com, a subscription service for generating online surveys. Prior to viewing the prerecorded teaching sessions, participants completed a multi-part questionnaire that included: (a) demographic items (age, gender, and ethnicity);

(b) a 7-item pretest to assess prior knowledge in the content area covered in the teaching session; and (c) a question to assess prior experience as learners in web-based settings. The instrument also featured directions about viewing the learning session and completing a post-questionnaire, organized in “parts” to measure perceived instructor immediacy, perceived social presence, and cognitive learning. Only the instruments used to measure perceived instructor immediacy and cognitive learning are further detailed here.

The immediacy questions Schutt used for her study were based on Gorham’s (1988) verbal immediacy scale (20 items), and Richmond et al.’s (1987) nonverbal immediacy scale (14 items; see Appendix B). These validated instruments have been implemented many times in face-to-face educational settings, but as of this writing only Schutt is known to have used them in a web-based context. Schutt revised the original wording for several items and omitted others to adapt them for use in web-based settings (see Appendix C).

Learning outcomes were measured twice, posttest and delayed posttest. The posttest, which featured the same seven items contained in the pretest, was administered directly after exposure to the teaching session. The delayed posttest, featuring four of the seven pre/posttest items, was embedded into one of the regular course exams, administered approximately one week after the study participation deadline. The time between exposure to the teaching sessions and learners’ completion of the posttest varied somewhat due to a one week lag-time between send-out of the invitation and the participation deadline.

Schutt used a one-way ANOVA to determine whether pretest scores should be used as a covariate for calculating group difference on the posttest. Her results indicated no significant differences among groups; thus co-varying wasn’t warranted. A one-way ANOVA was also used to determine differences in cognitive learning among the four groups (see

Table 2). Results of the analysis partially supported the overall hypothesis that participants who viewed the high-immediacy sessions would out perform their peers. Participants in Group 2 (high-immediacy with still photo) did out perform those in low-immediacy Groups 3 and 4. However, Schutt hypothesized that Group 1 (high-immediacy with video) would out perform all other groups which was not the case. The highest scoring group was Group 2 (high-immediacy with still photo). Surprisingly, Group 4 (low-immediacy with still photo) out performed both groups exposed to full video, Group 1 (high-immediacy with video) and Group 3 (low-immediacy with video). The only significant difference occurred between Groups 2 (high-immediacy with still photo) and 3 (low-immediacy with video). Analysis for the delayed posttest was done in a similar manner; indicating no significant differences among the four groups (see Table 2). Interestingly, however, the pattern seen for the posttest was not retained for the delayed posttest. Group 4 indicated the highest scores, closely followed by Group 1, then Group 2. Group 3 did retain its position as the lowest performing group at both posttest and delayed.

Table 2. Schutt's Posttest and Delayed Posttest Means

| Variables | Posttest <i>M</i> | Delayed Posttest <i>M</i> |
|-------------------|-------------------|---------------------------|
| Group 1 (Hi-Vid) | 5.22 | 3.22 |
| Group 2 (Hi-Stil) | 5.40* | 3.17 |
| Group 3 (Hi-Vid) | 4.87* | 3.06 |
| Group 4 (Lo-Stil) | 5.28 | 3.25 |

*Means were significantly different ($p < .05$).

Summary of Immediacy's influence on Learning Outcomes

Andersen's (1979) foundational work and the findings of 80 other studies that followed were included in a meta-analytical review conducted by Witt et al. (2004) that focused on instructor verbal and nonverbal immediacy behaviors and their relationship to students' perceived, affective, and cognitive learning. As noted earlier the vast majority of immediacy studies have relied on survey research (self-report) to measure learning outcomes. All but 10 of the 81 studies included in the Witt et al. (2004) meta-analysis used self-report measures. Although data utilizing student self-reports are considered useful for measuring perceived learning, researchers may object to these measures as accurate indicators of cognitive learning. Experimental or quasi-experimental research designs that measure cognitive learning are generally thought to be more rigorous than studies that employ only perceptual measures. Witt et al. (2004) report that for the 10 experimental studies included in their meta-analysis, where researchers studied controlled manipulations of instructor immediacy and their relationship with learning outcomes, it was generally found that the effects of both types of immediacy on cognitive, affective, and perceived learning were less pronounced than in studies that utilized survey research designs. It is interesting to note that of those 10 experimental studies, only two measured delayed recall.

Overall, findings of Witt et al. (2004) indicate significant positive relationships between instructor immediacy and student learning with slightly higher correlations among studies where teacher immediacy was measured as a single construct (verbal and nonverbal immediacy behaviors combined). The results revealed consistent patterns in the relationships between instructor immediacy behaviors and perceived and affective learning, whereas lower

correlations were seen for both types of immediacy in relationship to cognitive learning. All of the studies that measured cognitive learning assessed recall, recognition, and some method of grading, but as mentioned earlier just two measured delayed recall, and their results were inconclusive, highlighting the importance of further research in this area. Witt et al. summarized their findings by highlighting the point that instructors who are perceived as highly immediate generate higher levels of perceived and affective learning, but a much smaller effect is seen with regard to cognitive learning. They further suggest that due to the small number of experimental studies and heavy reliance on survey questionnaires for studies included in their meta-analysis, the quality of causal inferences is minimized. These findings point to the importance of continued research on cognitive performance associated with instructor immediacy, especially confirmatory experimental research that includes measuring the retention of learning over time.

In summary, then, the studies highlighted in this review of literature indicate the importance of participants' perceptions of the presence of others in their learning experience, the essential nature of its role in the learning process, and that learners' perceptions of community, social presence, and immediacy influence important learning outcomes. In web-based settings it can be challenging to replicate interactions that occur in face-to face settings. For participants in web-based settings the cues provided through these interactions will be conveyed differently based on the combination of media tools employed in the learning environment. As the studies presented in this review demonstrate, connection and interaction among participants are important contributors to learning outcomes. Social connections and how they are facilitated are therefore important factors for instructors and instructional designers to consider when developing courses in web-based environments. Further research

is needed to measure and evaluate the effectiveness of various strategies to determine which contribute the most to building social connections and influencing learning outcomes. It is particularly important to investigate strategies that are within the instructor's control, such as immediacy behaviors, and choice of communication media, to determine whether instructor immediacy influences actual cognitive learning as strongly as it has been shown to influence perceived learning and learner satisfaction.

The implications of the studies cited in this chapter affect both the realms of research and practice. Additional confirmatory experimental research is needed regarding immediacy, to determine its influence not only on cognitive learning, perceived learning and satisfaction, but also on retention of learning gains over time. Research is also needed to determine which media elements best convey immediacy and facilitate interaction. The knowledge gained from empirical studies can serve to inform course designers and instructors in proven methods to convey immediacy behaviors and facilitate communication and collaboration in web-based settings.

CHAPTER 3

METHODOLOGY

Chapter 2 focused on the constructs that underlie this research effort, specifically community, social presence, and immediacy. The goal was to explore how they interact and ways they can be cultured into learning environments to positively affect learning outcomes. The researcher also explained the effects of social presence and instructor immediacy on learner satisfaction, perceived learning, and cognitive learning. Areas for further research were identified that contributed to shaping this study.

This chapter describes the research design that grounds the study, including a description of the stimulus materials, population and sample, instrumentation and data collection procedures, and the data analysis plan. To answer the research questions, the researcher created four web-based conditions to examine student perceptions of instructor immediacy, cognitive learning, perceived learning, and satisfaction with the teaching session.

RESEARCH DESIGN

This study built on the work of Witt (2000) and Schutt (2007). Both researchers used an experimental design that featured scripted and prerecorded teaching sessions with manipulated levels of instructor immediacy to create the conditions necessary to explore their respective research questions. This section includes several subsections. For each, the procedures that were replicated, either from Witt's (2000) or Schutt's (2007), are noted as well as other similarities or differences.

Methodologically, the study is a one-factor design that explored the influence of immediacy (operationalized as having two dimensions: instructor behaviors and communication media), on participants' perceptions¹ of immediacy as well as cognitive learning, perceived cognitive learning, and satisfaction with the teaching session. For these two dimensions of immediacy, the primary dimension (verbal and nonverbal instructor behaviors) carries greater weight than the secondary dimension (the medium by which the instructor interjected herself). As in both Witt's and Schutt's studies, four scripted and prerecorded teaching sessions exhibiting both higher- and lower-immediacy behaviors were created—the verbal and nonverbal immediacy scales around which they were structured featured Schutt's adaptations of the Gorham (1988) verbal immediacy scale (20 items), and Richmond et al. (1987) nonverbal immediacy scale (14 items) detailed earlier (see Appendix B). It also replicates the structure of Schutt's four treatment groups organized into two sets. One set (both higher- and lower-immediacy) simulated a synchronous teaching session with one instructor and six mock students in a web-based classroom with full-motion video of the instructor, audio, and text chat. A second set was created in the same setting with a still image of the instructor replacing the full-motion video. The elements of the teaching sessions differed from Schutt's in four main ways: (a) the guest instructor was female; (b) the content the session covered was a different topic (cognitive dissonance theory); (c) the environment for the sessions was the Wimba Virtual Classroom; and (d) PowerPoint slides, which were continually displayed throughout Schutt's sessions, were not included.¹

The process for collecting the data more closely resembled Witt's, with controlled small group settings being used to administer the pretest materials, present the teaching

¹The present study did not explore the effects of presenting test-based content on learning outcomes.

sessions, and administer the posttest measures. Clearly, the setting for the sessions differed from Witt's in that they were conducted in a computer lab where participants sat at individual workstations with headsets and all materials were web-based. Witt's sessions were projected onto a large screen in the room and the instruments used for data collection were paper-based. In contrast, Schutt's (2007) study participants accessed her materials in a field setting rather than a controlled setting.

Participants

Participants in the study were undergraduate students enrolled in two 500-seat sections of a lower-division psychology course (PSY 101; 3 units) at a large urban public university in southern California. PSY 101 is required for the psychology major but it also meets general education requirements for non-majors. Both sections of PSY 101 were taught by the same instructor and met twice weekly, on Tuesdays and Thursdays. One section of the course was delivered in a traditional face-to-face manner in a high-end technology-infused classroom, while the other was a blended course that met in the same high-end classroom once per week and in a Wimba Virtual Classroom for the second weekly meeting. Participation in the study was, of course, voluntary. Students who opted in received 20 points of extra credit for the PSY 101 course (3% of the total course points).

Teaching Sessions/Experimental Treatments

As noted earlier, the study replicated key elements of experimental immediacy studies conducted by Witt (2000) and Schutt (2007), which both used 15-20 minute prerecorded teaching sessions with manipulated immediacy conditions. At the heart of this study as well

were two scripted and prerecorded 15-minute teaching sessions. The topic for the sessions was *cognitive dissonance theory*—common content for undergraduate psychology students (Myers, 2007). The main tenets of the theory can be covered in a relatively short session; moreover, it is not difficult to exemplify how the theory can be applied to real life situations in ways to which younger students can easily relate without having prior knowledge of the topic. This topic was also chosen based on the following:

- Approved by the course instructor
- Introductory level for the discipline
- Not included as part of the content covered by the regular course instructor

Cognitive dissonance theory is relatively straightforward. There is a tendency for people to seek harmony (consistency) among their beliefs, feelings, and opinions (also known as cognitions). When inconsistencies occur between behaviors or attitudes, the result is dissonance among cognitions (disharmony among beliefs, feelings, and/or opinions). Dissonance most often occurs in situations where a person must choose between two incompatible beliefs or actions. In essence, the theory maintains that something must change to eliminate the dissonance so that the person can return to a state of harmony. Factors that affect the strength of the dissonance are the number of dissonant beliefs, and how important each one is to the individual. Dissonance can be eliminated in three ways: (a) by reducing the importance of the dissonant beliefs; (b) by adding more consonant/harmonious beliefs that outweigh the dissonant beliefs; and (c) by changing the dissonant beliefs so that they are no longer out of harmony or inconsistent (Kearsley, 2008).

The guest instructor for the prerecorded sessions was chosen based on her demonstrated excellence as a teacher, knowledge of the lesson content, and ability to exhibit

higher- and lower-immediacy behaviors on camera. She holds the position of Professor and Co-Director of Teacher Education at the university where the study was conducted and is also the faculty liaison for the School in the Park program,² and the designer of Armaiti Island.³

Instructor behaviors for the higher- and lower-immediacy sessions were based on Gorham's (1988) verbal immediacy scale (20 items), and Richmond et al.'s (1987) nonverbal immediacy scale (14 items; see Appendix B), as modified by Schutt (2007) for use in an online setting (see Appendix C). Her modification, with a reverse discriminator item that she omitted added back for this study, resulted in a total of 17 verbal items and 11 nonverbal items as noted in Appendix C. Table 3 depicts the distribution of immediacy behaviors more specifically within the four treatments. Several behaviors address the formal or informal characteristics of the instructor. Expanding on these behaviors, the instructor was dressed a bit more formally (wearing a suit jacket) for the lower-immediacy sessions and less formally (wearing a more casual blouse with an open collar and no jacket) for the higher-immediacy sessions (see Appendix D).

In addition to manipulating instructor behaviors, two different combinations of communication media were used for delivery of the course content. Ultimately then, this resulted in the four conditions. Treatment Groups 1 and 2 were those in which the instructor exhibited higher-immediacy behaviors. For Treatment Groups 3 and 4 the instructor exhibited lower-immediacy behaviors. Each immediacy set (higher and lower) included one session conveyed by rich media (full video of the instructor) and another conveyed by more

²A park-based program for 3rd, 4th, and 5th graders. Reference <http://edweb.sdsu.edu/people/CMathison/SITP.html>

³An electronic simulation designed for professional educators. Reference <http://edweb.sdsu.edu/people/CMathison/ArmaitiIsland.html>

Table 3. Instructor Immediacy Behaviors by Treatment Group

| Instructor Behaviors | Group 1 (Hi-Video) | Group 2 (Hi-Still) | Group 3 (Lo-Video) | Group 4 (Lo-Still) |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| Exhibited a relaxed posture, moving upper body and head (animated). | X | | | |
| Exhibited a more stiff posture, not moving upper body and head (not animated). | | | X | |
| Smiled or displayed a still photo of herself smiling. | | X | | |
| Did not smile, displayed a still photo of herself not smiling. | | | | X |
| Used inclusive language, "we," "our." | X | X | | |
| Used exclusive language, "my," "mine." | | | X | X |
| Asked students to address her by first name (informal). | X | X | | |
| Asked students to address her as Dr. (formal). | | | X | X |
| Addressed students by first name. | X | X | | |
| Addressed students by last name. | | | X | X |
| Used enthusiastic voice and varied vocal expressions. | X | X | | |
| Used a more dull, monotone voice. | | | X | X |
| Used personal examples, talked about experiences outside of class. | X | X | | |
| Used impersonal examples, did not talk about experiences outside of class. | | | X | X |
| Smiled, exhibited emotion, used gestures and humor. | X | X | | |
| Did not smile, exhibit emotion, use gestures or humor. | | | X | X |
| Looked directly at the camera often/did not appear to read notes. | X | X | | |
| Looked less often at the camera/appeared to read notes. | | | X | X |
| Asked how students felt about topic. | X | X | | |
| Did not ask how students felt about topic. | | | X | X |
| Solicit students' views/asked questions/encouraged students to talk. | X | X | | |
| Did not solicit students' views/ask questions/encourage students to talk. | | | X | X |
| Invited students to contact her outside of class if they want to discuss something. | X | X | | |
| Did not invite students to contact her if they want to discuss something. | | | X | X |
| Provided feedback/praised students' comments. | X | X | | |
| Did not provide feedback/praise students' comments. | | | X | X |
| Encouraged discussion on unplanned student questions/comments. | X | X | | |
| Did not encourage discussion on unplanned student questions/comments. | | | X | X |

lean media (a still photo of the instructor, accompanied by an identical audio file) all sessions simulated interaction with six mock students via text chat throughout the session. The four Treatment Groups are depicted in Table 4 (also reference Appendix D).

Table 4. Experimental Treatment Groups

| Groups | Treatments |
|--------------------|---|
| Group 1 (Hi-Vid) | Higher-immediacy with full video, audio, and text chat |
| Group 2 (Hi-Still) | Higher-immediacy with still photo, audio, and text chat |
| Group 3 (Lo-Vid) | Lower-immediacy with full video, audio, and text chat |
| Group 4 (Lo-Still) | Lower-immediacy with still photo, audio, and text chat |

Instrumentation

Data were collected in a variety of ways as described below.

PRE-SESSION INVENTORY

The researcher worked collaboratively with the regular course instructor to develop a pre-session inventory with two distinct parts. Consistent with Schutt (2007), the first part was a demographic inventory that called for students to indicate their age, gender, and ethnicity as well as questions to assess prior experience in online educational settings (see Appendix E). The researcher included three questions related to students' experience receiving instruction in online settings. Students indicated how many courses they had taken in the past where part or all of the instruction was delivered online, how many of their current courses were blended or fully online, and the total number of such courses they had been exposed to. In regard to demography, Witt (2000) included questions related to age and gender, but not related to ethnicity or experience in online educational settings.

Part two was a content-based pretest featuring seven items to assess prior knowledge in the content area (see Appendix F). Conceptually, they focused on who developed the theory, what cognitions are, what dissonance is, what dissonance among cognitions means, and strategies that can be used to reduce or eliminate dissonance among cognitions. Four of the seven questions were traditional multiple choice. Each of the other three questions was multiple choice with multiple correct answers. Here, partially correct answers were scored as incorrect. Structuring and grading these three questions in this manner increased their level of difficulty over the four questions with only one correct answer, which the researcher felt was important in light of the fact that just seven total questions were asked. Schutt's (2007) study also included a pretest of content knowledge (seven items), but Witt's (2000) did not.

The data collected from the pre-session inventory were used to determine the equivalency of the four treatment groups and the extent to which they represented the larger population.

POST-SESSION INVENTORY

The post-session inventory included measures to assess participants' satisfaction with the teaching session and perceived learning, perceived immediacy, and cognitive learning at two points in time.

Satisfaction and Perceived Learning Measures

The researcher developed two sets of questions to assess students' satisfaction with the teaching session (4 items) and their perceived learning (3 items). Both sets of questions used an ordinal scale for response choices (see Appendix G). The satisfaction items assessed

how participants valued the teaching session, whether it held their attention, how likely they were to recommend it to others, and their level of interest in learning more about the theory presented. Questions related to perceived learning asked participants to indicate their level of learning, how well they felt they understood the theory, and how well they thought they could apply the theory to real life situations. These questions were posed just after participants had viewed the teaching session—before the immediacy questions and the posttest of cognitive learning. Neither Witt (2000) nor Schutt (2007) assessed satisfaction or perceived learning as part of their studies. However, many researchers, as noted in Chapter 2, have assessed satisfaction and perceived learning and the researcher for this study was interested in including measures to assess these outcomes for comparison.

Instructor Immediacy Questionnaire

As detailed earlier, the immediacy questionnaire for the study consisted of two parts based on Schutt's adaptation of validated instruments developed by Gorham (1988) to measure verbal immediacy (20 items), and Richmond et al. (1987) to measure nonverbal immediacy (14 items). Both verbal and nonverbal immediacy instruments used a 5-point ordinal scale that ranged from 0 (never) to 4 (often). The original scales are located in Appendix B, and the scales as adapted by Schutt (2007) are Appendix C. The original instruments have been implemented many times in face-to-face educational settings, but as of this writing only Schutt is known to have used an adapted version in a web-based context. Schutt revised the original wording for several items and omitted others to adapt them for use in online environments.

Example of an omitted item: The original nonverbal immediacy scale included an item that asked respondents if the instructor “touches students in the class.” Participants in web-based settings are not co-located. Therefore, that item was omitted.

Example of a revised item: For the original verbal immediacy scale one item reads, “Gets into conversations with individual students before or after class.” Schutt’s version was modified to read, “Invites students to have conversations before or after class.”

One verbal immediacy item that Schutt omitted was determined to be appropriate for use in a web-based setting, and therefore was added back. This item, a reverse discriminator, related to the use of inclusive pronouns, “Refers to class as ‘my’ call or what ‘I’ am doing.”

Schutt reported that reliability coefficients for the original scales ranged from .77 to .94, for verbal immediacy, and .76 to .82 for nonverbal immediacy. Schutt’s reliability analysis for the revised measures combined yielded a Cronbach’s alpha of .90. Separated out, the reliability coefficient for the verbal immediacy items was .86. For the nonverbal immediacy items, reliability was .85.

Posttest

Students completed a posttest that replicated the pretest, in that the same seven items were presented in the same order as before (see Appendix F). The posttest was designed to assess learning gains in the cognitive domain. The posttest was administered after participants viewed the teaching session and completed the satisfaction, perceived learning, and immediacy measures.

Delayed Posttest

Items for the delayed posttest were embedded into the last of four regular exams for the course to allow for a longer delay than measured in earlier studies. It was then notably different from Schutt's study in that delayed posttest measures were administered 5-6 weeks after exposure to the teaching session, whereas for Schutt's study the time frame between the posttest and delayed posttest was 1-2 weeks. Witt's (2000) study did not include a delayed posttest.

To recap, the delayed posttest for this study featured the same measures as the pre/posttests (items presented in the same order), and was embedded into the last regular course exam; it assessed retention of learning gains more long-term. The regular course exam included 40 questions with the delayed posttest items presented afterwards (Qs 41-47). Altogether then, they accounted for 17.5% of the exam questions. Students were aware that the seven posttest items were part of the research study and did not count toward the grade for the exam or the course.

PROCEDURES

For this study students were aware that they were participating in a research study and were told that they would be evaluating one of four teaching sessions in a web-based setting. Participants for Witt's (2000) and Schutt's (2007) studies were not aware that they were part of an experimental study. Schutt's participants were told by their regular course instructor that they would complete an online assignment that included a prerecorded teaching session by a guest instructor in preparation for their upcoming midterm exam. Similarly, Witt's

(2000) participants were told that they would be receiving a portion of their course content through a video-taped lecture by a guest instructor.

As with Witt's (2000) study, small group sessions for this study were run in a controlled environment. Students signed up for these sessions through a web-based research participation tracking system—Sona Systems Ltd. (see: <http://www.sona-systems.com/>). The sessions were held in computer labs (22 seats) equipped with new iMac computers. Each participant was seated at his or her own workstation (equipped with a headset) where he or she viewed the stimulus materials and completed the questionnaires. Upon entering the lab, each participant drew a randomizer chip from a canister, selected a workstation, and reviewed and signed the Informed Consent document. Once the document was signed, he or she heard a brief overview of the study and was encouraged to ask questions/seek clarification. The individual was then directed to the link corresponding to his/her respective treatment group; he or she then accessed the website by entering a password that was written on the back of the randomizer chip.

The next steps in the process are outlined here. Participants:

1. Completed the pretest, e.g., 13 questions to gather demographic information (3), determine prior experience in web-based educational settings (3), and assess prior knowledge of the content (7)
2. Viewed the prerecorded teaching session
3. Completed the 35 items to assess satisfaction with the session (4 items), perceived learning (3 items), and perceived immediacy (28 items)
4. Took the posttest, i.e., same seven questions featured in the pretest to evaluate cognitive learning in the content area (presented in the same order)
5. Completed the delayed posttest (embedded into the fourth regular course exam)—used to measure retention of learning gains 5-6 weeks after the initial

exposure (i.e., the same seven questions featured in the pre/posttests presented in the same order)

In contrast, Schutt's study was conducted in a field setting, where participants received an email invitation that included links to where the stimulus materials were located. Participants were randomized before the invitation was sent and were exposed to the treatments and data collection instruments in a variety of settings. All materials were web-based.

CHAPTER 4

RESULTS

The purpose of this study was to investigate how instructor immediacy (operationalized as having two dimensions: instructor behaviors and communication media) affects perceived immediacy, cognitive learning, perceived learning, and satisfaction with teaching. Again, immediacy was operationalized as having two dimensions: instructor behaviors and communication media, with the primary dimension (verbal and nonverbal instructor behaviors) carrying greater weight than the secondary dimension (the medium by which the instructor interjected herself).

Chapter 3 described the research design used to carry out the study, including details about the experimental treatments, population and sample, instrumentation, procedures, and limitations. This chapter summarizes the results of the data analysis and concludes with a summary of key points. Organizationally, the researcher first details demographic characteristics of the study participants, comparing them to the population from which they were recruited (by age, gender, and ethnicity). The remaining content is organized around the four overarching research questions listed here.

Research Question 1 (RQ1): How do participants perceive immediacy?

Research Question 2 (RQ2): How does immediacy influence cognitive learning?

Research Question 3 (RQ3): How does immediacy influence perceived learning?

Research Question 4 (RQ4): How does immediacy influence satisfaction with teaching?

PARTICIPANT DEMOGRAPHY

Participants in the study were undergraduate students enrolled in two 500-seat sections of an introductory Psychology course (PSY 101). Both sections of PSY 101 met twice weekly, on Tuesdays and Thursdays, and were taught by the same instructor. One section of the course (9:30 a.m. start-time) featured a blended format, with one weekly class delivered face-to-face in a high-end technology-infused classroom, and the other delivered synchronously in the Wimba Virtual Classroom; the other section (11:00 a.m. start-time) was delivered in a traditional face-to-face manner in the same high-end technology-infused classroom. A total of 599 students participated (72% of the total 830 enrolled). However, records for 23 participants were unusable—either because the students were under the age of 18, or they did not complete the tasks associated with the study; altogether, then, there were 576 usable records for analysis. Because participants could leave questions unanswered, the number of responses per item varies somewhat throughout the analysis.

The study unfolded in a computer lab setting where, upon entry to the room, participants were randomly assigned to one of four treatment groups:

1. Group 1 (Hi-Vid, $n = 145$)—Group 1 was exposed to a 15-minute prerecorded teaching session where the instructor exhibited higher-immediacy behaviors with a rich media delivery method that included full video of the instructor and text chat.
2. Group 2 (Hi-Stil, $n = 154$)—Group 2 was exposed to a 15-minute prerecorded teaching session where the instructor exhibited higher-immediacy behaviors with a more lean media delivery method that included a still photo of the instructor and text chat.
3. Group 3 (Lo-Vid, $n = 135$)—Group 3 was exposed to a 15-minute prerecorded teaching session where the instructor exhibited lower-immediacy behaviors with a rich media delivery method that included full video of the instructor and text chat.

4. Group 4 (Lo-Stil, $n = 142$)—Group 4 was exposed to a 15-minute prerecorded teaching session where the instructor exhibited lower-immediacy behaviors with a more lean delivery method that included a still photo of the instructor and text chat.

Random assignment allowed for a fairly even split between the two PSY 101 sections (9:30 a.m. class: $n = 285$ or 49.5%; 11:00 a.m. class: $n = 291$ or 50.5%) overall. Random assignment also ensured balance within sections by treatment group. For the 9:30 a.m. section, the percentages ranged from 47.6% to 51.4% across the four groups, while the 11:00 a.m. section percentages ranged from 48.6% to 52.4%. Thus, with the nearly 50/50 balance within treatment groups for each of the two sections, the familiarity with the Wimba Virtual Classroom that the 9:30 a.m. blended section participants had was not considered to be a confounding variable or limitation of the study.

Females comprised 68.9% of participants ($n = 397$) and males 31.1% ($n = 179$). This split remained within about 3 percentage points when randomized by treatment group. The vast majority of participants (96.7%) were in the 18 to 21 age range. The mix by race/ethnicity for the participants is indicated in Table 5. Caucasian was the largest group represented ($n = 250$; 43.4 %), followed by Filipino American ($n = 78$; 13.5%), Mexican American/Chicano ($n = 67$; 11.6%), and Latino/Hispanic ($n = 52$; 9%). When organized by treatment group the percentages shifted somewhat. Most notably, there were larger percentages of Asians in Group 2 and Filipino Americans in Group 3 as compared to the mix for the overall population (see Table 5).

Table 5. Percentages by Racial/Ethnic Group

| | Overall | Group 1 (Hi-Vid) | Group 2 (Hi-Stil) | Group 3 (Lo-Vid) | Group 4 (Lo-Stil) |
|---------------------------------|---------|---------------------|----------------------|---------------------|----------------------|
| Caucasian/European/Non-Hispanic | 4.3 | 45.5 | 44.8 | 39.3 | 43.7 |
| Filipino American | 13.5 | 7.6 | 11.0 | 20.7 | 15.5 |
| Mexican American/Chicano | 11.6 | 17.2 | 8.4 | 8.1 | 12.7 |
| Latino/Hispanic | 9.0 | 10.3 | 9.1 | 8.9 | 7.7 |
| Asian/Southeast Asian | 8.0 | 6.2 | 11.0 | 5.9 | 8.5 |
| Mixed/two or more groups | 8.0 | 6.9 | 9.1 | 9.6 | 6.3 |
| Middle Eastern | 3.1 | 2.8 | 3.9 | 2.2 | 3.5 |
| African American | 2.1 | 1.4 | 2.6 | 2.2 | 2.1 |
| Other | .9 | 1.4 | .0 | 2.1 | .0 |
| Missing | .3 | .0 | .0 | .7 | .0 |

The sample adequately represents the population from which it was drawn (PSY 101 students; $n = 830$).

- **Gender.** The division by gender was 68.9% female for the sample, as compared to 68.1% for the two course sections combined. Thus, males comprised 31.1% of the sample, and 31.9% of the population.
- **Age.** Over 90% of the population and the sample were under the age of 22. However, 18-year-olds comprised the age group most represented in the sample; within the population, they represented 56.1%). The researcher believes some of this difference is attributable to minors being excluded from the study; in the population, students 17 or younger comprised 6.8%.
- **Race/ethnicity.** Sample/population comparisons by race/ethnic group varied a bit, but showed similar proportions (see Table 6). For example, the majority in both the sample and population were Caucasian (43.4 and 46.3%, respectively). The most notable difference was the percentage of students identifying themselves as Filipino, which was four percentage points higher for the sample than the population (13.5 to 9.5%, respectively) as depicted in Table 6. Other ethnic/racial group comparisons are within two percentage points.

Table 6. Percentages by Ethnic Group for the Population and Sample

| | Sample | Population |
|---------------------------------|--------|------------|
| Caucasian/European/Non-Hispanic | 43.4 | 46.3 |
| Filipino American | 13.5 | 9.5 |
| Mexican American/Chicano | 11.6 | 12.4 |
| Latino/Hispanic | 9.0 | 7.6 |
| Asian/Southeast Asian | 8.0 | 6.7 |
| Mixed/two or more groups | 8.0 | 8.1 |
| Middle Eastern | 3.1 | 2.1 |
| African American | 2.1 | 3.1 |
| Other | .9 | 2.1 |
| Missing | .3 | 2.2 |

As detailed in Chapter 3, there were three questions in the pre-session inventory related to students' experience receiving instruction in online settings. The first two asked how many courses they had taken in the past where part or all of the instruction was delivered online, and how many of their current courses were blended or fully online. The third question, intended as a quality check for the sum of the numbers from the first two questions, asked for the total number of such courses they had or were taking where instruction was delivered online. Due to the large number of inconsistencies/non-matching numbers between the responses to the first two questions summed and the third quality check question, the researcher did not further analyze these data nor include them in the reporting of results.

RESULTS RQ1: IMMEDIACY

The first critical measure for this research study was participants' perception of immediacy. The researcher's driving question was: *How do participants perceive immediacy?* It was hypothesized that participants exposed to higher-immediacy instructor behaviors (Groups 1 and 2) would perceive higher immediacy than those in the lower-

immediacy treatments (Groups 3 and 4), and that participants exposed to higher-immediacy instructor behaviors delivered with rich media/full video (Group 1) would perceive the highest immediacy of the four groups.

Immediacy, as explained in Chapter 1, is perceived psychological or physical closeness (Christophel, 1990) that is conveyed by both nonverbal cues (e.g., a relaxed body posture, smiling, and use of gestures) and verbal cues (e.g., use of personal examples, humor, and emotion; Hostetter & Busch, 2006). For this study, immediacy was operationalized as having two dimensions: instructor behaviors and communication media, with verbal and nonverbal instructor behaviors carrying greater weight than the secondary dimension (communication media). As noted earlier, Treatment Groups 1 and 2 were those in which the instructor exhibited higher-immediacy behaviors; in Groups 3 and 4, however, those behaviors were far lower. Each set included one session featuring rich media (full video for the instructor) and another delivered via more lean media (a still photo of the instructor, with the same audio file). All sessions included text chat with six mock students throughout.

As detailed elsewhere, the immediacy questionnaire used in this study was based on validated instruments used extensively in face-to-face settings to investigate immediacy and its influence on learning outcomes (see Appendix B). The non-verbal instrument (14 items) was developed by Richmond et al. (1987), and the verbal instrument (20 items) was developed by Gorham (1988). More specifically, the researcher used Schutt's (2007) adaptation of these instruments—which were moderately revised for use in a technology-mediated setting (see Appendix C).

Three sets of scores were computed from the immediacy measures: verbal immediacy (17 items), nonverbal immediacy (11 items), and verbal and non-verbal combined (28 items).

Participants responded to a 5-point scale that ranged from 1 = *Never* to 5 = *Always*. Seven items (3 verbal and 4 nonverbal), designed as reverse discriminators, were recoded prior to analysis (see Appendix C). The highest possible scores were 85 for the verbal items (17 x 5), 55 for the non-verbal items (11 x 5), and 140 for the combined items (28 x 5).

The researcher performed three one-way ANOVAs to determine differences by treatment group (verbal, non-verbal, combined). Results for each test indicated that participants exposed to higher-immediacy instructor behaviors (Groups 1 and 2) did perceive higher levels of immediacy than their lower-immediacy counterparts (Groups 3 and 4)— $p = .000$ (see Table 7).

Table 7. Mean Scores for Immediacy

| | Verbal | Non-Verbal | Combined |
|-----------------------------|--------|------------|----------|
| Group 1 (Hi/Vid) $n = 145$ | 53.36 | 43.13 | 96.49 |
| Group 2 (Hi/Stil) $n = 154$ | 51.13 | 25.90 | 76.86 |
| Group 3 (Lo/Vid) $n = 135$ | 35.08 | 17.78 | 52.73 |
| Group 4 (Lo/Stil) $n = 142$ | 37.62 | 18.18 | 55.80 |
| Total $n = 576$ | | | |

Verbal Immediacy

Relative to the verbal items, participants exposed to higher-immediacy instructor behaviors, Treatment Groups 1 and 2, did perceived significantly higher levels of immediacy than their lower-immediacy counterparts (Groups 3 and 4)— $p = .000$. Post hoc Scheffé revealed significant group differences for five of the six possible pairs (Treatment Groups 1 and 3, 1 and 4, 2 and 3, 2 and 4, 3 and 4—see Table 7); the only pair for which the mean

difference was not significant was Groups 1 and 2—both of them receiving the higher-immediacy intervention (53.36 and 51.13, respectively; $p = .064$). Interestingly, even though the lower-immediacy groups (3 and 4) were significantly different from one another on the post hoc Tukey ($p = .034$), the mean for Group 4 (Lo-Stil) was higher than that for Group 3 (Lo-Vid) at 35.08 and 37.62, respectively.

Nonverbal Immediacy

The results for nonverbal immediacy confirmed that participants exposed to higher-immediacy instructor behaviors, Treatment Groups 1 and 2, also perceived significantly higher levels of immediacy than their Groups 3 and 4 counterparts— $p = .000$. Again, the post hoc test (Scheffé) revealed significant group differences for five of the six possible pairs (Treatment Groups 1 and 2, 1 and 3, 1 and 4, 2 and 3, and 2 and 4—see Table 7); the only pair for which the mean difference was not significant was Groups 3 and 4—both of them receiving the lower-immediacy intervention (17.78 and 18.18, respectively; $p = .966$). Repeating the same pattern as for the verbal immediacy results, the mean for Group 4 (Lo-Stil) was higher (albeit slightly) than that for Group 3 (Lo-Vid), at 18.18 and 17.78, respectively.

Verbal and Nonverbal Immediacy Combined

Not surprisingly, then, results for verbal and nonverbal immediacy items combined, also indicated that participants exposed to higher-immediacy instructor behaviors (Groups 1 and 2) perceived higher levels of immediacy than the lower-immediacy groups (3 and 4)— $p = .000$. Again, the post hoc Scheffé revealed significant group differences for five of the six possible pairs (Treatment Groups 1 and 2, 1 and 3, 1 and 4, 2 and 3, and 2 and 4—see

Table 7); the only pair for which the mean difference was not significant was again Groups 3 and 4—both of them receiving the lower-immediacy intervention (52.73 and 55.80, respectively; $p = .199$). Consistent then with the results for verbal and non-verbal immediacy run separately, the mean for Group 4 (Lo-Stil) was higher than that for Group 3 (Lo-Vid). Results thus firmly suggest that participants in Treatment Groups 1 and 2, exposed to an instructor who exhibited behaviors consistently shown in face-to-face settings to contribute to increased psychological closeness, perceived higher immediacy than participants not similarly exposed (Treatment Groups 3 and 4). Additionally, results confirm the hypothesis that those exposed to the higher-immediacy treatment delivered with rich media (full video of the instructor) perceived the highest immediacy among the four groups. It is interesting to note that mean scores for Groups 1 and 2—both exposed to higher- immediacy instructor behaviors—were significantly different from one another and consistently higher than those for their lower-immediacy counterparts. For these participants, rich or lean communication media (full video v. still photo) may indeed have affected perceptions of immediacy. A surprising finding was that participants in Treatment Group 4, exposed to lower-immediacy behaviors with more lean media (only a still photo of the instructor) perceived higher immediacy than Group 3, exposed to lower-immediacy behaviors with rich media (full video of the instructor), possibly indicating that when the instructor exhibits lower-immediacy behaviors communication media plays a lesser role.

RESULTS RQ2: COGNITIVE LEARNING

This section details results of the data gathered to measure cognitive learning. The researcher's driving question was: *How does immediacy (operationalized as having two*

dimensions: instructor behaviors and communication media) influence cognitive learning?

Again, immediacy was operationalized as having two dimensions: instructor behaviors and communication media, with verbal and nonverbal instructor behaviors carrying greater weight than the secondary dimension (communication media). Assisted by the course instructor, the researcher developed seven items for the purpose of accessing participants' knowledge of the content (cognitive dissonance theory) at three points in time: prior to their exposure to it, immediately after exposure to it, and more "long-term" (5 to 6 weeks after the initial exposure). As elsewhere described, the seven cognitive learning items were a mix of multiple choice and check-all-that-apply (see Appendix F). The check-all-that apply items were scored holistically; meaning that partial correct answers were scored as incorrect.

The researcher hypothesized that participants exposed to higher-immediacy instructor behaviors (Groups 1 and 2) would outperform those exposed to lower-immediacy behaviors (Groups 3 and 4), and that Group 1 (exposed to higher-immediacy behaviors with rich media/full video) would out perform all other groups. These hypotheses were generally supported. The higher-immediacy treatment groups (1 and 2) had means above the lower-immediacy treatment groups (3 and 4) for all measures related to cognitive learning at both posttest and delayed posttest, and participants in Group 1 (Hi-Vid) showed the highest level of cognitive learning among the four groups. Results for the pretest are detailed first, followed by results for the immediate posttest, and then results for the delayed posttest. Following the separate reports of each test is a section that compares pre/post, post/delayed, and pre/delayed test results. Then multiple comparisons related to the three tests are presented. The section ends with a summary of key findings.

Pretest Scores

The researcher was careful to choose a topic to which participants were unlikely to be exposed prior to the intervention; thus scores were relatively (but expectedly) poor. Fewer than 10% of the participants in Treatment Groups 1, 3, and 4 earned total pretest scores of four or more ($n = 6, 9, \text{ and } 7$, respectively). Participants in Group 2 performed best, with about 15% ($n = 19$) earning total pretest scores of four or more (see Table 8).

Table 8. Frequencies for Pretest by Treatment Group

| | 0-3 Correct | Cum % |
|-----------------------------|-------------|-------|
| Group 1 (Hi-Vid) $n = 122$ | 116 | 95.1 |
| Group 2 (Hi-Stil) $n = 129$ | 110 | 85.3 |
| Group 3 (Lo-Vid) $n = 118$ | 109 | 92.4 |
| Group 4 (Lo-Stil) $n = 121$ | 114 | 94.2 |
| Total $n = 490$ | | |

A one-way ANOVA of pretest scores by Treatment Group was conducted to determine whether pretest scores should be used as a covariate for calculating group difference on the posttest. The overall F test indicated a significant difference between groups ($p = .026$). However, the post hoc Scheffé revealed that the only pair for which mean scores were significantly different was Treatment Groups 1 and 2 (2.22— $p = .030$), as noted in Table 9. Given the low scores generally, the researcher felt that this “knowledge difference” was not critical and opted not to use pretest scores as a covariate in later analyses. It was determined, then, that in terms of content knowledge prior to the intervention, the groups were indeed equivalent; thus co-varying wasn’t warranted.

Table 9. Mean Scores for Pretest by Treatment Group

| Treatment Group | Pretest Means |
|-----------------------------|---------------|
| Group 1 (Hi-Vid) $n = 122$ | 1.83 |
| Group 2 (Hi-Stil) $n = 129$ | 2.22 |
| Group 3 (Lo-Vid) $n = 118$ | 1.99 |
| Group 4 (Lo-Stil) $n = 121$ | 1.97 |
| Total $n = 490$ | |

Posttest Scores

Showing improved performance at posttest, more than 80% of the participants in Treatment Groups 1, 2, and 3 earned total posttest scores of four or more ($n = 108, 112,$ and $94,$ respectively). Participants in Group 4 (Lo-Stil) performed less favorably, with only about 63% ($n = 86$) earning total posttest scores of four or more (see Table 10). Although Treatment Group 1 (Hi-Vid) outperformed Groups 2, 3, and 4, each group had significantly better pre to post scores. As noted earlier, no one in any group earned a perfect score on the pretest, but several did so at posttest (18, 3.2%). By treatment group, seven participants with perfect scores were from Group 1 (Hi-Vid), two were from Group 2 (Hi-Stil), five were from Group 3 (Lo-Vid), and four were from Group 4 (Lo-Stil).

A one-way ANOVA of posttest scores by Treatment Group revealed a significant difference between groups ($p = .003$). However, the post hoc Scheffé revealed that the only pair for which mean scores were significantly different, was Groups 1 and 4 ($3.96 - p = .003$), as depicted in Table 11. Interesting to note is that these two groups represent the treatment extremes: higher-immediacy/full video (Group 1) and lower-immediacy/still photo (Group 4).

Table 10. Frequencies for Posttest by Treatment Group

| | 0-3 Correct | Cum % |
|----------------------------------|-------------|-------|
| Group 1 (Hi-Vid) <i>n</i> = 145 | 30 | 20.7 |
| Group 2 (Hi-Stil) <i>n</i> = 151 | 37 | 24.5 |
| Group 3 (Lo-Vid) <i>n</i> = 134 | 35 | 26.1 |
| Group 4 (Lo-Stil) <i>n</i> = 142 | 52 | 36.6 |
| Total <i>n</i> = 572 | | |

Table 11. Mean Scores for Posttest by Treatment Group

| Treatment Group | Posttest Means |
|----------------------------------|----------------|
| Group 1 (Hi-Vid) <i>n</i> = 145 | 4.57 |
| Group 2 (Hi-Stil) <i>n</i> = 151 | 4.28 |
| Group 3 (Lo-Vid) <i>n</i> = 134 | 4.26 |
| Group 4 (Lo-Stil) <i>n</i> = 142 | 3.96 |
| Total <i>n</i> = 572 | |

Delayed Posttest Scores

As mentioned earlier in the limitations section, although the content for the teaching sessions (cognitive dissonance theory) was not covered in class by the regular course instructor, there was a section in the course text that the students were to have read prior to taking the regular course exam into which the delayed posttest measures were embedded. It is unknown whether study participants actually read that section of the text or how exposure to that material may have affected their delayed posttest scores, either positively or negatively.

Although all groups showed significantly improved performance pre to post, each group's scores dropped back somewhat post to delayed (a 5 to 6-week interval). At delayed posttest (Table 12), fewer than 50% of the participants exposed to higher-immediacy

instruction (Groups 1 and 2) earned total scores of four or more ($n = 58$ and 62 , respectively). Performing somewhat lower than Groups 1 and 2, less than 40% of those in lower-immediacy Groups 3 and 4 earned total scores of four or more ($n = 47$, and 48 , respectively). Only one participant earned a perfect score on the delayed posttest, whereas several students had done so at 5-6 weeks earlier on the posttest (18 ; 3.2%).

Table 12. Frequencies for Delayed Posttest by Treatment Group

| | 0-3 Correct | Cum % |
|-----------------------------|-------------|-------|
| Group 1 (Hi-Vid) $n = 131$ | 73 | 55.7 |
| Group 2 (Hi-Stil) $n = 148$ | 86 | 58.1 |
| Group 3 (Lo-Vid) $n = 129$ | 82 | 63.6 |
| Group 4 (Lo-Stil) $n = 130$ | 82 | 63.1 |
| Total $n = 538$ | | |

A one-way ANOVA of delayed posttest scores by Treatment Group revealed no significant difference between groups ($p = .858$). However, Treatment Group 1 (Hi-Vid) still outperformed Groups 2, 3, and 4. Interestingly, the lower-immediacy group with lean media (Group 4) out performed (albeit slightly) Group 2 (Hi-Stil) and Group 3 (Lo-Vid) as depicted in Table 13.

Table 13. Mean Scores for Delayed Posttest by Treatment Group

| Treatment Group | Posttest Means |
|-----------------------------|----------------|
| Group 1 (Hi-Vid) $n = 131$ | 3.21 |
| Group 2 (Hi-Stil) $n = 148$ | 3.13 |
| Group 3 (Lo-Vid) $n = 129$ | 3.06 |
| Group 4 (Lo-Stil) $n = 130$ | 3.15 |
| Total $n = 538$ | |

Pre/Post/Delayed Test Comparisons

The researcher then performed a series of tests to explore the pre/post/delayed test data. She first ran a Repeated Measures ANOVA to include all three tests, pre/post/delayed. She then explored pretest to posttest, posttest to delayed posttest, and pretest to delayed posttest comparisons.

PRE/POST/DELAYED TESTS REPEATED MEASURES ANOVA

The researcher opted to more stringently test cognitive learning via the Repeated Measures ANOVA. The *within subjects* factor was the three testing points (pretest, posttest, delayed posttest), the *between-subjects* factor was Treatment Group, and the dependent variable was test scores. This procedure thus required three scores for each record—which explains why the total number of participants is lower in the aggregate ($n = 460$) and by Treatment Group than reported for the other analyses performed. The means and standard deviations for test scores in the aggregate and by group are presented in Table 14.

Results for the ANOVA indicated a significant *testing* effect (Wilks' Λ ; $p = .000$, multivariate $\eta^2 = .74$). Also significant were results for *testing by Treatment Group* (Wilks' Λ ; $p = .006$, multivariate $\eta^2 = .02$). Important to understand, however, is that the “change” for scores post to delayed was “reversed.” On the final exam—administered 5 to 6 weeks after exposure to the intervention—student scores significantly deteriorated both in the aggregate and by group although they still remained significantly higher than at pretest.

Table 14. Repeated Measures ANOVA

| | Treatment Group | Mean | Std. Deviation | N |
|-----------------------|-------------------|------|----------------|-----|
| Total Correct/Pre | Group 1 (Hi-Vid) | 1.83 | .927 | 110 |
| | Group 2 (Hi-Stil) | 2.24 | 1.129 | 124 |
| | Group 3 (Lo-Vid) | 2.04 | 1.082 | 112 |
| | Group 4 (Lo-Stil) | 2.00 | .987 | 114 |
| | Total | 2.03 | 1.044 | 460 |
| Total Correct/Post | Group 1 (Hi-Vid) | 4.65 | 1.359 | 110 |
| | Group 2 (Hi-Stil) | 4.39 | 1.273 | 124 |
| | Group 3 (Lo-Vid) | 4.33 | 1.385 | 112 |
| | Group 4 (Lo-Stil) | 4.18 | 1.485 | 114 |
| | Total | 4.38 | 1.381 | 460 |
| Total Correct/Delayed | Group 1 (Hi-Vid) | 3.26 | 1.373 | 110 |
| | Group 2 (Hi-Stil) | 3.24 | 1.321 | 124 |
| | Group 3 (Lo-Vid) | 3.13 | 1.376 | 112 |
| | Group 4 (Lo-Stil) | 3.21 | 1.307 | 114 |
| | Total | 3.21 | 1.340 | 460 |

PAIRWISE COMPARISONS

Follow-up pairwise comparisons—operationalized through a series of paired-samples *t* tests, helped to illuminate how the means differed from one another pretest to posttest, posttest to delayed posttest, and pretest to delayed posttest. The means and standard deviations for paired-samples test scores are first presented in the aggregate (see Table 15).

All three comparisons (pre/post, post/delayed, and pre/delayed) showed significant differences. The smallest *p value* was for the pretest/posttest comparison. The next smallest *p value* represented the posttest/delayed posttest comparison. Important to note with this comparison, however, is that the results were “reversed”—with student scores regressing on the delayed posttest. The next (and final) *p value* for the pretest/delayed comparison indicated

a significant retention of learning more long-term, albeit significantly less than what was seen at the point of the immediate posttest.

Key results associated with each pairwise comparison are detailed in the subsections that follow.

Table 15. Paired-Samples *t* Tests

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|-----------------------|------|-----|----------------|-----------------|
| Pair 1 | Total Correct/Pre | 2.03 | 460 | 1.044 | .049 |
| | Total Correct/Post | 4.38 | 460 | 1.381 | .064 |
| Pair 2 | Total Correct/Post | 4.38 | 460 | 1.381 | .064 |
| | Total Correct/Delayed | 3.21 | 460 | 1.340 | .062 |
| Pair 3 | Total Correct/Pre | 2.03 | 460 | 1.044 | .049 |
| | Total Correct/Delayed | 3.21 | 460 | 1.340 | .062 |

Pre/Post Comparisons

The researcher focused on pre/post differences by first exploring test results in the aggregate. Results indicated significance between pretest (2.03) and posttest means (4.38; $p = .000$). She then explored pre/post differences by Treatment Group. As mentioned earlier, although Treatment Group 1 (Hi-Vid) outperformed Groups 2, 3, and 4, pre to post, each group had significantly better scores at posttest, as depicted in Table 16. Most notably, Group 1 had the lowest mean score (1.83) at pretest, but the highest mean score at posttest (4.65), as seen in Table 16.

Table 16. Pre/Posttest Paired-Samples *t* Test by Treatment Group

| Treatment Group | Pretest Means | Posttest Means | sig. (2-tailed) |
|----------------------------------|---------------|----------------|-----------------|
| Group 1 (Hi-Vid) <i>n</i> = 110 | 1.83 | 4.65 | .000 |
| Group 2 (Hi-Stil) <i>n</i> = 124 | 2.24 | 4.39 | .000 |
| Group 3 (Lo-Vid) <i>n</i> = 112 | 2.04 | 4.33 | .000 |
| Group 4 (Lo-Stil) <i>n</i> = 114 | 2.00 | 4.18 | .000 |
| Total <i>n</i> = 460 | | | |

Post/Delayed Comparisons

Here again, the researcher first focused on post/delayed differences in the aggregate and then by Treatment Group. In the aggregate, there was a significant difference between posttest (4.38) and delayed posttest means (3.21; $p = .000$) as depicted in Table 17 (although in the opposite direction of what was seen pre/post, indicating a *decrease* in learning gains). Post/delayed posttest differences by Treatment Group indicated that although the groups exposed to higher-immediacy instructor behaviors (Groups 1 and 2) still outperformed their lower-immediacy counterparts post- to delayed posttest, score differences were not significant.

Pre/Delayed Comparisons

Finally, the researcher explored the pre/delayed data. Aggregate results indicated a significant difference between pretest and delayed posttest means ($m = 2.03$ and 3.21 ; $p = .000$). She then explored pretest and delayed posttest differences by Treatment Group (see Table 18). Most notably, all groups showed a significant improvement pretest to delayed posttest, even though their scores decreased significantly from posttest to delayed posttest. Although the scores were quite close on the delayed test, groups exposed to higher-

immediacy instructor behaviors (Groups 1 and 2) outperformed the lower-immediacy groups (3 and 4), with scores for Group 4 (Lo-Stil) higher than for Group 3 (Lo-Vid), depicted in Table 18.

Table 17. Post/Delayed Posttest Paired-Samples *t* Test by Treatment Group

| Treatment Group | Posttest Means | Delayed Posttest Means | sig. (2-tailed) |
|----------------------------------|----------------|------------------------|-----------------|
| Group 1 (Hi-Vid) <i>n</i> = 110 | 4.65 | 3.26 | .000 |
| Group 2 (Hi-Stil) <i>n</i> = 124 | 4.39 | 3.24 | .000 |
| Group 3 (Lo-Vid) <i>n</i> = 112 | 4.33 | 3.13 | .000 |
| Group 4 (Lo-Stil) <i>n</i> = 114 | 4.18 | 3.21 | .000 |
| Total <i>n</i> = 460 | | | |

Table 18. Pre/Delayed Posttest Paired-Samples *t* Test by Treatment Group

| Treatment Group | Pretest Means | Delayed Posttest Means | sig. (2-tailed) |
|----------------------------------|---------------|------------------------|-----------------|
| Group 1 (Hi-Vid) <i>n</i> = 110 | 1.83 | 3.26 | .000 |
| Group 2 (Hi-Stil) <i>n</i> = 124 | 2.24 | 3.24 | .000 |
| Group 3 (Lo-Vid) <i>n</i> = 112 | 2.04 | 3.13 | .000 |
| Group 4 (Lo-Stil) <i>n</i> = 114 | 2.00 | 3.21 | .000 |
| Total <i>n</i> = 460 | | | |

Summary

In summary, then, all score comparisons were statistically significant. The repeated measures test—which includes only those students with three test scores—confirmed that the greatest change (reflecting knowledge gains) was pretest to posttest, with Group 1 (Hi-Vid) outperforming all other Treatment Groups. In addition, Group 1 showed the greatest gain score (mean difference) pre to post. However, knowledge gains for all groups deteriorated

significantly weeks after exposure to their respective interventions—with the decline for Group 1 the most pronounced (1.39, vs. 1.15 for Group 2, 1.20 for Group 3, and .97 for Group 4. Still, pretest/delayed posttest results clearly show that Group 1 maintained its learning “lead” over the other three Treatment Groups—(gain of 1.43). Interestingly, the Group 4 (Lo-Stil) pretest to delayed posttest gain was the next largest (1.21), followed by Group 3 (Lo-Vid; 1.09) and Group 2 (Hi-Stil; 1.00). Table 19 depicts results in full.

Table 19. Mean Scores for Pre/Post/Delayed Tests by Treatment Group

| Treatment Group | Pretest Means | Posttest Means | Delayed Means | <i>Pre/Post Gain</i> | <i>Post/Delayed Loss</i> | <i>Pre/Delayed Gain</i> |
|-------------------------------------|---------------|----------------|---------------|----------------------|--------------------------|-------------------------|
| Group 1 (Hi-Vid) <i>n</i> = 110 | 1.83 | 4.65 | 3.26 | 2.82 | 1.39 | 1.43 |
| Group 2 (Hi-Stil) <i>n</i> = 124 | 2.24 | 4.39 | 3.24 | 2.15 | 1.15 | 1.00 |
| Group 3 (Lo-Vid) <i>n</i> = 112 | 2.04 | 4.33 | 3.13 | 2.29 | 1.20 | 1.09 |
| Group 4 (Lo-Stil) <i>n</i> = 114 | 2.00 | 4.18 | 3.21 | 2.18 | .97 | 1.21 |
| Total <i>n</i> = 460 | | | | | | |

RESULTS RQ3: PERCEIVED LEARNING

This section focuses on the results of the data gathered to measure perceived learning. The researcher’s driving question was: *How does immediacy (operationalized as having two dimensions: instructor behaviors and communication media) influence perceived learning?*

Again, immediacy was operationalized as having two dimensions: instructor behaviors and communication media, with verbal and nonverbal instructor behaviors carrying greater weight than the secondary dimension (communication media). Three items on the post-survey, administered just after exposure to the teaching session, attended to this construct—one focused on *quantity* (how much learned), one on *level of understanding*, and one on *applicability to real life situations* (see Appendix F). The item that measured quantity (how much learned) featured a four-point scale that ranged from 1 = *learned a lot* to 4 = *didn't learn much at all*. The remaining two items (related to level of understanding and applicability) featured a 5-point scale that ranged from 1 = *extremely well* to 5 = *not well at all*.

The researcher hypothesized that participants exposed to higher-immediacy instructor behaviors (Groups 1 and 2) would indicate higher levels of perceived learning than those exposed to lower-immediacy behaviors (Groups 3 and 4), and that Group 1 (exposed to higher-immediacy behaviors with rich media/full video) would perceive higher levels of learning than all other groups. These hypotheses were supported. Means for the higher-immediacy treatment groups (1 and 2) were higher than those for the lower-immediacy treatment groups (3 and 4) on all three items with participants in Group 1 (Hi-Vid) indicating the highest level of perceived learning among the four groups (see Table 20).

The researcher performed a one-way ANOVA for each item to explore Treatment Group differences; results in the aggregate were indeed significant ($p = .000$). Group 1's ratings were more favorable on all the perceived learning measures than those for the other three groups, and Group 2's ratings were higher than those for Groups 3 and 4. More detailed

results from the post hoc analyses (Scheffé) for each question related to perceived learning follow:

- (Q1) Results regarding the question that asked *how much they learned* indicated significant differences on the Scheffé between Group 1 (Hi-Vid) and each of the other three groups ($p = .001$), and there was a significant difference between Group 2 (Hi-Stil) and Group 4 (Lo-Stil), $p = .005$.
- (Q2) For the question that asked about *level of understanding*, there were significant differences on the post hoc Scheffé between all groups ($p = .000$ to $.031$) but Groups 3 (Lo-Vid) and 4 (Lo-Stil).
- (Q3) Lastly, results for the question that addressed *applicability to real life situations* indicated significant differences on the post hoc tests between Group 1 (Hi-Vid) and the lower-immediacy groups (3 and 4) $p = .000$ to $.001$ (Scheffé).

Table 20. Mean Scores for Perceived Learning

| Perceived Learning Qs | Group 1 (Hi-Vid) | Group 2 (Hi-Stil) | Group 3 (Lo-Vid) | Group 4 (Lo-Stil) |
|---|---------------------|----------------------|---------------------|----------------------|
| Q1 <i>How much learned...</i> (4-point scale) | 3.20 | 2.82 | 2.60 | 2.48 |
| Q2 <i>How well understood...</i> (5-point scale) | 3.76 | 3.45 | 3.07 | 3.06 |
| Q3 <i>Can apply the theory...</i> (5-point scale) | 4.26 | 4.03 | 3.84 | 3.79 |

In summary then, there were significant differences between groups on all questions related to perceived learning, and the groups exposed to higher immediacy instructor behaviors (1 and 2) rated all measures more favorably than their lower-immediacy counterparts (3 and 4). As important, Group 1 participants (Hi-Vid) consistently indicated the highest levels of perceived learning; with Group 2 (Hi-Stil) providing the next highest ratings on these same items.

RESULTS RQ4: SATISFACTION WITH TEACHING

This section targets results for satisfaction with the teaching session. The researcher's driving question was this: *How does immediacy (operationalized as having two dimensions: instructor behaviors and communication media) influence satisfaction with teaching?* Again, immediacy was operationalized as having two dimensions: instructor behaviors and communication media, with verbal and nonverbal instructor behaviors carrying greater weight than the secondary dimension (communication media). Participants responded to four items on the post-survey that was developed to assess satisfaction with the teaching session—specifically, *value to the learner, whether it held the learner's attention, if they would recommend it (their session) to others, and whether or not they were interested in learning more about the topic* (see Appendix F). Three of the four satisfaction questions featured a scaled response set with options that ranged from 1 = *extremely* to 5 = *not at all*. Options for a fourth satisfaction item ranged from 1 = *definitely would* to 4 = *definitely would not*.

The researcher hypothesized that participants exposed to higher-immediacy instructor behaviors (Groups 1 and 2) would show higher satisfaction ratings than those exposed to lower-immediacy behaviors (Groups 3 and 4), and that those in Group 1 (exposed to higher immediacy behaviors delivered with rich media/full video) would indicate higher levels of satisfaction with the teaching session than all other groups. These hypotheses were supported. The higher-immediacy treatment groups (1 and 2) had means above the lower-immediacy treatment groups (3 and 4) for all measures related to satisfaction, and participants in Group 1 (Hi-Vid) showed the highest level of satisfaction among the four groups (see Table 21).

Table 21. Mean Scores for Satisfaction with Teaching

| Perceived Learning Qs | | Group 1 Hi-Vid | Group 2 Hi-Stil | Group 3 Lo-Vid | Group 4 Lo-Stil |
|----------------------------------|-----------------|-------------------|--------------------|-------------------|--------------------|
| Q1 <i>How valuable...</i> | (5-point scale) | 3.75 | 3.56 | 3.31 | 3.26 |
| Q2 <i>Held attention...</i> | (5-point scale) | 3.72 | 3.10 | 2.56 | 2.59 |
| Q3 <i>Recommend to others...</i> | (4-point scale) | 3.17 | 2.77 | 2.27 | 2.26 |
| Q3 <i>Want to learn more...</i> | (5-point scale) | 3.16 | 2.99 | 2.76 | 2.77 |

As with the perceived learning measures, the researcher performed the one-way ANOVA on each satisfaction measure (rather than on the overall “cluster” of items). Significance between groups was found for all questions related to satisfaction but results were inconsistent—not surprising given the mean scores themselves. Repeating the same pattern as for the perceived learning measures, Table 19 shows that Group 1 (Hi-Vid) indicated greater satisfaction in all areas measured, with means ranging from 3.16 to 3.75, followed by Group 2 (Hi-Stil) with means ranging from 2.77 to 3.56. The mean scores for lower-immediacy groups (3 and 4) indicated less satisfaction than higher-immediacy groups (1 and 2) but were quite close to each other, ranging from 2.27 to 3.31 (Group 3, Lo-Vid), and from 2.26 to 3.26 (Group 4, Lo-Stil). Interestingly, mean scores for the lower-immediacy with lean media treatment (Group 4) were slightly higher than those seen for the lower-immediacy with rich media treatment (Group 3) on two items, Q2 (*held attention*) and Q4 (*want to learn more*).

More detailed results from the post hoc analyses (Scheffé) for each question related to perceived learning follow:

- (Q1) For the question that assessed the *value of the teaching session*, Group 1 (Hi-Vid) showed higher ratings than all groups, with scores significantly different

from lower-immediacy Groups 3 and 4 ($p = .000$). Group 2 (Hi-Stil) was significantly different from its lean media counterpart, Group 4 ($p = .024$).

- (Q2) Results for the question that asked *how well the session held their attention*, higher-immediacy Groups 1 and 2 differed significantly from all groups including each other ($p = .000$); only lower-immediacy Groups 3 and 4 did not differ significantly on this measure.
- (Q3) Responses to the question about *recommending the session to others* showed the same pattern as responses for Q2, with only lower-immediacy groups (3 and 4) not differing significantly.
- (Q4) Lastly, regarding the question about whether they would like to *learn more* about the topic of the teaching session, significant differences occurred between groups Group 1 (Hi-Vid) and Groups 3 (Lo-Vid) and 4 (Lo-Stil), $p = .002$.

CHAPTER 5

DISCUSSION

These are exciting times. Advances in technology occur daily that are changing how people perceive themselves and others in computer-mediated settings, the ways they express themselves and communicate with one another, and the ways in which they work and learn. The widespread development of technology infrastructures and computing capabilities have increased global access to the Internet and created new methods by which educational content can be delivered, and through which teachers and learners can interact. As one might expect, given the accelerated pace of technological advancement, research about learning with the aid of new technologies remains several steps behind. Adding to the challenge of keeping pace with the development of new ways of communicating are the complexities revolving around growing trends toward miniaturization, wireless accessibility, and the delivery of instructional content anytime and anywhere.

In higher education, web-based and other “alternative” forms of educational settings are being investigated in response to the need to serve increasing numbers of diverse student populations. Delivering instruction and facilitating learning in web-based settings can be an effective alternative to traditional face-to-face classrooms, allowing for communication without regard to geographic and time constraints. The purpose of this study was to add to this developing research base by focusing on the important area of social and behavioral cues. Specifically, the researcher investigated verbal and nonverbal instructor immediacy behaviors

transmitted into the Wimba Virtual Classroom and how these behaviors and choice of communication media influenced learning outcomes.

This chapter begins with a bit of background information regarding the concept of immediacy, media richness theory, how immediacy was operationalized for the purposes of this study, and an overview of the research design to provide a context for the discussion of the results that follows. Results are then discussed separately for each of the four research questions (what the study revealed and what additional questions it generated), followed by brief sections that highlight the strengths of the study, limitations, and recommendations for further research, and a summary of conclusions.

BACKGROUND FOR THE STUDY

As mentioned earlier, immediacy is created in part by physical cues such as smiling, speaking directly to students, having a relaxed body posture, gesturing, and utilizing humor (Hostetter & Busch, 2006). Higher-immediacy instructor behaviors have been shown to contribute to increased psychological closeness—thereby reducing psychological distance (Christophel, 1990). The concept of instructor immediacy has been widely studied in face-to-face educational environments with many positive effects. Higher-immediacy behaviors have been evidenced as contributing to increased learner affect toward the instructor and greater levels of satisfaction (Andersen, 1979; Gunawardena & Zittle, 1997; Hostetter & Busch, 2006; Richardson & Swan, 2003), perceived learning (Christophel, 1990; Gorham, 1988; Richardson & Swan, 2003; Richmond et al., 1987) and in some cases cognitive learning (Messman & Jones-Corley, 2001; Witt, 2000). However, few studies have been conducted

focusing on the immediacy construct in web-based settings, the ways these cues are conveyed (through various types of communication media), and their effects on learning outcomes.

Communication media have varying capabilities for conveying messages and verbal or visual cues. Media richness theory has been used to analyze communication and media choices with the goal of reducing ambiguity of communication through selection of appropriate media type (Newberry, 2001). Daft and Lengel (1984) assert that communication media have varying capacities for conveying information and social cues that aid in resolving the ambiguity of the message and facilitating proper interpretation. They maintain that for more ambiguous tasks, understanding is more readily achieved when the communicators use “richer” media. Rich media (such as synchronous full video) are characterized as having the capacity to carry or convey the most information, while more lean media (such as asynchronous text-chat) are characterized as those with a lesser capacity for conveying information and behavioral cues.

As noted earlier, although the concept of instructor immediacy has been widely studied in face-to face educational environments with many positive effects, studies to assess immediacy behaviors in web-based settings have been few, particularly those utilizing advanced audio/video capabilities to assess how these behaviors can be conveyed and their influence on learning outcomes. Although many studies have shown that highly immediate instruction positively influences participants’ satisfaction with learning and perceived learning, significantly fewer have measured cognitive learning, and for those results have been mixed. Retention of learning over time has received very little attention, and the few studies that have measured retention used a delay of only 1-2 weeks. Review of the literature also reveals that more studies of the influence of immediacy on learning outcomes are needed

where variables are manipulated in controlled settings and content is delivered using different combinations of technology. Particularly important is the need for studies that assess cognitive learning (actual content knowledge) rather than only perceived learning based on self-report measures.

The aim of the present study was to address these needs and contribute to this emerging research base. The researcher utilized a controlled experimental design to study the immediacy construct in a web-based setting, the WIMBA Virtual Classroom. She operationalized immediacy as having two dimensions: instructor behaviors and communication media. She did not, however, accord these dimensions as having equal value, but hypothesized that verbal and nonverbal instructor behaviors (the primary dimension), would carry greater weight related to perceptions of immediacy and three learning outcomes: cognitive learning, perceived learning, and satisfaction with teaching. The secondary dimension, the medium by which the instructor interjected herself (rich media/full-motion video v. lean media/still photo of the instructor with audio) was accorded less value. Specifically then, the purpose of the study was to explore how higher- and lower-immediacy behaviors delivered by both rich and lean media would affect participants' perceptions of immediacy, cognitive learning, perceived learning, and satisfaction with teaching.

The study replicated experimental research design elements used by both Witt (2000) and Schutt (2007), the key element of each being the use of prerecorded teaching sessions where instructor immediacy was manipulated to create higher and lower conditions. For this study, in addition to manipulating instructor immediacy behaviors, two different combinations of communication media were used for delivery of the course content, resulting in four conditions for investigation. Two treatments featured an instructor who exhibited

higher-immediacy behaviors, and two others featured the same instructor exhibiting lower levels of immediacy behaviors. Each immediacy set (higher and lower) included one session conveyed by rich media (full video of the instructor) and one conveyed by more lean media (a still photo of the instructor, accompanied by an identical audio file). All sessions included simulated interaction with six mock students via text chat throughout the session.

Participants in the study were undergraduates enrolled in two 500-seat sections of an introductory psychology course at a large urban public university in southern California, and were taught by the same instructor. One section was delivered in a traditional face-to-face manner in a high-end technology-infused classroom, while the other was a blended course that met in the same high-end classroom once per week and in a Wimba Virtual Classroom for the second weekly meeting.

Thirty-five small group sessions were run in a controlled setting, a computer lab equipped with 22 individual workstations with headsets. Each participant was seated at his or her own workstation where s/he viewed (by random assignment) one of the four teaching sessions (delivered by a guest instructor in the WIMBA Virtual Classroom) and completed the demographic, immediacy, cognitive learning, perceived learning, and satisfaction measures. Cognitive learning was measured at three points: prior to viewing the teaching session to assess prior knowledge in the content area, just after exposure to the teaching session, and more long-term (5-6 weeks after exposure to the teaching session).

SUMMARY OF RESULTS

The overall hypothesis for the study was that higher-immediacy instructor behaviors and the use of rich media (full-motion video of the instructor) would result in greater levels

of perceived immediacy, cognitive learning, perceived learning, and satisfaction with teaching. Several key patterns emerged from the analysis of data. Namely, participants exposed to higher-immediacy instructor behaviors consistently perceived higher immediacy, indicated higher levels of cognitive learning, and rated satisfaction and perceived learning higher than those exposed to lower-immediacy instructor behaviors. Most notably, participants exposed to higher-immediacy behaviors through the use of rich media (full video of the instructor) showed the most favorable outcomes among groups on all measures. Results of analyses, structured around the four overarching research questions are detailed here.

Results RQ1: Immediacy

RQ1: How do participants perceive immediacy?

Four major findings emerged from the analysis of data related to how participants perceived immediacy. First and most notably, participants exposed to higher-immediacy instructor behaviors (Groups 1 and 2) did perceive higher immediacy than those exposed to lower-immediacy behaviors (Groups 3 and 4), and participants in Group 1 (exposed to higher- immediacy behaviors delivered with rich media/full video) showed the highest levels of perceived immediacy among groups. Secondly then, these results served as confirmation that the manipulations of immediacy were, indeed, sufficiently different from one another for participants to perceive the differences.

Thirdly, mean scores for Groups 1 and 2—both exposed to higher-immediacy instructor behaviors—were significantly higher than their lower-immediacy counterparts and significantly different from one another for all three analyses (verbal and nonverbal items

analyzed separately and combined). This appears to indicate that rich or lean communication media (full video v. still photo) may have contributed to perceptions of immediacy for those participants exposed to higher-immediacy behaviors.

However, a fourth and unexpected finding was that mean scores for the two groups exposed to lower-immediacy instructor behaviors (Treatment Groups 3 and 4) were much closer to one another than their higher-immediacy counterparts. Most interestingly, Group 4, exposed to lower-immediacy behaviors with more lean media (only a still photo of the instructor) perceived slightly higher immediacy than Group 3, exposed to lower-immediacy behaviors with rich media (full video of the instructor). This finding might indicate that when the instructor exhibits lower-immediacy behaviors communication media plays a lesser role, or that viewing an instructor who exhibits lower-immediacy is actually less appealing to learners than just hearing the instructor's voice. For future studies it might prove enlightening to focus on this perplexity by providing measures specific to the elements of the media type and also to include conditions (for both higher- and lower-immediacy) where no visual of the instructor is present, for comparison. It would also be interesting to conduct a factor analysis of individual immediacy behaviors to determine which are most influential, and in what combinations they are most influential.

Results RQ2: Cognitive Learning

RQ2: How does immediacy influence cognitive learning?

Hypotheses regarding cognitive learning were generally supported. Four major findings emerged here. The first was that participants exposed to higher-immediacy instructor behaviors (Groups 1 and 2) outperformed those exposed to lower-immediacy behaviors

(Groups 3 and 4), and those in Group 1 (exposed to higher immediacy behaviors delivered with rich media/full video) showed the highest scores among groups on all measures, pretest to posttest. Secondly, even though this same pattern was seen on the delayed posttest (5-6 weeks after the initial posttest), with participants in Groups 1 and 2 outperforming Groups 3 and 4, differences between groups there were not significant at this juncture.

Third and most notable was that all groups improved significantly from pretest to posttest, then decreased significantly from posttest to delayed posttest, but remained significantly better at delayed posttest than at pretest. Furthermore, Group 1 (Hi-Vid), who performed the lowest at pretest, showed the best scores on the posttest and the delayed posttest.

And lastly, repeating the same pattern as was seen for perceived immediacy results, cognitive learning scores for participants in the lower-immediacy groups (3 and 4) were much closer than for those exposed to higher-immediacy instructor behaviors (Groups 1 and 2). Again, Group 4 participants who were exposed to lower-immediacy behaviors with more lean media (only a still photo of the instructor) scored slightly higher than Group 3 (exposed to full video of the instructor), more strongly suggesting that media plays a lesser role when the instructor is less immediate, and that exposure to full motion video of a less immediate instructor may be less appealing to learners or actually distract them from processing the content being presented. Again, further study is needed to determine the influence of different communication media on cognitive learning, including audio only delivery methods.

Although it was encouraging to find that all groups still showed significant improvement 5-6 weeks after their initial exposure to the teaching session, the decline from

the point of the initial posttest warrants further investigation, highlighting the need for additional research to uncover what can be done to enhance retention of learning over time.

Results RQ3: Perceived Learning

RQ3: How does immediacy influence perceived learning?

The hypotheses related to perceived learning were supported. The first two findings mirrored the pattern seen in the results for the first two research questions. First, there were significant differences between groups on all three perceived learning measures, with the groups exposed to higher-immediacy instructor behaviors (1 and 2) rating each measure more favorably than their lower-immediacy counterparts (3 and 4). Secondly, and consistent with their actual cognitive learning performance, Group 1 participants (Hi-Vid) indicated the highest levels of perceived learning on all measures followed by Group 2 (Hi-Stil). Interestingly, Group 4 (Lo-Stil) participants, who achieved slightly better mean scores for actual cognitive learning on the delayed posttest than Group 3 (Lo-Vid), did not show higher levels of perceived learning than their Group 3 counterparts.

Results RQ4: Satisfaction with Teaching

RQ4: How does immediacy influence satisfaction with teaching?

Repeating the same overall pattern as results for the other three research questions, Group 1 (Hi-Vid) indicated greater satisfaction on all items, followed by Group 2 (Hi-Stil). Of note here, however, is that although the mean scores for lower-immediacy groups (3 and 4) indicated less satisfaction than higher-immediacy groups (1 and 2), they were again much closer to one another than Groups 1 and 2, with Group 4 (Lo-Stil) indicating slightly higher satisfaction levels than Group 3 (Lo-Vid) on two of the four satisfaction items. As mentioned

earlier, this pattern highlights the notion that when the instructor exhibits lower-immediacy behaviors the choice of communication media is less important. Furthermore, results suggest that using rich media for instructors that exhibit lower-immediacy behaviors may not be worth the investment, and could actually result in less learner satisfaction than using more lean media. Bottom line, more research including measures to specifically address media type is needed.

STRENGTHS OF THE STUDY

The findings from this study highlight the importance of the social aspects of learning and their influence on learning outcomes, and contribute to the research base in several important ways. Results of the study confirm findings from research in face-to face settings, indicating that higher instructor immediacy behaviors contribute to increased perceptions of learning and satisfaction with teaching in web-based settings as well.

In the more murky cognitive learning domain, where results of earlier studies have been mixed or inconclusive, results from this study showed that participants exposed to higher-immediacy instructor behaviors did perform significantly better when tested just after exposure to the teaching session, but indicated that these differences were much less pronounced some 5-6 weeks later. Although this is the only known immediacy study to have measured retention of learning gains more long-term (5-6 weeks after exposure to the teaching session), results were consistent with other studies that included measures for retention (1-2 weeks out), indicating no significant differences among groups and a significant decline in retention of learning gains over time. This finding underscores the need

for continued research to uncover what improvements can be made in instruction and delivery methods to enhance retention.

Lastly, replicating key elements from the studies of Witt (2000) and Schutt (2007) resulted in a strong research design which provides a solid methodology that can be used in future research to explore outcomes related to immediacy and the use of different communication media with other populations and topic areas.

LIMITATIONS OF THE STUDY AND RECOMMENDATIONS FOR FURTHER RESEARCH

It is important to mention the limitations of the study, for those are areas where future research could make an important contribution. There are six areas that stand out for consideration. The first deals with the short duration of the teaching sessions, 15 minutes in length. Using a study session that is longer in length (thus providing more information in the content area) would allow for a wider breadth of knowledge to be assessed, adding to the internal validity of the cognitive learning instrument.

Secondly, the study used only a “one shot” single occasion exposure of the teaching session. Evaluating the use of multiple sessions of varying lengths might yield useful information.

Thirdly, given that the sessions were prerecorded, participants for this study were unable to interact with the instructor or other students. Conducting a similar study with the instructor and participants in real-time would be a logical next step to see if similar results are seen when participants can actually interact with the instructor and their peers.

The fourth area is that only two combinations of communications media were studied for content delivery. Other combinations of communication media could also be included to

assess the contribution of text-based content such as PowerPoint slides, or audio only Podcasts in combination with other media and varied levels of instructor immediacy. As mentioned earlier, measures could be included in future studies to more directly assess different media as a factor separate from immediacy, whereas for this study immediacy was conceptualized as including both instructor behaviors and communication media. Since the influence of media seems less pronounced when lower-immediacy behaviors are employed, it would be helpful to know more about the specific effects of the media. Replicating the study with the addition of two treatments where the instructor is face-to face with the mock participants (for a total of six treatments), might also be illuminating.

The fifth area relates to the use of only one content area from one academic discipline. Studies in other disciplines covering different content may yield different results.

The sixth area relates to the use of only one instructor for content delivery and the demographic characteristics (age, gender, or other variables) of the instructor and the learners. There are issues related to demography and culture that could be better understood by studying immediacy and learning outcomes using a variety of instructors with different populations of learners to explore similarities and differences. Given that behaviors that are deemed to be more or less immediate vary from one culture to another, cross-cultural studies could provide useful information, especially in light of increasing globalization and more far-reaching distance education offerings.

CONCLUSION

As technology advances, the affordances that support teaching and learning change as well. Connecting individuals through technology can create unique opportunities for social

interaction and collaboration. Due to the social nature of learning it is important to know how different levels of instructor immediacy and combinations of communication media influence learning outcomes. Although many questions remain to be answered in regard to immediacy and learning outcomes, there is a good foundation in place to branch out from.

The findings from this study help to inform researchers and practitioners that are involved in designing and facilitating learning in web-based settings. Clearly, research over several decades indicates that higher-immediacy behaviors contribute to greater satisfaction and perceived learning. Importantly, the results of this study confirmed that instructor immediacy behaviors that have been shown to reduce psychological distance in face-to-face settings also had a positive influence on learning outcomes in a web-based setting.

There are other important implications that should be of particular interest to instructors. Not only is it desirable to maximize learner satisfaction and perceived learning for the benefit of the learner, but it is also important to note that higher-immediacy positively affects learner affect toward the instructor, which in turn affects teaching evaluations that are an important component of the promotion, tenure and review process.

Although results pertaining to cognitive learning did indicate that learners exposed to higher immediacy instructor behaviors outperformed those exposed to lower-immediacy behaviors, the most intriguing question that remains is why the initial difference lessened over time. This area of research for web-based settings has only begun to be explored.

Notably, the results of the study revealed that when the instructor exhibited higher-immediacy behaviors the type of communication media used to interject the instructor into the web-based setting also made a difference. Less clear is why the type of communication media was less influential when the instructor exhibited lower-immediacy behaviors,

highlighting the importance of additional follow-up research in this area. Implications for developers and instructors also include the importance of providing flexibility in media choices that can be customized to suit the type of content to be conveyed and the characteristics of the instructor. For those instructors who are more naturally immediate, using full video would seem to be a good option. However, for those instructors who are less naturally inclined, it may not be prudent to use full video until they have had the opportunity to receive immediacy training and practice incorporating these behaviors. Most certainly then is the importance of providing immediacy training and opportunities to see immediacy behaviors expertly modeled. Providing support for instructors in the use of technology will also aid them in adopting good practices and fine-tuning new skills.

Another important implication relates to the trend toward miniaturization and the use of mobile devices for steadily increasing applications. The smaller the monitor, the more difficult it becomes to relay nonverbal/visual cues. As a result, developing ways to convey these cues by other means rises in importance. No matter how immediate the instructor is in his/her personal and professional behaviors, immediacy must also be conveyed in other ways that support learning. Immediacy needs to be conceptualized in light of anytime, anywhere learning, and conveyed not just through what happens during class time, week to week, but also through what happens in between. Learning support that happens through stand-alone assets such as course websites, as well as other technologies that help to provide opportunities for communication and collaboration needs to convey immediacy as well.

One last consideration that arises in relation to truly mobile (anytime, anywhere) learning is the loss of control over the environment. Learners are increasingly in control of where and when they choose to engage in a learning activity. Educators and instructional

designers need to be aware of the shift of control to the learners and realize how their roles are shifting as well.

In closing, the ultimate goal of teaching is, of course, that optimal learning takes place and that students feel positively about the learning experience. The primary responsibility for bringing about these outcomes lies with the instructor. It is under his/her control to foster interaction and cultivate social inclusion, whether web-based or face-to face, and to determine how best to convey information. By knowing what behaviors contribute to increased affect and knowledge construction, instructors can seek to modify their behavior accordingly. Additionally, they can make more prudent use of communications resources by understanding which combinations of media best transmit different types of information and important social cues. New opportunities arise daily that extend our reach and expand our options as educators and learners. The road ahead will have bumps, and potholes, and learning curves, but how exciting it is to have so many open doors.

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APPENDIX A

STRATEGIES FOR CULTURING SOCIAL PRESENCE

IN TECHNOLOGY-MEDIATED LEARNING

ENVIRONMENTS

**Strategies for Culturing Social Presence in Technology-Mediated Learning Environments
(Aragon, 2003)**

Strategies for Course Designers

| Strategy | Details |
|---|--|
| Develop a Welcome Message | Include a welcome message from the instructor for the purpose of introducing the instructor, welcoming the participants and providing a brief overview of the course (ex. a brief streamed video, or a written welcome statement from the instructor with his/her picture, with or without audio). |
| Include Student Profiles | Post participant profiles including a picture, contact information and a brief bio. The bio might include the participants' current position, prior experience, interests associated with the field of study, and personal information of their choosing. |
| Incorporate Audio | Include audio, where the instructor broadcasts to the participants or where instructor and participants broadcast back and forth. An alternative is to provide a toll-free number to allow multiple participants to call in and interact as a group. |
| Limit Class Size | Class size significantly influences social presence, with smaller classes being significantly better with respect to student achievement, educational processes and participant attitude (Glass & Smith, 1979, as cited in Aragon, 2003). A student-instructor ratio of 30 (or less):1 is suggested (Rovai, 2001). With more than 30, it can be difficult to achieve social equality and the amount of social presence that can be achieved may be diminished. |
| Structure Collaborative Learning Activities | Collaborative activities can include group work, discussion groups, brainstorming, group assignments and projects, and computer-mediated group debates, utilizing electronic discussion boards or chat programs. |

Strategies for Instructors

| Strategy | Details |
|--|--|
| Contribute to Discussion Boards | Discussion boards help to replace verbal interactions that occur in face-to-face environments. Active involvement aids in increasing perceptions of instructor immediacy and intimacy, helping to establish a social connection with course participants. |
| Promptly Answer E-Mail | Timely responses from instructors can also increase immediacy and are valuable to the establishment of social presence in web-based settings (Newberry, 2001). Prompt replies, within 24 hours, help the instructor to convey value and interest. |
| Provide Frequent Feedback | Feedback related to assignments, participation, and course progress is a critical element in VEEs. Personalizing to the participant(s) helps to cultivate social presence by showing that accomplishments are valued. |
| Strike Up a Conversation | Self-disclosure promotes social attraction and bonding between individuals and humor is the invitation to start a conversation (Gorham & Christophel, 1990). Interaction facilitated by synchronous or asynchronous chat sessions, can provide a forum for participants to share stories and experiences, and get to know each other better. |
| Use Humor | Humor, tastefully used, can put people at ease, reduce social distance and convey goodwill within the educational environment. |
| Use Emoticons | Emoticons, facial expressions created through combinations of punctuation marks on the keyboard or facial expression clip art images, can convey nonverbal cues to aid in accurate interpretation of text-based messages. |
| Use Vocatives | Addressing participants by name helps in cultivating social presence. Participants' names can be more challenging to learn in web-based settings, due to missing verbal and visual input that aid in association. The use of student profiles can be a useful tool toward this end. |
| Allow Participants Options for Addressing the Instructor | Formal titles establish a hierarchy within social situations, potentially creating distance between instructor and participants. Addressing the instructor on a more personal basis can be helpful in reducing distance. |

Strategies for Participants

| Strategy | Details |
|--|---|
| Contribute to Discussion Boards | Participating on a regular basis helps participants get to know each other and the instructor. Passivity, when it comes to discussion boards, can lead to instructional and social isolation. |
| Promptly Answer E-Mail | Responding within 24-hours to instructors and other participants contributes to immediacy and conveyance of value. Instructors as well as participants can feel their messages aren't valued when responses are delayed. |
| Strike Up a Conversation | Participants can aid in increasing social presence by initiating interactions in synchronous or asynchronous forums. Sharing ideas, seeking assistance and offering assistance to others cultivates intimacy. |
| Share Personal Stories and Experiences | Although experiences vary among and between participants and instructor, it is important for participants to feel comfortable sharing personal stories and experiences. This helps to build social presence and intimacy and contributes to the development of community. |
| Use Humor | The same guidelines apply to participants as to instructors. Humor can do much to reduce social distance, but should be in good taste, inoffensive in nature. |
| Use Emoticons | Participants can provide nonverbal cues by using emoticons to facilitate accurate interpretation of messages by the instructor and other participants. |
| Use Appropriate Titles | Participants should address the instructor based on guidelines provided by the instructor. |

APPENDIX B

VERBAL AND NONVERBAL IMMEDIACY

BEHAVIORS (ORIGINAL SCALES)

**Verbal and Nonverbal Immediacy Behaviors
Original Scales**

Gorham's (1988) 20 Verbal Immediacy Behaviors

1. Uses personal examples or talks about experiences she/he has had outside of class.
2. Asks questions or encourages students to talk.
3. Gets into discussions based on something a student brings up even when this doesn't seem to be part of her/his lecture plan.
4. Uses humor in class.
5. Addresses students by name.
6. Addresses me by name.
7. Gets into conversations with individual students before, after or outside of class.
8. Has initiated conversations with me before, after, or outside of class.
9. Refers to class as "my" call or what "I" am doing.*
10. Refers to class as "our" class or what "we" are doing.
11. Provides feedback on individual student work through comments on papers, oral discussions, etc.
12. Calls on students to answer questions even if they have not indicated that they want to talk.*
13. Asks how students feel about an assignment, due date, or discussion topic.
14. Invites students to telephone or meet with him/her outside of class if they have questions or want to discuss something.
15. Asks questions that have specific, correct answers.*
16. Asks questions that solicit viewpoints or opinions.
17. Praises students' work, actions, or comments.
18. Criticizes or points out faults in students' work, actions, or comments.*
19. Will have discussions about things unrelated to class with individual students or with the class.
20. Is addressed by his/her name by the students.

*Presumed to be nonimmediate. Items reverse coded for analysis.

Richmond et al.'s, (1987) 14 Nonverbal Immediacy Behaviors

1. Sits behind a desk while teaching.*
2. Gestures while talking to class.
3. Uses monotone/dull voice while talking to class.*
4. Looks at the class while talking.
5. Smiles at the class as a whole, not just individual students.
6. Has a very tense body position while talking to the class.*
7. Touches students in the class.
8. Moves around the classroom while teaching.
9. Sits on a desk or chair while teaching.*
10. Looks at the board or notes while talking to the class.*
11. Stands behind podium or desk while teaching.*
12. Has a very relaxed body posture while talking to the class.
13. Smiles at individual students in the class.
14. Uses a variety of vocal expressions while talking to the class.

*Presumed to be nonimmediate. Items reverse coded for analysis.

APPENDIX C

IMMEDIACY SCALES AS MODIFIED BY SCHUTT

**Immediacy Scales as Modified by Schutt
(with Gorham's original item 9 added back in; now listed as item 7)**

For each of the following statements please select the response which best represents your experience with the teaching session you watched. The instructor in this session...

0=never 1 2 3 4=Often

Gorham's (1988) Verbal Immediacy Behaviors (revised)

1. Uses personal examples or talks about experiences she/he has had outside of class.
2. Asks questions or encourages students to talk.
3. Gets into discussions based on something a student brings up even when this doesn't seem to be part of her/his lecture plan.
4. Uses humor in class.
5. Addresses students by name.
6. Invites students to have conversations before, after or outside of class.
7. Refers to class as "my" class or what "I" am doing.*
8. Refers to class as "our" class or what "we" are doing.
9. Provides feedback on student work, comments, discussions, etc.
10. Calls on students to answer questions even if they have not indicated that they want to talk.*
11. Asks how students feel about an assignment, due date, or discussion topic.
12. Invites students to telephone or meet with him/her outside of class if they have questions or want to discuss something.
13. Asks questions that solicit viewpoints or opinions.
14. Praises students' work, actions, or comments.
15. Criticizes or points out faults in students' work, actions, or comments.*
16. Has discussions about things unrelated to class with students
17. Is addressed by his/her name by the students.

*Presumed to be nonimmediate. Items reverse coded for analysis.

Richmond et al.'s, (1987) Nonverbal Immediacy Behaviors (revised)

1. Sits motionless/still while teaching.*
2. Gestures while talking to class.
3. Uses monotone/dull voice while talking to class.*
4. Looks at the class while talking.
5. Smiles at the class as a whole, not just individual students.
6. Has a very tense body position while talking to the class.*
7. Moves upper body while teaching.
8. Appears to read notes while talking to the class.*
9. Has a very relaxed body position while talking to the class.
10. Smiles at individual students' comments in the class.
11. Uses a variety of vocal expressions while talking to the class.

*Presumed to be nonimmediate. Items reverse coded for analysis.

APPENDIX D
SCREENSHOTS WITH LINKS TO
TEACHING SESSIONS

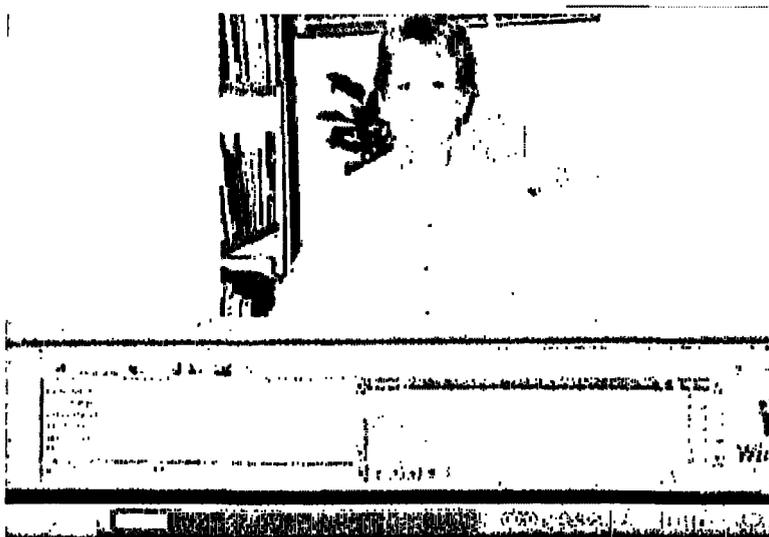
Screenshots with Links to Teaching Sessions

Session for Group 1 - Higher-Immediacy with Full Video

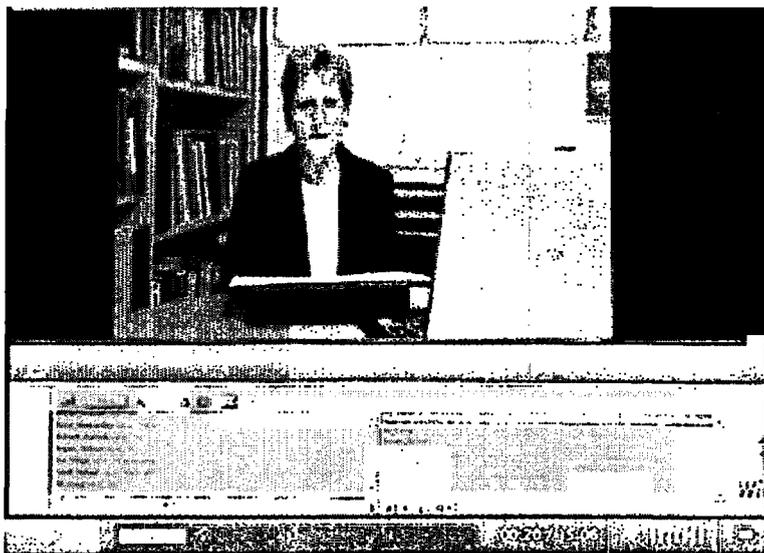


<http://www.veoh.com/search/videos/q/Teaching+and+LEarning+Online#watch%3Dv16148325KWhzSNP6>

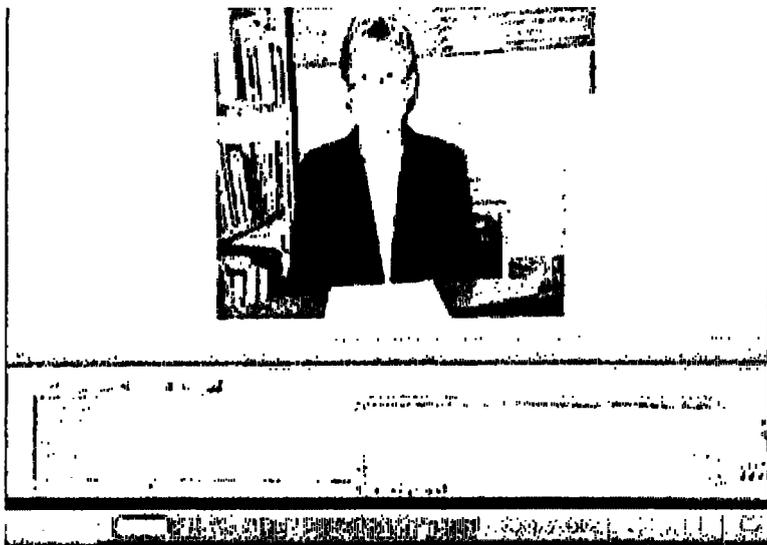
Session for Group 2 - Higher-Immediacy with Still Photo



<http://www.veoh.com/search/videos/q/Teaching+and+LEarning+Online#watch%3Dv161484715T2mXBXR>

Session for Group 3 - Lower-Immediacy with Full Video

<http://www.veoh.com/search/videos/q/Teaching+and+LEarning+Online#watch%3Dv16148508hmx34AWY>

Session for Group 4 - Lower-Immediacy with Still Photo

<http://www.veoh.com/search/videos/q/Teaching+and+LEarning+Online#watch%3Dv16148536eeMXycan>

APPENDIX E

INVENTORY OF DEMOGRAPHIC MEASURES

Inventory of Demographic Measures

1. Your age:
2. Your gender:
 - Female
 - Male
3. Your race/ethnicity:
 - African American/Black (non-Hispanic)
 - Native American or Alaskan Native
 - Caucasian/White/European, (non-Hispanic)
 - Asian/Southeast Asian
 - Pacific Islander
 - Filipino American
 - Latino/Hispanic/Spanish Origin
 - Mexican-American/Chicano
 - Middle-Eastern
 - Mixed/parents are from two (or more) different groups
 - Other

Measures for experience in online learning settings

4. Have you taken one or more courses in the past where part or all of the instruction was delivered online?
 - Yes
 - No
5. Are you currently taking one or more courses where part or all of the instruction is delivered online?
 - Yes
 - No
6. How many total courses (including ones you are enrolled in now) have you taken where part or all of the instruction was delivered online? _____

APPENDIX F

MEASURES OF COGNITIVE LEARNING

Measures for Cognitive Learning

The following questions measure your knowledge of a topic in psychology called cognitive dissonance theory (correct responses are noted in **bold text**).

1. Cognitive dissonance is a theory of human:
 - Learning
 - Teaching
 - Remembering
 - **Motivation**

2. Cognitive dissonance theory was developed by:
 - Dr. Larry Festust
 - **Dr. Leon Festinger**
 - Dr. Leo F. Inger
 - Dr. Leonard D. Unger

3. What are cognitions (check all that apply)?
 - **Thoughts, beliefs, opinions**
 - **Behaviors**
 - **Feelings, emotions**
 - **Facts, knowledge**

4. What does dissonance among cognitions mean?
 - A person doesn't know what to believe.
 - A person makes a poor decision.
 - A person thinks things are true that are actually false.
 - **A person has thoughts or feelings that are not in harmony.**

5. The greatest dissonance is created when the cognitions in conflict:
 - Are related to self-esteem
 - **Are equally attractive**
 - Have financial implications
 - Relate to childhood issues

6. Indicate how someone might behave to reduce dissonance among cognitions (check all that apply):
 - Go to the gym to relieve stress.
 - **Add new consonant beliefs to out-weigh the dissonant beliefs.**
 - **Reduce the importance of one of the dissonant cognitions.**
 - **Change (ignore or eliminate) one of the cognitions involved in the dissonant relationship.**

7. Suzanne likes smoking cigarettes (cognition one), but being healthy is also important to her (cognition two). These two cognitions are dissonant, because smoking is unhealthy. What could Suzanne do to eliminate the dissonance among these two cognitions (check all that apply)?

- **Suzanne can quit smoking.**
- **Suzanne can convince herself that smoking helps keep her weight down, and that being overweight would be a greater threat to her health so it's best not to quit smoking.**
- **Suzanne can drink more water to flush out the toxins.**
- **Suzanne can decide that being healthy is not so important after all.**

APPENDIX G

MEASURES FOR SATISFACTION AND

PERCEIVED LEARNING

Measures for Satisfaction and Perceived Learning

Satisfaction Items

1. How valuable (useful or important to know) was what you learned about cognitive dissonance theory?
 - Extremely valuable
 - Quite valuable
 - Somewhat valuable
 - Not valuable at all

2. How well did the teaching session hold your attention?
 - Extremely well; it held my attention the entire time.
 - Very well; it held my attention most of the time.
 - Relatively well; it held my attention for some of the time.
 - Not too well; it held my attention for a very short time.
 - Not well at all; it didn't really hold my attention.

3. Would you recommend this session to other students?
 - I definitely would.
 - I probably would.
 - I probably would not.
 - I definitely would not.

4. How interested are you in learning more about cognitive dissonance theory?
 - Extremely interested
 - Very interested
 - Somewhat interested
 - Limitedly interested
 - Not interested at all

Perceived Learning Items

1. How much do you think you learned about the topic of cognitive dissonance theory?
 - I learned a lot; I definitely could explain the basic principles of cognitive dissonance theory to others.
 - I learned quite a bit; I could explain a lot about cognitive dissonance theory to others.
 - I learned a few things; I could explain a few ideas about cognitive dissonance theory to others.
 - I didn't learn much at all; I really couldn't explain the topic to others.

2. How well do you feel you understand cognitive dissonance theory?

- Extremely well
- Very well
- Somewhat well
- Limitedly well
- Not well at all

3. In your opinion, how well does cognitive dissonance theory apply to or seem associated with real situations you (or others you know) have experienced?

- Extremely well
- Very well
- Somewhat well
- Limitedly well
- Not well at all

Open-ended Item

1. What is one word or phrase that you would use to describe the teaching session to a friend? _____

1. What is one word or phrase that you would use to describe the teaching session to a friend? _____